

Declassified E.O. 12356 Section 3.3/NND No. 785015

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PREVENTION OF DISEASE
OCT. 1942; APR. - JUNE 1944

28 pp

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HEADQUARTERS
675TH REGIMENT
ALLIED CONTROL COMMISSION
(PROVISIONAL)
APO 394

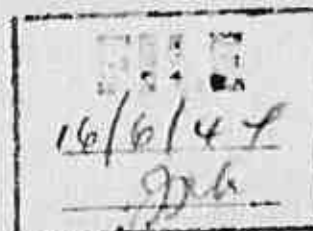


File: 720.22

15 June 1944

SUBJECT: Purification of Water Supply.

TO : All Unit Commanders, this Regiment.



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1. Section IV, Circular #77, Headquarters NATCUSA, is quoted for information of all concerned.

"IV - PURIFICATION OF WATER SUPPLY

1. Evidence has been received that troops are not disinfecting water obtained from unauthorized sources and that some units are not exercising proper precautions to ensure a safe water supply.

2. ALL WATER in this theater will be considered non-potable and WILL NOT BE CONSUMED BY TROOPS UNLESS DISINFECTED by use of chlorine or heat in accordance with standard U. S. Army procedures. Exception may be made if the supply is obtained from deep wells, properly sealed, and it has been established by a Medical Laboratory, Army or Medical General Laboratory that there is no possibility of contamination with harmful bacteria of the source of supply or distribution system.

3. In any event, frequent tests will be made to determine the potability of water being consumed by any unit.

4. Water treated with chlorine will be considered potable if after a contact period of thirty (30) minutes a residual chlorine content of 0.4 parts per million of chlorine is found as determined by the standard of U. S. Army orthotolidine test.

5. Bacteriological cultures will be made periodically on all water supplies being used by large numbers of troops as a check on the potability of water being consumed.

6. Troops will always endeavor to secure water from authorized sources but if unable to do so and they are obliged to consume water from other sources, it will be treated by the individual concerned by adding the appropriate number of halazone tablets to the water at the proper interval prior to consumption.

7. Commanding officers of all grades will take steps to enforce the above instructions and to see that the necessary instruction, training and

Ltr. Purification of Water Supply, dtd 15 June 44, (Cont'd).

inspections are given and adequate supplies are obtained to insure a safe water supply for all troops in the command."

By order of Colonel PARKIN:

Morris K. Goldstein
MORRIS K. GOLDSTEIN
1st Lt., Infantry
Adjutant

785015

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HEADQUARTERS
2675TH REGIMENT
ALLIED CONTROL COMMISSION
(PROVISIONAL)
APO 394



12 May 1944

CIRCULAR)
NUMBER 5)



MALARIA CONTROL

1. In accordance with Peninsular Base Section directives, (See PBS Circulars #33 of 2 March 1944 and #53 of 30 April 1944), personnel of the 2675th Regiment will be governed by the following regulations as regards atabrine suppressive treatment beginning 1 May 1944:

a. Personnel who will not take atabrine: Those permanently located in an area bounded on the south by the Gulf of Naples and on the north by a line from Pozzuoli (10.0-46.7) to Trentola (15.0-64.0) to Aversa (17.5-64.0) to Frattamaggiore (23.5-60.0) and to the Gulf of Naples through Portici (23.4-46.0).

b. Personnel who will take atabrine:

(1) All personnel outside the zone described in a, above.

(2) Personnel, even though living in the zone described above, who have duties which routinely take them out of the area during the hours of darkness. This applies to many officers and men at Headquarters, Allied Control Commission who travel out of the Naples Area.

c. Method of Administration:

(1) Dosage. One tablet* (0.1 gram) daily, preferably at the evening meal, with a cupful of liquid.

(2) Supervision. The administration will be supervised by an officer or NCO when possible who will personally see that the drug is taken "on the spot".

(3) Sensitivity. Individuals found to be truly sensitive to atabrine may take in lieu thereof (0.6 gram) 10 grains quinine daily. This will be done upon written consent of the unit medical officer, who will critically estimate individual cases after a trial period on divided doses.

2. The following individual protective measures will be carried out by all personnel:

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U S R E S T R I C T E D Equals British R E S T R I C T E D

Cir 15 (12 May 44)

Hq. 2675th Regt AGC, (Cont'd)

a. Mosquito Nets. Sleeper under bednets will be required by all personnel. Nets are now available for all personnel. Mosquito nets will be properly adjusted and regularly inspected for tears.

b. Repellent will be applied to all exposed portions of the body by all personnel at sundown and will be repeated at 3-hour intervals until bedtime. Repellent containing Ixalalone (See label on bottle) should be applied at one-hour intervals.

c. Leggins will be worn by all sentries on duty at night and by all personnel outside of Metropolitan Area, Naples, whose duties require them to be outside of a screened tent or building after nightfall.

d. Sleeves will be rolled down and buttoned at night.

e. Spray killing of adult mosquitoes will be done in all sleeping quarters at dusk and before bedtime. Except in towns and villages, all civilian habitations, farmhouses, and stables within a one mile radius of each unit bivouac will be sprayed weekly with insecticide to eliminate infected adult mosquitoes.

(*Note: During the first week, one-half tablet (0.05 gram) will be taken daily.)

By order of Colonel PAUGH:

R. T. UNLER
Lt Col, AGC
Executive Officer

OFFICIAL:

F. H. VERMUTH
F. H. VERMUTH
WOJG, USA
Asst Adjutant

(pr)

DISTRIBUTION: 000

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JLIED CONTROL COMMISSION
JPC 324



3 APR 1944

SUBJECT: Malaria

TO: All Personnel.

The following is extracted and republished from 94th Sub Area Routine Orders, dated 28 April 1944 for the information and guidance of all personnel of this headquarters.

1. Malaria is one of the most important health problems in the Mediterranean theater of war. During the 1943 Malaria season the disease seriously reduced the efficiency of all units that failed to take adequate anti-malaria precautions. Owing to the slackness on the part of officers and men alike, the Sicilian Campaign was gravely handicapped by a high rate of malaria casualties. It is estimated that this rate rose to ten times the figure that would have occurred had orders been obeyed.

2. The whole of the mainland of Italy may be regarded as malarious in some degree. This Sub Area is divided at present into malarious and one highly malarious area. The extent of the highly malarious area is set out below:

3. Boundaries of highly malarious area in 94 Sub Area:

NORTH, Road SALerno, ENOLI (N) CONUNSI (N)
E.S., Easting grid line 6.00
SOUTH, Northing grid line N.00
West, Easting grid line N.70

4. Commanding Officers are reminded that they are responsible for the health of their men and that they will incur a grave responsibility should they neglect to enforce orders on the subject of malaria.

