

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

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

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MALARIA & DISEASE
APR. - OCT. 1944

FILE

710

HEADQUARTERS
ALLIED CONTROL COMMISSION
APO 394
Public Health Sub-Commission
Tel. 489001-500

Adjutant	h
Asst. Acs.	
Asst. Acs.	
Chief Clerk	h

AAC/3005/PH

1 October 1944

SUBJECT: - Malaria Control Branch.

TO : - See Distribution Below.

1. Effective 1 October 1944, the Malaria Control Branch of the Public Health Sub-Commission is discontinued.

2. All Malaria Control activities heretofore coming under the supervision of the Malaria Control Branch are from today to be performed by the Public Health Branch of this Sub-Commission.

3. The Rockefeller Foundation Malaria Demonstration Unit will continue its functions as heretofore under the immediate supervision of Dr. Henry W. Hens, within the Public Health Branch of this Sub-Commission.

G.B. ANDERSON, Brigadier,
Director,
Public Health Sub-Commission.

Distribution "A"

ADJ.

R-E-S-T-R-I-C-T-E-D.

ROME ALLIED AREA COMMAND
APO No. 794 U. S. Army

A.S. 720

Subject: Valerious Area.

26 July 1944.

To : See Distribution.

1. The whole of the Rome Area is considered Malarious.
2. a. The area lying between the Coast and a line drawn between CREVEIERI (MR 7428768) and CARLUCCIO (MR 750330) is particularly dangerous.

b. The only units to be accommodated in the area specified in para 2 a. above are those whose presence there is necessary for urgent operational reasons.

c. Units, both US and British, already established in this area who fall within the terms of para 2 b. above will report to G-3 Headquarters Rome Allied Area Command the reasons which render their continued presence there necessary and will seek advice from Medical Section Headquarters Rome Allied Area Command as to the measures to be taken to minimize the risk of Malaria.

d. Units already in the area specified in para 2 a. who do not fall within the terms of para 2 b. will apply through G-3 to Real Estate Section Rome Area for an alternative area to be allotted elsewhere.

e. Units desiring to move into the area specified in para 2 a. will apply to G-3 Section Rome Area and will show reasons why they should be considered as falling within the terms of para 2 b. above.

3. Elsewhere in the Rome Area units will seek advice from the Medical Section Rome Area as to the siting of their camps, bivouacs, etc., and full anti-malarial precautions will always be taken.

By command of Major General JOHNSON:

S. R. C. Cook

I. L. QUINN
Capt. AGD

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3. Elsewhere in the Rome Area units will seek advice from the Medical Section Rome Area as to the siting of their camps, bivouacs, etc., and full anti-malarial precautions will always be taken.

By command of Major General JOHNSON:

L. A. P. Cook
L. A. P. COOK
Capt. AGD
Asst. Adj. Gen.

DISTRIBUTION
"H"

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- 1 -

R-E-S-T-R-I-C-T-E-D

Copy in above file No.

HEADQUARTERS
ALLIED CONTROL COMMISSION
PUBLIC HEALTH SUB-COMMISSION
MALARIA CONTROL BRANCH
APO 394

26 June 1944

THEORETICAL MEMORANDUM

PAGE 5

ANOPHELES CONTROL BY FLYING AND HAND-CASTING PARIS GREEN

1. INTRODUCTION

Recently several tons of Paris green have been made available from British Army stocks for use by civilian agencies, especially in the vicinity of military installations. These supplies have already been distributed on a regional basis. But it will not be possible to supply sifters, blower, or blower.

In many malarious areas of Italy civilian control agencies are well acquainted with Paris green as a larvicide and may have sifters, blower, and blower in hand, ready to use. But frequently such apparatus may not be available. The purpose of this memorandum is to call attention to the fact that larviciding with Paris green may be done without the use of machines.

2. PARIS GREEN

Paris green is a mixture of copper, an arsenic green, where crystalline powder. For larvicidal purposes the arsenic content should be not less than 50 per cent. Fineness should be such that the Paris green will pass a 300-mesh sieve.