5. Basic Personal Anti-malarial Precautions:

The following precautions will be taken by all ranks throughout the Sub Area not 7 May 44:

- (a) All ranks will sleep under mosquito, or sand fly nets.
- (b) All ranks will wear, between sunset and sunrise, long trousers and shirts fastened at the wrists and neck.
- (c) Guards, and others on night duty, will apply anti-mosquito repellent to exposed portions of the body every four hours between sunset and sunrise.

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2. The whole of the mainland of Italy may be regarded as malarious in some degree. This Sub Area is divided at present into malarious and one highly malarious area. The extent of the highly malarious area is set out below:

3. Boundaries of Highly Malarious Area in 24 Sub Area:

NORTH, Road S. LENO, EOLI (M) COMITATO (M)
E.S.T., Easting grid line 5.00
SOUTH, Northing grid line 11.00
West, Easting grid line 11.70

4. Commanding Officers are reminded that they are responsible for the health of their men and that they will incur a grave responsibility should they neglect to enforce orders on the subject of malaria.

5. Basic Personal Anti-Malarial Precautions:

The following precautions will be taken by all ranks throughout the Sub Area ref 7 Map 44:

- (a) All ranks will sleep under mosquito, or sand fly nets.
- (b) All ranks will wear, between sunset and sunrise, long trousers and shirts fastened at the wrists and neck.
- (c) Guards, and others on night duty, will apply anti-mosquito repellent to exposed portions of the body every four hours between sunset and sunrise.

6. Extra Personal Anti-Malaria Precautions:

The following additional precautions in Highly malarious area in the Sub Area will be taken by all ranks ref 7 Map 44:

- (a) All ranks will take one tablet of Malaricine daily.
- (b) All ranks will wear, between sunset and sunrise, boots and anklets or puttees.
- (c) All local habitations will be out of bounds between sunset and sunrise.

RESTRICTED**7. Anti-malaria Precautions in Tents and Buildings**

- (a) All tents and occupied buildings will be sprayed with anti-mosquito spray once daily.
- (b) In highly malarious areas, spraying of sleeping accommodation will take place twice daily, once in the morning and once in the evening, an hour before sunset.

8. Unit Orders:

GSC of all units will issue orders for carrying out the above precautions and will particularly ensure that the following items are properly covered in them:

- (a) Nets. That regular and frequent inspections are carried out to see that nets are properly used and kept in good repair.
- (b) Dress after dark. That the orders given are carried out by all ranks and no relaxation is permitted for any reason.
- (c) Repellent lotion or ointment. That application of repellents is carried out under the supervision of an officer or NCO.
- (d) Mepantrin. That a parade under an officer, or NCO, is held for taking mepantrin.
- (e) Spraying of buildings and tents. That regular and frequent inspections are made to see that this is carried out.
- (f) Officers. That anti-malaria orders are quite clearly made applicable to all officers, as well as other ranks.

9. Punishment:

GSC will treat disobedience of anti-malaria orders as a serious offence and will not hesitate to take disciplinary action against officers and other ranks in respect of any such disobedience.

BY COMMAND of Lieut General MASON L. ORRILLANE:

E. J. GRIGGS.
CWO, USA.
Asst Adjutant

OFFICIAL:

E. J. Griggs

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- (a) Hats. That regular and frequent inspections are carried out to see that hats are properly used and kept in good repair.
- (b) Dress after dark. The orders given are carried out by all ranks and no relaxation is permitted for any reason.
- (c) Repellent lotion or ointment. That application of repellants is carried out under the supervision of an officer or NCO.
- (d) Messing. The a parade under an officer, or NCO, is held for taking messerine.
- (e) Spraying of buildings and tents. That regular and frequent inspections are made to see that this is carried out.
- (f) Officers. That anti-malaria orders are quite clearly made applicable to all officers, as well as other ranks.

9. Punishment:

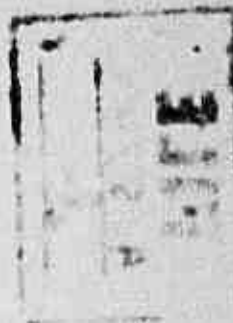
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By Command of Lieut General MASON MCKILLANE:

E. J. CHICCA.
CWO, US.
Asst Adjutant

OFFICIAL:
E. J. Chirca
E. J. CHICCA
CWO, US.
Asst Adjutant

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HEADQUARTERS
2675TH REGIMENT
ALLIED CONTROL COMMISSION
(PROVISIONAL)
APO 394



File: 720.

24 April 1944.

SUBJECT: Malaria Control Report.

TO : All Company Commanders, this Regiment.

1. It is desired that all Company Commanders study and disseminate throughout their commands the information contained in letter, file: AG 710 BPMED, subject: "Malaria Control in the Army", Hq PBS, dated 18 April 1944.

2. A report, to reach this headquarters by 8 May 1944, will include the following certificate:

"I have read and understand the contents of letter, file: AG 710 BPMED, subject: "Malaria Control in the Army", Hq PBS, dated 18 April 1944, and have disseminated the necessary information among the members of my command."

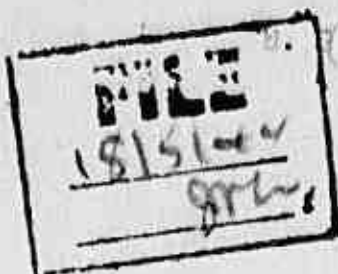
By order of Colonel PARKIN:

Morris K. Goldstein
MORRIS K. GOLDSTEIN
1st Lt., Infantry
Adjutant

720 - Prevention of Disease

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HEADQUARTERS
PENINSULAR BASE SECTION
APO 782

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ADJ-REAR

U-4812

Seen: MR. CHOCIN EJC
LT. DARBY R12W

AS TLO RYMED

18 April 1944

Subject: Malaria Control in the Army.

To : See Distribution.



1. The attached letter has been reproduced for the information and guidance of all officers concerned. Its contents will be carefully read by each officer in the Peninsular Base Section.

2. A report will be rendered by each unit commander not later than the 10th of May, stating that each officer in his command has read and clearly understands the contents of this article.

By command of Major General WILSON:

D. W. MASTIN

D. W. MASTIN
Major, A.G.D.
Asst. Adj. Gen.1 Incl:
Malaria Control in the ArmyDISTRIBUTION:
"A" and "B"

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HQ. CINDT. MAIN

ADJ-MAIN

720 - Distribution of Malaria

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MALARIA CONTROL IN THE ARMY

A SYNOPSIS FOR LINE OFFICERS

by

Paul F. Russell
Colonel, M.C.I. INTRODUCTION.

Three-fourths of the estimated yearly world total of 300,000,000 civilian cases of malaria occur where Allied forces are today maintaining supply lines or are actively fighting the Axis. For example, such regions as the Caribbean, Amazon, West Africa, Corsica, Fentine Marshes, Balkans, Mesopotamia, India, Burma, South China, New Guinea, Bismarck and Solomon Islands are notoriously malarious. Thus for most theaters, including WATGUSA, malaria is certainly the greatest disease hazard now facing the Army and malaria control has become a fundamentally important military factor.

Upon every officer and enlisted man in the Army there have been placed certain responsibilities as regards malaria prophylaxis but it must be emphasized that the prevention and control of malaria is definitely a command function. Army regulations clearly make it the duty of commanding officers of units, great or small, to provide the maximal protection against malaria which circumstances will permit. These notes have been prepared to assist line officers in discharging their malaria control responsibilities.

Knowledge is a source of power. Officers can exert essential command functions to better advantage in the prevention and control of malaria if they know the answers to certain basic questions about the disease. The following four seem most pertinent:

1. What is the military importance of malaria?
2. What facts about malaria as a disease bear directly on the military problem?
3. What is the Army's official policy regarding malaria prevention and control?
4. What practical methods are available for controlling military malaria?

This synopsis deals with these four aspects of malaria in the Army.

II. MILITARY IMPORTANCE OF MALARIA.

Before presenting data to show how in the present war malaria mosquitoes have put several divisions out of combat into hospitals and rehabilitation camps, it is of interest to recall that military victories by malaria have been recorded through all history.

On the very roads, fields, and marshes where today the Allies face the Germans, malaria shattered the health of Caesar's army in the Roman Civil Wars. Julius Caesar himself, as well as Fabius Maximus, had the characteristic chills

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and fever. Again, when the Gauls under Brennus were besieging Rome malaria so scourged their forces that they retreated in disorder. Later, in the 12th century, malaria is said to have completely disorganized the army of Frederick Barbarossa who was bent on capturing Rome. This defeat of his enemies by malaria was commemorated in verse by Godfrey of Viterbo who wrote:

"Those from whom Rome was unable to defend herself,
Were dispersed by the air
At whose breath the German youth fell."

In those days malaria was thought to be caused by bad air, mephitic vapours from the marshes. The Italian words mal aria, meaning bad air, were finally used not only for the cause but for the disease itself.

Many stories of military disasters due largely or in part to malaria during the Middle Ages and on into the 20th century could be cited. Perhaps the most interesting example preceding the present war was the Macedonian episode in World War I. In Greek Macedonia during 1916-1918 three armies were shattered by malaria. British and French faced German and Allied forces for three years but the Anopheles mosquito successfully immobilized them all. At one time only 20,000 of the 120,000 French troops were active. The rest were lying around in hospitals and quarters with fever. When their general was directed by the High Command to move forward, he replied, "Regret that my army is in hospital with malaria." The British, with an average strength of 124,000 had 162,500 hospital admissions for malaria. They sent home 75,000 chronic cases in 1918 and during that year lost an estimated 2,000,000 man-days service because of this one disease. The Germans and their allies were in a similar plight. Had any one of these armies been able to control malaria it could have dominated the Balkans, perhaps greatly modifying the course of the war.

In the present war malaria has again demonstrated that where poorly controlled it can be a greater source of casualties than the enemy. There is nothing in the Southwest Pacific, in Burma, or in Corsica, for example, more dangerous to the success of the military efforts than malaria. Not many statistics are permissible at this time but the following will emphasize the military menace of this disease.

During a six-month period, from October 1942 to April 1943, although difficult fighting was in progress, only 2.75 percent of all hospital admissions in the Southwest Pacific Theater were due to battle casualties but 30 percent were from malaria. While active combat was in process in the Buna-Gona area of New Guinea, and all casualties were taken out by air, approximately five cases of malaria were evacuated for each battle casualty. In 1943, in the South and Southwest Pacific Theaters, several allied divisions were incapacitated for periods of 7 months or longer because of malaria. Some divisions had to be reconstructed not because of Japanese action but because of malaria.

One division after seven months in a non-malarious rehabilitation area, where the best known malaria therapy was intensively applied, was still having relapsing cases of malaria in numbers sufficient to disrupt training. This division had been exposed to intense malaria on Guadalcanal for about six months with only minimal protection from malaria mosquitoes. Suppressive atabrine had been used but how faithfully one can not say.

Under such conditions of inadequately controlled malaria it is necessary

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to count on two divisions in rear areas for one in the advance zone. One of the rear divisions will be pretty much in hospital with chills and fever while the other is being rebuilt because of this disease.

In Assam at times more than half the beds in some Army hospitals have been occupied by malaria patients. Practically 100 percent of Chinese, Indian, British, and American forces who retreated through Burma into Assam in 1942 suffered from malaria and this disease so decimated the pursuing Japanese that it was a large factor in preventing them from marching on into Assam and Bengal.

Sicily is by no means as malarious as Burma or Guadalcanal yet Allied armies lost from malaria alone the equivalent fighting effectiveness of two infantry divisions for a month. There were some 4000 more casualties from malaria than from battle. Many cases contracted in Sicily first became ill in Italy and this resulted in a high sick rate during the early days of the Italian Campaign. About three-quarters of a million man-days were lost to WTOUSA in 1943 because of malaria. It should be noted that Corsica, Sardinia and areas of South Italy are generally considered to be much more intensely malarious than North Africa and Sicily. Indeed, Corsica has been called one of the three most malarious places on earth.

Certainly, no one can logically question the current gravity of the problem of military malaria.

III. MALARIA AS A DISEASE.

Although most officers now have some general knowledge of malaria as a disease there are some practical points which it may be advantageous to review.

Malaria is caused by minute protozoal parasites which live in the blood, destroying red cells and sometimes blocking small vessels of the brain or other vital organ. While classical symptoms are periodic chills and fever, yet many cases have irregular fever with a variety of symptoms, sometimes mild, occasionally very grave. Diagnosis is usually possible either by symptoms or by microscopic examination of stained blood smears.

The average soldier with malaria costs the Army 18 man-days loss per attack. In spite of the best known treatment, from 30 to 80 percent of cases will have from two to ten attacks from one infection over a period of six or seven months. Without suitable protection against mosquito bites in areas like Corsica and South Italy it may be anticipated that, in spite of suppressive atabrine, there will be contracted many cases of malaria which will continue to have relapses for months.