Paris green kills larvae only when it is ingested and can act as a gut poison. When properly distributed it floats on the water surface for some hours, unless wave action or rain causes it to sink. Anopheles larvae feed at the surface on floating particles. They do not discriminate but sweep into their mouths any particles small enough to be swallowed. Hence they are vulnerable to floating Paris green. Culicid larvae feed mostly beneath the surface, having hard domes. Thus they are less apt to ingest Paris green and are generally not controlled by this larvicide.

As a rule, a one per cent mixture of Paris green and saw dust is used for larviciding by hand-casting or from hand blower. The mixture may be made up by weight or by volume. The objective is to put

any serious cases of Italy civilian control agencies are well acquainted with Paris green as a larvicide and may have sifters, blenders, and blowers in hand, ready to use. But frequently such apparatus may not be available. The purpose of this memorandum is to call attention to the fact that larviciding with Paris green may be done without the use of machines.

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Paris green kills larvae only when it is ingested and can act as a gut poison. When properly distributed it floats on the water surface for some hours, unless wave action or rain causes it to sink. Monobelon larvae feed at the surface on floating particles. They do not discriminate but sweep into their mouth any particle small enough to be swallowed. Hence they are vulnerable to floating Paris green. Callinix larvae feed mostly beneath the surface, having head downwards. Thus they are less apt to ingest Paris green and are generally not controlled by this larvicide.

As a rule, a one per cent mixture of Paris green and some diluting agent is used for larviciding by hand-sifting or from hand blowers. The mixture may be made up by weight or by volume. The objective is to put on about a pound of pure Paris green (e.g. 100 pounds of a one per cent mixture) per acre. Not less than 10 grams of Paris green per 100 square meters of breeding surface, or 80 linear meters of breeding edge, should be used. This minimal figure works out at about 14 ounces per acre.

As mixed, ready for use, Paris green should kill all 2nd to 4th stage monobelon larvae in a pan in the laboratory in two hours, using 0.1 gram of Paris green (4.0. 10 grams of a one per cent mixture) per square meter.

3. FIELD MIXING AND HAND-CASTING

The practical usefulness of field mixing and hand-casting Paris green for larviciding was well illustrated in the successful campaign to eradicate A. auriline from Brazil. Many tons of Paris green were used, with

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3292

full effect, by hand-feeding the larvae, which was mixed in the field. This method not only was adequate but it resulted in a great saving of labor and transportation costs.

The application of Paris green by this method of field-feeding and hand-feeding is very simple. The laborer carries with him a small supply of pure Paris green. When he arrives beside the water to be treated, he gathers about a kilogram (2.2 pounds) of road dust, dry earth, or fine gravel in a pail or finely woven basket. To this he adds ten grams of Paris green and then mixes it thoroughly with the diluent. He repeats this procedure five times and then has in his pail or basket about five kilograms (11 pounds) of a one per cent mixture of Paris green and diluent. This mixture is then hand-cast, with the wind, over the breeding surface in such a way as to get maximum spread. A little practice is required.

It is necessary to provide the laborer with (a) pail or basket, having marks indicating 1 to 5 kilogram levels; (b) a standard measure for 10 grams of Paris green; (c) a scoop (like a grocer's sugar scoop) for collecting the diluent, mixing it, and for casting it over the water, and (d) a small supply of Paris green.

With this equipment the laborer is ready for a day's work. Transport is reduced to a minimum.

In spreading the mixture it may be thrown from hand or from scoop. It takes a little practice to get good distribution from the scoop.

4. TOXICITY OF PARIS GREEN

Paris green is a poison and must be handled with care. There is no danger of poisoning human, live stock, fishes or crops when the application is made as described above. But supervision is required to prevent overloading of the breeding area and careless storage of the Paris green.

Laborers applying Paris green should wash hands and clean finger nails frequently, especially before urinating and eating. A daily bath after work is important. Otherwise some will develop interform dermatitis, scrotal ulcers, or other signs or symptoms of arsenic poisoning.

5. MISCELLANEOUS

Regional and Provincial Public Health Officers, AGC, should make certain that adequate stocks of Paris green for lenticling in

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Laborers applying Paris green should wash hands and clean finger nails frequently, especially before urinating and eating. A daily bath after work is important. Otherwise some will develop mercurial dermatitis, sore throat ulcers, or other signs or symptoms of arsenic poisoning.