With prompt and adequate treatment the death rate in malaria cases is less than 0.5 percent and was only 0.11 percent in WTOUSA in 1943.

There is no effective immunity and a man may be reinfected soon after he has been cured of an attack. Men in excellent physical condition are as susceptible to malaria infection as those physically unfit. Food has no influence whatever in preventing infection. Naturally, better nourished and healthier individuals may withstand the bad effects of the disease more readily. But they will contract the disease just as quickly and are equally liable to such sudden complications as the blocking of brain capillaries, with coma and perhaps death.

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Malaria is spread by certain mosquitoes of the group known as Anopheles. These mosquitoes suck human blood for food. If there are mature malaria parasites (called gametocytes) in that blood they will not be digested by the Anopheles mosquito but will develop, in 10 - 14 days, into another stage of the parasite's life cycle, producing sporozoites. These sporozoites when they enter a man's blood stream, with the mosquito's saliva, will produce an attack some 6 to 14 days later.

The mosquito lives in water during the first 7 to 14 days of its life before it emerges as an adult with wings. Thus, taking the time factors into consideration, it is apparent that mosquito larvae seen today may be the cause of malaria attacks appearing in nearby troops next month.

Local inhabitants are generally the chief source of mature parasites (gametocytes) necessary to infect mosquitoes which in turn infect soldiers. Malaria mosquitoes in NATOUSSA can fly up to two miles, twice as far as in the average tropical area. In NATOUSSA, adult Anopheles rest in daytime inside houses, barracks, tents, animal sheds, and outbuildings. They feed at night, almost always between sunset and sunrise. In the tropics they may rest in the jungle by day and may feed some hours before sunset or after sunrise.

Different species of Anopheles have different types of breeding places. In NATOUSSA, malaria mosquitoes breed along the edges of slow moving streams, in stream bed pools, in brackish and fresh water marshes, in ponds, irrigation water, and agricultural wells. Malaria mosquitoes begin to breed actively in April, reach a peak in June, and become relatively scarce in September or October. New cases of clinical malaria begin to appear in May, reach a peak in July or August and have lowest incidence in March. In many tropical areas malaria mosquitoes breed perennially and malaria may be contracted in any month of the year. In some parts of NATOUSSA an occasional winter infection may be contracted from semi-hibernating mosquitoes, especially during the first two months of cold weather.

Quinine and atabrine are about equal in their effect on malaria. Neither one will prevent an infection. It requires emphasis that neither quinine nor atabrine is in any way a substitute for mosquito repellents, sprays, the protection of clothing, or other antimalaria measures. These drugs are used for suppressive treatment in the field to make the best of a bad job or to make doubly sure that the success of a mission will not be impaired by active cases of malaria. Suppressive treatment will keep infected men on their feet. Only a few will actually be cured by the small doses of suppressive drug. Most of those who are infected will at a later date develop malaria and some will eventually require months of rehabilitation.

Atabrine is the drug of choice because of a quinine shortage and because it may be a little more effective in suppressing malaria. There is no evidence that the efficiency of aviators is lowered by atabrine.

Most individuals are able to take one tablet of atabrine each day with the evening meal without ill effects. Occasionally there will be a little looseness of the bowels or slight discomfort which will clear up in a few days while continuing the atabrine. Doses of two tablets a day are not tolerated so well and are not recommended.

IV. OFFICIAL ARMY POLICY REGARDING MALARIA PROPHYLAXIS.

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The official policy of the Army as regards malaria prevention and control has been made clear in a series of Army Regulations, W.D. Circulars, Theater and Unit Command Directives. Some of the more important of these have been outlined in Appendix A below. No further comment is required in this section than a re-emphasis of the basic fact that malaria prophylaxis is a command, and not a medical or engineer, responsibility. The commanding officer enforces the regulations, circulars, and directives and calls upon medical, engineer, and quartermaster corps for necessary technical aid and supply.

V. MILITARY MALARIA CONTROL.

a. A Command Function. Military malaria is preventable to a very large extent but only by strong command impulses down the line. Group methods of environmental sanitation are of great value when feasible and especially in fixed installations. But in a theater of operations it is the precautions taken by the individual soldier which are most important. If a soldier routinely and systematically makes proper use of mosquito repellents, sprays, and the protection of clothing he has a very good chance of avoiding infection under combat conditions. If when not in combat he adds to these measures the use of bed nets and the practice of avoiding malarious villages at night then he may expect to remain malaria-free even where environmental control has not been possible. But the soldier who has not been trained in the use of these measures or who becomes careless is likely to become a malaria casualty. The great importance of the individual measures for protection against mosquito bites is one of the basic reasons why malaria control among soldiers must be a command function. There must be systematic training and effective malaria discipline.

Unit commanders who do not enforce malaria discipline jeopardize the efficiency of their command. They may not realize it at the time because the full effects of malaria unfold gradually for six or seven months, or longer, after infection.

A quotation from an order by Field Marshall Sir Archibald Wavell bears out this point. His order reads in part as follows: "In theaters where future operations are likely to take place we may well find that disease, and especially malaria, is a more dangerous factor than enemy resistance. We have already had experience of the effects of a bad malaria season in Assam.

We must prepare to meet malaria by training as strict and earnest as against enemy troops; we must be as practical in the use of our weapons against it as we are with the rifle; we must study the habits of the mosquito as we do the tactics of the Japanese; we must know methods of antimosquito work as well as how to construct trenches to hold a position."

In other words, since it has been proved in HATGUSA as well as elsewhere that, when operating against the enemy in a malarious area and season, the Anopheles mosquito if unchecked may incapacitate more men than the enemy, it becomes a matter of military common sense to teach men how to outwit the mosquito and to insure by strict command action that they do so.

b. Basic Principles of Control. The prevention and control of malaria in badly infested areas is a complicated, continuous, and painstaking task, involving many essential technical but undramatic details and requiring full-time application of a comprehensive and specialized plan. Therefore an anti-malaria policy in the Army involves the following basic elements: (a) Law; (b) Persuasion; (c) Organization; (d) Training; (e) Supply; (f) Technical

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Operation. Each of these factors or phases must be adequately developed, implemented, and followed through if malaria is to be controlled.

(a) Law. There is first the law which assigns responsibilities, dictates rules of conduct and orderly procedures, interdicts obstructive and retrograde steps, imposes penalties, provides a solid foundation for effective action. In the Army, the law as regards malaria takes several forms, such as: Army Regulations, War Department Circulars, Theater Directives and Unit Command Directives, discussed in Appendix A, below.