5. MISCELLANEOUS

Regional and Provincial Public Health Officers, AOC, should make certain that there are adequate stocks of Paris green for servicing in malarious areas under their supervision. If more Paris green is required, requisitions should be submitted through channels to the Medical Supply Branch, Public Health Sub-Organization, AOC, HQ Main, APO 394. It is probable that more Paris green will be in hand for distribution in July and again in August.

PAUL P. RUSSELL,
Colonel, M.C.,
Chief, Malaria Control Branch.

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HEADQUARTERS
PENINSULAR BASE SECTION
APO 782

Adj. Main
114511

AG 710 BFMED

Subject: Malaria Discipline.

To : See Distribution.

3 July 1945

Adjutant	
Asst. Asst.	<i>N.P.</i>
Asst. Asst.	
Chief Clerk	<i>[Signature]</i>

1. There is definite evidence of the occurrence of new malaria cases and an unwarranted number of recurrences of previously contracted malaria among troops of the Peninsular Base Section.

2. Many of these cases have been investigated and, in practically every instance, they have resulted from lack of malaria discipline.

3. In order to guide unit commanders in the execution of their responsibility, the following information, obtained as a result of investigation of malaria cases, is brought to their attention.

a. Insect repellent is not being employed unless mosquitoes are so numerous as to constitute a pest problem. It must be emphasized that the anopheline mosquitoes, transmitters of malaria, are not seen frequently even in highly malarious areas and that it is the unnoticed mosquito which is most apt to transmit malaria. The application of insect repellent to exposed parts of the body every three (3) hours from sunset until the soldier gets under his mosquito bar must be a routine practice. There are adequate supplies of this most valuable agent in the Base Section QM Supply.

b. Units have sent men to Agropoli Recreational Center without mosquito bars, and these men have slept in a malarious area for at least five days without the protection of netting. In the future any officer or enlisted man leaving the bivouac area and who might possibly sleep away from it will take his mosquito bar.

c. Several units with authorization for outdoor movies at night require (on paper) that insect repellent be applied before entrance, but they are failing to enforce their orders. Any such units spot-inspected and found deficient in this regard will not be permitted outdoor movies. Privileges are being extended only to the deserving.

d. Atabrine administration when prescribed is very slack. Some units, although bivouaced in an atabrine-free area, have men on duty after sundown in malarious areas who are not taking atabrine. This deficiency will be corrected without delay.

e. Men who have been hospitalized for malaria this year will take one (1) tablet of atabrine daily regardless of the location of their

3291

RESTRICTED

Hospitals are returning men to their units with notes to the dispensary surgeon informing him of this. The unit commander, however, is responsible for its enforcement.

3. Several unit commanders have been making decisions regarding the malariousness of an area without consultation of this Headquarters. All information regarding the malaria hazard in any given area will not be considered valid (although it may be correct in many instances) unless originating from the Surgeon, PBS.

4. In order to assist unit commanders in the carrying out of malaria discipline, the commander of each company, battery, detachment, or similar unit will appoint one (1) Malaria Control Officer and one (1) Malaria Control Non-Commissioned Officer without delay and submit their names to this office upon receipt of this letter. They will make nightly inspections and call to the attention of their unit commander all failures in malaria discipline.

5. Malaria is a preventable disease and will therefore be prevented.

Francis M. Cox
FRANCIS M. COX
Colonel, C. E.
Commanding

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HEADQUARTERS
PENINSULAR BASE SECTION
APO 702

Ady Mann
42726 files

AG 710-Malaria 3PLED

23 June 1944

Subject: Malaria Control

To : See Distribution.



1. Reference: Letter this Headquarters, dated 17 May 1944, File AG 364.1 EPCT, Subject: "Selection of Bivouac Sites".

2. For information and guidance of commanders in selection and maintenance of bivouac areas, the attached map, "Highly Malarious Areas", is furnished. These areas will be avoided in so far as possible, unless the tactical situation demands their use.