(b) Persuasion. Law by itself is never so effective as when backed up by carefully planned persuasion. This is especially true in regard to public health, civil or military. Army directives order a soldier to apply mosquito repellent to his skin when exposed to bites but unless the individual soldier has been persuaded that this is a good thing to do the order can rarely be adequately enforced, even after suitable training. This is true of bed nets, and other individual measures. Good salesmanship as well as strict discipline are required of commanding officers in this regard. There must be developed among the men a genuine desire to outwit malaria mosquitoes. Persuasion is a factor that adds greatly to the effectiveness of law and training.

(c) Organization. It has been demonstrated over and over again, in civil life and in the Army, that it is not possible successfully to control malaria in any but lightly endemic areas, or in small groups of individuals, unless there is a special malaria control organization to survey, plan, execute, supervise, and maintain the numerous and technical measures which must be carried out continuously if malaria is to be defeated. Where malaria is prevalent, it is nearly certain that other diseases such as the diarrhoeas and dysenteries, typhus, or some tropical infection will also be common. All sanitary problems are greater. A small unit charged with all sanitary measures can not give the time and attention to malaria which is absolutely essential for its control. Few malaria control measures are permanent. Screening and ditching, for instance, require constant maintenance, oiling and spraying are ever recurring measures which have to be meticulously applied. Hence, the need for full and undivided attention by a specially trained malaria control organization.

Therefore, a Special Organization for Malaria Control has been authorized in the Army and it is discussed in Appendix B, below. Line commanding officers should not only utilize help which the trained malaria control personnel can give but should also attempt to institute an efficient local control organization. Antimalaria company details are described in Appendix A, paragraph b (1.) (c). It will often be necessary to supplement these details with labor gangs, properly supervised. There must be good correlation between medical inspector and engineer. Clear lines of responsibility must be drawn.

(d) Training. Experience has made perfectly clear the importance of training in all aspects of military operations but it sometimes needs to be emphasized that this is as true for protection against mosquitoes as against gas or hostile planes. In Appendix C are listed certain training aids which are available in the Army.

(e) Supply. An adequate and prompt supply of antimalaria equipment and materials is essential to the success of a control program. The chief items involved are atabrine and quinine; Paris green, oil, and gossanol; repellents; sprayers and dusters; bed nets and screening. W.D. Circular #239

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(Appendix A) authorized allowance of some of these items for various geographical areas, on the basis of 1000 men per month. W.D. Circular #178 (Appendix A) fixes responsibilities for specifications, requirements, funds, purchase, inspection, storage, and issue between the Quartermaster, Engineer, and Medical Corps. W.D. Circular #223 (Appendix A) directs that antimalaria supplies and personnel will be given the highest priorities of movement to, and especially within, a malarious theater. This circular also directs that adequate supplies of repellents, aerosol insecticide dispensers, and suppressive drugs will be provided and sent forward by higher commanders to combat units.

(f) Technical Operation. When there are strong and practical directives, good line cooperation, a suitable specialized organization, adequate training of all ranks in individual protective measures, and an ample, prompt flow of antimalaria equipment and supplies, then successful control of malaria is all but assured. There remain the technical operations of spraying, larviciding, draining, filling, screening, and maintaining. These measures are pretty well standardized and have long demonstrated their effectiveness. They are discussed in various text books, in S.G.O. Circular letter #22, of 16 January 1943, in FM 21-10 and FM 8-10, W.D. Training Circular No. 108, dated 21 September 1943 and elsewhere.

VI. CONCLUSIONS.

Malaria control in the Army is dependent to a large extent on effective command action. For instance, it has been proved beyond doubt that malaria mosquitoes will not pierce skin or clothing which has been treated with standard QM issue mosquito repellent (either 612 or dimethylphthalate) for at least three and usually four hours after application. There are ample supplies of these repellents for issue. On paper, no one in the Army should be bitten by malaria mosquitoes because suitable directives have been issued ordering the use of these repellents. Naturally, as with all other aspects of life, practice lags behind the ideal but the point is that every feasible effort should be made to close the gap as far as possible, because malaria constitutes one of the greatest sources of lost man power to the Army. The weapons are available but the soldier must be taught and constrained to use them. For this reason, military malaria control is basically a command function and will be successful in direct proportion to the degree to which line officers develop malaria control discipline within their units. The officer who fails to prevent malaria within his command has failed in one of his duties and has permitted mosquitoes to assist the enemy in delaying final victory.

The Army policies as regards malaria control appear to be logical, comprehensive, and practical. Suitable directives have been issued, specialized personnel made available, adequate supplies procured and sent forward under highest priorities. The need is for more training and stimulation of enlisted personnel, especially in combat, and for more complete and active command action as regards malaria control. Military malaria is preventable.

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APPENDIX AARMY REGULATIONS, CIRCULARS AND DIRECTIVES HAVING SPECIAL
REFERENCE TO MALARIA PREVENTION AND CONTROLa. Army Regulations.

(1) AR 40-205 - AR 40-210. There are a number of Army Regulations which have a bearing on malaria control. For example, AR 40-205, dated 31 December 1942, deals with military hygiene and sanitation, and AR 40-210, dated 15 September 1942, deals with prevention and control of communicable diseases of men. These regulations fix upon commanders of all grades responsibility for sanitation and for enforcement of provisions of sanitary regulations within their organizations and the boundaries of areas occupied by them. This includes (a) selection of camp sites, with due regard to environmental factors affecting health of troops; (b) provision of suitable shelter and clothing; (c) protection of personnel from insects; (d) instruction of personnel in the application of hygienic measures for the maintenance of health under all conditions; (e) enforcement of Army Air Forces and United States Public Health Service regulations governing the quarantine, inspection, and disinsectization of Army aircraft operating in or coming from regions where disease-bearing insects are found.

AR 40-210 (par. 20) specifies that commanding officers, using all means at their disposal, will enforce the following prophylactic measures (among others) against insect-borne diseases whenever indicated and applicable: (a) destruction of adult, larval, and egg states of disease-bearing insects with fumigants, insecticides, and larvicides; (b) elimination of breeding and resting places; (c) prevention of transport into non-infested areas; (d) selection of camp sites, sufficiently removed from breeding places of dangerous insects or from human habitations infested by animal or insect carriers; (e) proper employment of screening, nets, protective clothing, and repellents; (f) prophylactic medication when indicated; (g) systematic instruction of all personnel in measures for avoiding insect-borne diseases. This is a very important regulation because forthright and intelligent command action is required to develop the efficient administration of control measures and the high malaria discipline essential to the prevention of malaria in Army units.