3. Commanding officers are reminded that responsibility for sanitation and preservation of health is a command function and that they are therefore responsible for proper malaria control measures within their areas.

By command of Major General WILSON:

L. F. Nickel
L. F. NICKEL
Lt. Col., A.G.D.
Adjutant General

1 Incl:
Map, "Highly Malarious
Areas".

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Chief Clerk	<i>3290</i>

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HEADQUARTERS
ALLIED CONTROL COMMISSION
PUBLIC HEALTH SUB-COMMISSION
MALARIA CONTROL BRANCH
APO 374

1 June 1944

TECHNICAL MEMORANDUM)

NUMBER 3)

SUBJECT: HAND-KILLING ADULT MOSQUITOES.

1. INTRODUCTION.

The Malaria Commission of the League of Nations in 1927 recommended that, "An active and energetic endeavor should be made, wherever possible, to induce householders, especially housewives, to make the killing of adult mosquitoes found within the house a part of the daily cleaning task". The Commission was convinced that, "this measure, if it could be effectively carried out, would have very remarkable results".

As a matter of fact, this measure was used effectively by Gorgas in the Panama Canal Zone, where systematic hand destruction of adult mosquitoes notably reduced malarial incidence in certain installations. Ross, in 1911, also emphasized the possibilities of this method and suggested that children should carry it out.

Certain popular malaria control bulletins published by the Italian Government, prior to the war, included hand-killing of adult anophelines among practical measures believed to be within the capabilities of average families.

But not much attention has been paid to these considerations because, normally, it has been easier to use other means of destroying mosquitoes or of screening them out. Even in countries like Italy, where malaria carrying anophelines usually spend their daylight hours resting on walls and ceilings of bedrooms and stables, easily accessible, very little hand-killing of these insects has been practiced.

Yet this measure of hand-killing adult anophelines in the daytime would seem to have potential value, especially during the present season in Italy, where little or no insecticide or screening will be available to civilians. Here the malaria-carrying mosquito is highly vulnerable in the daytime. If systematically and well done, hand-killing in a village would

the house a part of the daily cleaning task. The Commission was convinced that, "this measure, if it could be effectively carried out, would have very remarkable results".

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Yet this measure of hand-killing adult anophelines in the daytime would seem to have potential value, especially during the present season in Italy, where little or no insecticide or screening will be available to civilians. Here the malaria-carrying mosquito is highly vulnerable in the daytime. If systematically and well done, hand-killing in a village would certainly reduce the transmission of malaria to a marked degree by destroying a high percentage of infected mosquitoes before they could become infective. It is known that the plasmodium requires from 10 to 14 days in which to mature into the infective sporozoite stage.

The purpose of this memorandum is (a) to suggest that attempts be made to get householders in malarious areas to destroy as many as possible of the mosquitoes which rest on the walls and ceilings of their bedrooms and stables in the daytime; and (b) to outline some details of this measure of hand-killing adult anophelines.

2. METHODS.

The simplest method of hand-killing mosquitoes resting on the walls and ceilings is to hit them with a fly-swatter. The swatter may be made in the usual way of a square of wire screen-cloth fastened to a handle, or it may be improvised from paper, cloth, leather, small twigs, rushes, or other material. A damp towel, half-folded lengthwise, makes a good mosquito swatter. It must be used in a slapping rather than a brushing manner.

Slapping mosquitoes with the hand is less satisfactory, but it may be done if the hand is kept as flat as possible and is pushed rather than waved against the insect. Mosquitoes on the wing are more easily hand-caught if palms and

Fingers are wet, especially if the water is soapy.

Anopheles are sluggish in the daytime. Blooded individuals are easy prey, others require but little skill. Children soon become adept at destroying resting mosquitoes in houses and outbuildings.

Simple collecting cans may be made from small shallow tin containers holding cotton, paper, cloth, or matted hay soaked in kerosene, crude oil, soapy water, or soft mud. The tins are mounted on handles, one tin at the end for mosquitoes on the ceiling and one tin on the side for those on the walls. When disturbed, a resting mosquito will fly down into the moist wadding, where it sticks long enough to be overcome by fumes or crushed by fingers. With a scarcity of almost everything but mosquitoes, such improvisation may be required to make an effective collecting can. In some areas it might be possible to have a quantity of mosquito catchers manufactured locally and cheaply from salvaged tins. The appended diagram illustrates a type of catcher used in Italy before the war.