In AR 40-205 and AR 40-210 the Medical Department is charged with investigation of sanitary conditions, initiation and supervision of measures for the control and prevention of disease in military personnel and among the inhabitants of occupied territories. The functions of medical officers are described mainly of an inspectorial and advisory nature. They make recommendations and provide technical advice, and they are enjoined to keep themselves informed regarding the latest advances in sanitary science and preventive medicine as announced from time to time in current medical publications.

Specifically, AR 40-205 (par. 21) charges the surgeon of each station or command with the responsibility for investigating the prevalence, distribution, and significant habits of those mosquitoes which may be transmitting disease to the troops or affecting their efficiency, morale, or comfort. The surgeon is not only responsible for recommending those measures which are necessary for the control of such mosquitoes but also for technically supervising the execution of measures to insure their effectiveness.

(2) AR 100-30. The Corps of Engineers is charged with the execution

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of work on buildings, structures, and grounds necessary to control insects, vermin, and rodents in accordance with recommendations of the Medical Department. Such work includes drainage, filling, larvicidal programs, and screening. (AR 100-80, dated 10 August 1942).

b. War Department Circulars.

(1) General. War Department Circulars are usually issued by order of the Secretary of War, signed by The Chief of Staff or The Adjutant General. These circulars are more than informative, they are orders.

(2) W.D. Circular #178.

(a) General. Circular #178, dated 7 August 1943, reaffirms the responsibilities of commanding officers and medical officers as stated in AR 40-205 and AR 40-210. It also clarifies responsibilities as regards supply of materials and equipment by the Quartermaster Corps and the Corps of Engineers. For example, the supply officer, Quartermaster, is responsible for storage and issue of such malaria control items as insect repellents (stock number 51-R-265), and aerosol type insecticide dispensers (stock number 51-I-159). The Medical Corps is responsible for specifications of such items, the Quartermaster Corps for requirement estimates, for funds, for purchases, and for inspection of the items.

(b) Corps of Engineers. Continuing, W.D. Circular #178 provides that, as regards the Engineers, "Under direction of the Commanding Officer the technical supervision and execution of work and such construction and maintenance, including screening, on real property as is required to effectuate control measures (other than ordinary housekeeping by troops units or individuals) necessary for the protection of health in connection with environmental factors of insects, rodents, or other vermin, is charged to:

Post Engineers. Posts, camps, stations, ports or other military installations in the continental United States and the Northwest Service Command.

Unit Engineers. In the field."

The Circular #178 goes on to provide that "this work will be performed in accordance with the recommendations of the surgeon and will include eradication of pest sources on real property, such as mosquito control work involving drainage of swamp areas, ditching, spreading oil, fumigation of buildings, certain construction, and similar work. This work also will include the procurement, purchase, storage, and issue of all specialized supplies, including materials and equipment (separate from those furnished by the other technical services) as are needed for its accomplishment and are used predominantly by engineers." For example, knapsack oil sprayers, Paris green and rotary dusters are items for which the Medical Corps must form specifications but the Engineer Corps make estimates of requirements, supply funds, make purchases, store, and issue.

Finally, paragraphs Nos. 3 and 4 of W.D. Circular #178 provide that troops units or individuals who are to effect control measures in connection with ordinary housekeeping will apply, under the technical supervision of the surgeon, the material furnished by the agency concerned. When the surgeon determines that local control measures applied by troop units or individuals are ineffectual or that construction measures for rodent control or eradication

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as pest sources on real property are necessary, the post commander of fixed installations or the unit commander or organizations in the field will direct that work be performed by the post engineer or unit engineer, respectively. It is stated that nothing in the circular will be construed to prohibit the application of minor pest control measures by unit details as directed by the commanding officer.

(3) W.D. CIR. #232. This circular, dated 1 October 1943, specifies the distribution of insecticides and pest control equipment. All theaters, departments, separate bases, and similar commands are grouped geographically according to probable needs for which certain allowances per 1000 men per month are set. These allowances may not be exceeded without express authority of the chief of the issuing technical service. Distribution of items within theaters and departments will be made, in accordance with needs of zones therein, at the discretion of the commanders. It is emphasized that it is important to distribute aerosol dispensers and repellents to troops in forward zones of malarious areas.

This circular authorizes supplies on requisition from the proper depot or port of embarkation. They are not supplied automatically unless such action is requested by an oversea commander. The level of supply of aerosol dispensers for all oversea commands is 60 days minimum, 90 days maximum. The level for all other items is that prescribed for Class I supplies.

Finally, this circular #232 calls attention to the fact that requirements for pyrethrum insecticides are in excess of availability. Commanders are enjoined to assure usage of the aerosol dispensers in strict accordance with the directions printed on the containers.

(4) W.D. Circular 223.

(a) General. Another and very important circular as regards malaria control in the Army is W.D. Circular #223, dated 2 September 1943. This circular reiterates the responsibilities laid down in AR 40-205, AR 40-210, AR 100-80, and W.D. Circular #178.

(b) Unit Control. W.D. Circular #223 further provides that commanders will exercise malaria control through regular military channels of command. Commanders will be assisted by the antimalaria details mentioned below, by organic medical personnel, and when appropriate, by special Medical Department organizations for malaria control. The commander is charged with supervision and enforcement of malaria control in his unit, with particular emphasis on development of malaria discipline. The commander is charged with timely requisitioning of antimalaria supplies for his unit. The commander will maintain liaison with any Medical Department malaria control organization in his area.

(c) Antimalaria Details. Circular #223 provides for Antimalaria Details, as follows: "In order to assist unit commanders in the control of malaria there will be formed in each company, battery, or similar unit, an antimalaria detail to consist of a minimum of two enlisted men, including one non-commissioned officer. In non-medical units this detail will be made up of non-medical personnel. This detail will be specially selected by the commander and will be given immediate training in use and minor maintenance repairs of screening and bed nets; hand-killing and spray-killing adult mosquitoes; larvicidal oiling of puddles and minor collections of water; minor ditching; minor water tidiness around a company encampment; and individual measures of malaria control in rear areas and in combat. These antimalaria details will

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carry out ordinary antimalaria housekeeping measures, such as those listed above, in and immediately around the company encampment."

(d) Instruction. W.D. Circular #223 also provides for a basic four-hour program of formal instruction for "all future officers and selectees during their training in the continental United States at such time or in such phase of training as determined by the commanding general of the responsible major command. This instruction will be completed for all personnel now in the military service of the United States, or in overseas areas subject to malaria, at the earliest practicable date." The formal instruction is to "be amplified by applicatory training in the field, especially during maneuvers."