If a room can be closed, a smoke smudge will paralyze all mosquitoes present so that they fall to the floor. Burning a little damp hay or green vegetation on a spade or sheet of metal will produce smoke generally dense enough to paralyze mosquitoes after 15 to 20 minutes exposure. Adding leaves of mint or eucalyptus to the fuel may increase the toxicity of the smoke. But smoke does not kill the insects, as a rule, so they must be swept up and burned or otherwise destroyed while temporarily paralyzed.

The best time of day for hand-killing anophelines is in the early forenoon. The insects are most apt to be found resting on walls and ceilings of bedrooms, stables, pig styres, and out-houses. Some will rest under eulverts, but the majority are in buildings, especially in the darker corners. White-washing or calcimining walls and ceilings of bedrooms and stables not only gives general hygienic improvement, but makes it much easier to see resting mosquitoes. In some locations a good catching time is one hour after sunset, when the insects may collect at windows and screens.

3. CONCLUSIONS.

Naturally, this measure of hand-killing anophelines will not have much effect unless it is done systematically in a majority of the houses of a village. But in view of the increasing malarial potential this season, with greatly reduced facilities for malaria control, it would seem logical to push hand-killing for all it is worth. In some areas it is perhaps the only measure of malaria control possible for the individual householder. Screens, bed nets, sprays, repellents, and prophylactic quinine or atabrine will generally not be available. The mosquito that spreads malaria will usually be found sitting on the walls and ceilings, easily accessible for hand-killing. The householder is not helpless against an insect which sleeps all day right under his hand.

Attempts might well be made to institute effective local propaganda regarding this measure. Civil, school, and church authorities might be helped

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Attempts might well be made to institute effective local propaganda regarding this measure. Civil, school, and church authorities might be helpful. Locally prepared posters, handbills, and other publicity measures should be considered. Competition for prizes might be arranged for school children. At any rate the slogan should be, "Kill Anopheles Mosquitoes and Prevent Malaria".

Paul F. Russell
PAUL F. RUSSELL
Colonel, A. C.
Chief, Malaria Control Branch, AGC

HEADQUARTERS
ALLIED CONTROL COMMISSION
R.C. & M.G. Section
APO 394

Ref/231/54/CA.

21 May 1944.

SUBJECT: Anti-Malarial Measures.

TO : R.Cs. Regions I, II, III, IV, V, VI & VII.
SCAOs. 5th and 8th Armies.

1. Colonel Russell, Chief of the Malaria Control Branch states that anti-malarial measures in the field will break down unless Italian Provincial Medical Officers are provided with transport. As the malaria season is shortly approaching it is imperative that Provincial Medical Officers should move quickly about their provinces. Regional Commissioners will take immediate steps to ensure, if this has not already been done, that one car per province is made available for the use of the Provincial Medical Officer. As the matter is of extreme importance Regional Commissioners will report the steps taken to allocate transport for this purpose.

2. Colonel Russell also states that the rationing of petrol in Region I has brought anti-malarial work to a standstill.

3. Economic Section have been asked to arrange for an increase of the petrol ration in Region I. Arrangements can also be made for increases in other Regions if circumstances warrant and a case is established.

4. This letter cancels our letter 231/53/CA dated 18 May 1944.

WDW/RAC.

W.D. Fiske
for NORMAN E. FISKE,
Colonel,
Deputy Executive
Commissioner.

Copy to: Region VIII.

" IX.

Admin Section (3)

Econ Section

Colonel Russell, Malaria Control Branch.

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HEADQUARTERS
ALLIED CONTROL COMMISSION
R.C. & M.G. Section
APO 394

Ref/231/53/Ca.

18 May 1944.

SUBJECT: Anti-Malarial Measures.

TO : R.Cs. Regions I, II, III, IV, V, VI, VII, VIII & IX.
E.CAOs. 5th and 8th Armies.

1. Colonel Russell, Chief of the Malaria Control Branch states that anti-malarial measures in the field will break down unless Italian Provincial Medical Officers are provided with transport. As the malaria season is shortly approaching it is imperative that Provincial Medical Officers should move quickly about their Provinces. Regional Commissioners will take immediate steps to ensure, if this has not already been done, that one car per province is made available for the use of the Provincial Medical Officer. Economic Section have been asked to arrange. As the matter is of extreme importance Regional Commissioners will report the steps taken to allocate transport for this purpose.
2. Colonel Russell also states that the rationing of petrol in Region I has brought anti-malarial work to a standstill.
3. Economic Section have been asked to arrange for an increase of the petrol ration in Region I, and to arrange for transport being provided, either by re-allocation or requisitioning.

[Handwritten signature]
NORMAN E. FISKE,
Colonel,
Deputy Executive
Commissioner.

JSR/RAC.

Copy to: Admin Section (3)
Econ Section
Colonel Russell, Malaria Control Branch.

File

HEADQUARTERS
ALLIED CONTROL COMMISSION
R.C. & M.S. Section
APO 394

Ref/231/35/GA.

25 April 1944.

EXECUTIVE MEMORANDUM)

NUMBER : 54)

MALARIA CONTROL.

1. Prevention of Malaria in this theatre is of fundamental importance to Allied Forces. Experiences of 1943 in Sicily and the notorious history of areas now occupied or which lie immediately ahead, indicate clearly that the Allies will sustain serious loss of manpower if malaria is not effectively controlled. All signs point to a season of unusually high density of malarial mosquitoes and of civilian carriers of the parasite - the two main factors in the transmission of malaria.

2. Protection of armed forces from malaria involves both intra and extra-entourment control programs. Army regulations, whether British, French, or American, clearly make it the duty of commanding officers of units, great or small, to take adequate steps for protection against malaria. Within and immediately around a military installation malaria prophylaxis is definitely a command function. In many areas there are civil malaria control problems continuous to military camps. Allied Control Commission will provide as much assistance as possible to all cases where civilian malaria or malarigenous conditions are a menace to Allied military engagements.

3. A Malaria Control Branch has been established in the Public Health Sub-Commission of Allied Control Commission. It has the following functions:

- (a) To assist the Army Senior Civil Affairs Officers and Regional Commissioners of Allied Control Commission in restoring and implementing civilian malaria control agencies, and in directing their activities.
- (b) To assist in coordinating civil and military malaria control activities.
- (c) To carry out essential malaria control field tests in cooperation with the Allied Forces.

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 - (b) To assist in coordinating civil and military malaria control activities.
 - (c) To carry out essential malaria control field tests in cooperation with the Allied Forces.
4. The Malaria Control Branch is located in Room 5, Regio Poste Building, Naples. Mail should be addressed to H.Q. Allied Control Commission, Public Health Sub-Commission, Malaria Control Branch, APO 394. The staff of the Branch is as follows:

Chief	Colonel Paul E. Russell, MC.
Medical Officer	Captain V.F. Tuzio, MC.
Malaria Engineer	Captain T.D. Anderson, Sn.C.
Entomologist	1st Lieut. M.A. Manzelli, Sn.C.
5. Direct communication on matters pertaining to malaria control is authorized between the Chief of the Malaria Control Branch, Regional Public Health Officers and Deputy Directors of Public Health, AMC 5th and 8th Armies.
6. Regional and Army Public Health Officers, Allied Control Commission will send to the Chief, Malaria Control Branch, on the first of each month, beginning 1 May 1944, a brief report listing location, type, and budget of local civilian malaria control work in progress, equipment, supply, labor, and transportation conditions, spleen or parasite surveys, malaria incidence figures; and any pertinent comments on the malaria situation. Sketch and spot maps should be included when feasible. The first report should list active Comitato Provinciale Antimalario, giving names and official titles of the members.