(W.D. No. 71, dated 16 February 1944, directs that the entry "Malaria control Tng. completed" be made under the item "Remarks" on W.D. A.G.O. Forms Nos. 65-1, 66-2, 66-3, 20 and 24.)

(e) Supplies. W.D. Circular #223 also directs that "malaria control by use of standard Quartermaster Corps issue repellents, aerosol insecticide dispensers, and, when indicated, by suppressive drugs, will be energetically carried out under combat conditions. Adequate supplies of these materials will be provided and sent forward by higher commanders. The use of those malaria control measures will be taught and stressed in preliminary training in combat problems." Finally, W.D. Circular #223 directs that "Antimalaria supplies and personnel will be given highest priorities of movement to, and especially within, a malarious theater."

c. A.G. Subject Letters. From time to time The Adjutant General has issued subject letters referring to malaria. Some examples follow.

(1) Malaria in the Sicilian Campaign (A.G. 710 Malaria (15 Nov 43) OB-S-C-M issued on 26 Nov 43). This subject letter was sent to commanding generals of the Forces, Areas, Theaters of Operations, Defense, Base and Service Commands, "for information and guidance". Attention is directed to the report of the Surgeon AFHQ North Africa that there were more malaria than battle casualties in the Sicilian Campaign in both 7th and 8th Armies. The letter stated that the War Department desired to emphasize that strict enforcement of malaria discipline is a most important factor in reducing malaria casualties during combat operations. It called attention to W.D. Circular 223 mentioned above. Finally, it noted that planning of operations in malarious territory should include provision for antimalaria supplies and trained personnel ready to institute mosquito control measures at the earliest moment in a campaign.

(2) Antimalaria Supplies for Troops Moving Overseas. (SPX 440 (24 Dec 43) OB-S-SFMYOT-M, issued 30 Dec 43). This letter signed by the AG for the CG ASF provides for issue of certain antimalaria supplies and equipment for units ordered overseas "in order to insure adequate protection against malaria infection for troops debarking in malarious areas." These supplies are to be loaded aboard the same vessel with the unit so as to be readily available to the unit commander while enroute to overseas destination and immediately upon debarkation.

(3) Malaria Prevention and Control at Airfields (AF 710 Malaria (20 Jan 44) OB-S-E, issued 25 Jan 44). This letter was sent to the Commanding Generals in North Africa, Middle East, South Atlantic, Antilles, and of the Air Transport Command, signed by the AG by order of the Secretary of War. It

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calls attention to laxity in the control of malaria at certain airfields where transient personnel has become infected. It reaffirms that malaria is preventable and it orders that immediate and forceful action be taken to prevent it. It orders that in addition to strengthening all antimosquito measures at airfields the following measures will be taken:

(a) Sleeping quarters shall be adequately screened, have nets in good repair, and be sprayed regularly.

(b) Supplies of repellents and insecticides shall be maintained and made available for use by transient personnel.

(c) Areas in the vicinity where there is substantial risk of contracting malaria will be declared out of bounds between sunset and sunrise, except for military necessity.

(d) Measures will be taken to see that sufficient guard personnel are posted at all airfields in order to preclude the necessity for transient air crews sleeping in aircraft.

d. Theater Directives. Not only are there Army Regulations and War Department circulars, but there are also theater malaria laws which take the form of directives signed by the adjutant "by command of" the theater commanding general.

(1) NATOUA Circular No. 12. An example of a theater directive is NATOUA Circular No. 12, dated 20 January 1944, dealing with immunization and disease. Paragraph V deals with malaria control and prevention and points out that malaria is one of the most important health problems in the theater. The malaria season is defined as extending from 1 May to 15 November, unless otherwise designated by an area commander. Non-malarious areas are designated as those areas in which malaria does not occur or in which there are effective control measures. The responsibility of all commanders to initiate and enforce malaria control measures is reaffirmed. It is also directed that atabrine, one 0.1 gram tablet per day six or seven consecutive days a week (as advised by the medical officer of the command) will be taken by all military personnel during the malaria season in all areas not designated as non-malarious. Individuals truly sensitive to atabrine may take 0.6 gram of quinine sulphate daily in lieu of atabrine. Troops scheduled for movement will be provided with sufficient atabrine for the entire trip.

In paragraph VI of NATOUA Circular No. 12, it is directed that Base section commanders will maintain malaria control in camp sites or bivouac areas set aside for troop use, when these areas are not occupied by tactical units. Tactical commanders occupying such areas will base their sanitary and disease control measures on regulations and practices in force in the area.

e. Unit Command Directives. In addition to War Department and theater malaria circulars and directives, there have been numerous directives issued by post, company or squadron commanders. These bring the smaller units into more intimate contact with malaria law and they make local practical application of general rules. They may, and frequently do, go even further than higher directives. It is well within the prerogatives, in fact responsibilities, of a commander of a smaller unit to extend the provisions of a higher directive so long as there is no contradiction, or nullification, of the higher law.

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For example, Headquarters 31st AA Artillery Brigade issued training memorandum No. 7 on 20 February 1944, calling attention to the importance of malaria, presenting some basic features of the problem, outlining control measures, and stressing the need for the greatest emphasis on individual protective measures and malaria discipline.

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APPENDIX BSPECIAL ORGANIZATION FOR MALARIA CONTROL

In October 1942, a Special Organization for Malaria Control was authorized for the Army, designed to be so flexible that it would fit into the differing frameworks of various malarious theaters. (See S.G.O. letter, Subject: "Special Organization for Malaria Control," dated 24 March 1943).

a. General nature. Essentially, this malaria control organization consists of a theater or area malarialogist, one or more assistant malarialogists, one or more control units, and one or more survey units, all functioning under the Surgeon to enable him better to carry out his responsibilities as outlined above.

Ideally, the entire Malaria Organization is assigned to theater or area headquarters for the performance of all duties pertaining to malaria control. Assistant malarialogists are then attached to the staffs of commanders as recommended by the Malarialogist through the Surgeon. Control and survey units are attached to sections, bases, armies, or areas, with authority for movement from one base to another still vested in headquarters. Of course, movement of units within a base is effected by the base commander, guided by recommendations from the malarialogist at headquarters through the Surgeon. Naturally, when attached to a base, malaria units, like all other units, are under jurisdiction of the base commander. It is usual to authorize direct communication on technical matters between the assistant malarialogists, survey and control units, and the malarialogist, through the Surgeon, Headquarters.

b. Malarialogist. The functions of the Malarialogist, with help from his organization, are: (a) administering, under the surgeon, the special malaria control organization; (b) surveying, planning, recommending, supervising and inspecting in regard to malaria control problems; (c) developing malaria discipline and training in all ranks; (d) advising and assisting the surgeon in regard to other insect-borne diseases. In other words, the work of a Theater Malarialogist is chiefly administration, training, and constant field inspection with many policy, personnel, and supply problems to solve.

c. Assistant Malarialogist. There may be one or more assistant malarialogists. Their functions are to assist the malarialogist in coordinating the work of the units, to aid in making surveys and recommendations, to act as malaria advisors to command units in the field to explain the malaria control program to line commanders, and to help to develop malaria morale in all ranks.

d. The Malaria Survey Unit. Survey units consist of two officers and 11 enlisted men. One officer is an entomologist, one a parasitologist. They are, in effect, mobile field malaria laboratories; dealing with collection and examination of smears and mosquitoes; surveying breeding places, checking up on the effectiveness of control measures, assisting, as requested, in the training of laboratory technicians in Army hospitals and dispensaries, maintaining charts and graphs relating to malaria and its control, and finally, if required and as directed, assisting in the supervision of control operations.

e. The Malaria Control Unit. A control unit consists of one officer and 11 enlisted men. The officer is a sanitary engineer. The functions of a control unit, in close cooperation with the local surgeon and engineer, are to prepare detailed plans for malaria control measures, recommend and supervise those measures, and if necessary and when authorized, carry out these measures, using soldier or local labor.

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f. Malaria Discipline Officer. In a number of areas there have also been designated non-medical malaria control, Malaria Discipline Officers, whose duties include development of malaria morale and discipline and enforcement of malaria control regulations. The enforcement of regulations regarding protective clothing is among the responsibilities of an Officer of the Day. But in highly malarious areas a Malaria Discipline Officer may be very useful in this respect.

g. Antimalaria Details. These have already been mentioned. (A.D. Cir. #223, Appendix A). They have an important part in the control program of a post or camp. They are responsible for malaria housekeeping in company or similar units.

h. Cooperative schemes. In some areas the Army and the Navy have carried out successful cooperative malaria control schemes. In other areas inter-allied programs have been necessary and feasible, when units of allied armies have held adjacent camps. In still other areas, close cooperation between civilian agencies and the Army has been essential. An excellent example has been the extracantonment malaria control of the U. S. Public Health Service in the southern states. In NATOUSA the Malaria Control Service, Public Health Sub Commission, Allied Control Commission is cooperating fully with the Army in a somewhat similar extracantonment malaria control program. Also, in some sections, French and Italian civilian agencies have carried out mosquito control work in civil communities contiguous to military installations.

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APPENDIX C

TRAINING AIDS IN MALARIA CONTROL

a. Schools. There has been set up an Army School of Malariology at Fort Clayton in Panama where Medical and Sanitary Corps officers and Survey and Control Units will be given thorough training in malariology. In several theaters, including NATOUSA, malaria schools have been established. The NATOUSA school has malaria courses for medical inspectors, laboratory officers, and enlisted personnel of the Antimalaria Details. Sub sections of the NATOUSA school have been set up in eight locations.

b. S.G.O. Letters. The S.G.O. has issued numerous circular letters and general information regarding malaria. For instance, SGO Circular Letter #33, dated 2 February 1943, dealing with the treatment and control of certain tropical diseases; also SGO Circular Letter #22, dated 16 January 1943, on Military Malaria Control; also SGO Circular Letter #153, dated 19 Aug 1943, on the drug treatment of malaria, suppressive and clinical. The Medical Intelligence Branch, Preventive Medicine Division, S.G.O., has issued maps showing world distribution of malaria; also memoranda on health and sanitation in a number of countries. These are available at theater medical headquarters, or on request from the S.G.O.

c. Field Manuals. There are also such Basic Field Manuals as FM 21-10 on Military Sanitation and First Aid, prepared under the direction of the Surgeon General and issued in 1943 by the War Department. Chapter 5 deals with insect-borne diseases. Then there is the Medical Field Manual, FM 8-40, on Field Sanitation, issued in 1940. An invaluable reference book is "Military Preventive Medicine" by Brig. Gen. George C. Latham, MC. The 3rd edition of this book was published in 1940 by the Military Service Publishing Company, Harrisburg, Pa. It is available in all medical headquarters libraries.

d. Pamphlets. Various pamphlets have been prepared for distribution to malarialogists. Examples are the following:

Mosquito Atlas - Parts I and II, by Lts. E.S. Ross and E.R. Roberts, Sanitary Corps, published by the American Entomological Society, Philadelphia, in 1943.

Keys to the Anopheline Mosquitoes of the World by Col. F. R. Russell, H.C., and Drs. L. L. Rozeboom and Alan Stone, published in the same way at the same time by the American Entomological Society.

These three pamphlets are available on request from the Office of the Surgeon General, Washington. Copies may become available for distribution in Theater Headquarters.

The War Department in August 1943 published an attractive booklet entitled, "This is Malaria". It is an illustrated popular account of malaria and its prevention, prepared especially for soldiers and printed in colors. This booklet will be distributed in NATOUSA at the beginning of the malaria season.

e. Text Books. Finally, there have been made available text books, journals of tropical medicine, and such bulletins as "Manual for the Microscopist".

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Diagnosis of Malaria in Man", Bulletin #180, National Institute of Health, U.S. Public Health Service, Washington, issued in 1943. In several areas medical officers have formed local medical societies holding regular meetings at which current literature and medical problems are discussed. The Army Medical Society in the jungles of New Guinea may be cited as a good example.

f. Films. There is a film, No. TF 8-953, on "Malaria: Cause and Control". This is available from Signal Corps film libraries in each theater and is useful in training non-medical personnel. It has an accompanying sound track and will run about 25 minutes.

g. Theater Circulars. Various theaters have issued circulars and informative material. For example, Circular Letter #34, dated 14 September 1943, issued by the Surgeon, MATOUSA, deals with the pharmacology of atabrine, its rational therapeutic use, and the duration of hospitalization of malarial patients.

h. Bulletin. There is a MATOUSA monthly medical bulletin which frequently contains instructive articles on malaria of special interest to medical officers.

i. Special Services. In some areas the Special Service Division has been of great help in malaria training and stimulation of malaria morale. Programs have been developed using lectures, booklets, posters, camp newspapers, bulletin board notices, moving pictures, radio talks and dramatized programs, and weekly seminars on malaria control.

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