1 copy in above file

280

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7. In each province where there is a malaria problem there will usually be found a Comitato Provinciale Antimalario. If this committee has been ~~disputedly~~ it should be reconstituted as soon as possible. The malaria committee should be advised that, if it has not already done so, it should immediately prepare malaria control plans and budgets along the general lines of preceding years. In Regions I, II, VI and VII these malaria control budgets will be submitted (through High Commissioners Sicily and Sardinia in Regions I and VI respectively) to the finance office of the Provincial Government for approval. Thence the approved budgets should be forwarded to the Minister of the Interior of the Italian Government. When approved by the Minister of the Interior, funds will be credited to the Provincial Office. In Regions III, IV and V approved budgets will be forwarded from the provincial finance office to the Regional Finance Officer, Allied Control Commission, who, if he approves will establish credits at the provincial Banco d'Italia. Since the malaria season has already begun, prompt consideration will be given to such plans and budget proposals.
8. So far as Allied Control Commission supplies are concerned, malaria control will be based on drainage, maintenance of drainage canals, canalizing of streams, regulation of water, filling, oiling, and the proper treatment of clinical cases. Excepting as civilian supplies are available from last year's stocks, no Paris Green is obtainable by Allied Control Commission for the control of civil malaria. Oil in reasonable amounts is available for laviciding. Sprayers for oil are in limited supply but brush oiling may be substituted for spraying in most cases, if necessary. Considerable ingenuity will be required in regard to transport where motor vehicles are not available on requisition. Full use must be made of mules, horses, donkeys and oxen. In many cases workers will have to walk to and from their work. Where vehicles are available but there is lack of gasoline, applications for gasoline will be favourably considered. Where the work is directly associated with military installations it may be possible to obtain transport assistance from the Commanding Officer.
9. Upon approval of plans and budgets, it is possible to obtain oil from the nearest agency of the Comitato Italiano Petroli on requisitions approved by the Provincial Office or C.I.O. Transport will have to be provided by the Comitato Provinciale Antimalario or the local requisitioning agency. The Medical Supply Branch, Allied Control Commission will send to each Regional Headquarters the provincial quota of sprayers. These may be obtained by the local malaria control agency from Regional Headquarters, Allied Control Commission.
10. Gasoline is not available to Allied Control Commission for distribution but supplies of atabrine/repacrine for therapeutic use have been provided. Each Regional Public Health Officer, Allied Control Commission, will requisition from the Medical Supply Branch, Public Health Sub-Commission, Allied Control Commission, the amount of atabrine/repacrine required by his regional provinces. The Supply Branch will send the desired amount to the Regional Headquarters from which provincial distribution will be made to the local malaria committee on requisition.

...is available for hand-carrying. Sprayers for oil are in limited supply but brush oiling may be substituted for spraying in most cases, if necessary. Considerable ingenuity will be required in regard to transport where motor vehicles are not available on requisition. Full use must be made of mules, horses, donkeys and oxen. In many cases workers will have to walk to and from their work. Where vehicles are available but there is lack of gasoline, applications for gasoline will be favourably considered. Where the work is directly associated with military installations it may be possible to obtain transport assistance from the Commanding Officer.

9. Upon approval of plans and budgets, it is possible to obtain oil from the nearest agency of the Comitato Italiano Petroli on requisitions approved by the Provincial Officer or C.I.A.O. Transport will have to be provided by the Comitato Provinciale Antimalaria or the local requisitioning agency. The Medical Supply Branch, Allied Control Commission will send to each Regional Headquarters the provincial quota of sprayers. These may be obtained by the local malaria control agency from Regional Headquarters, Allied Control Commission.

10. Quinine is not available to Allied Control Commission for distribution but supplies of atabrine/mepacrine for therapeutic use have been provided. Each Regional Public Health Officer, Allied Control Commission, will requisition from the Medical Supply Branch, Public Health Sub-Commission, Allied Control Commission, the amount of atabrine/mepacrine required by his regional provinces. The Supply Branch will send the desired amount to the Regional Headquarters from which provincial distribution will be made to the local malaria committee on requisition.

Due to the inadequate supply, suppressive prophylactic use of atabrine/mepacrine can not be recommended for civilians. Every effort should be made (a) to facilitate distribution of atabrine/mepacrine to civil agencies for treatment of malaria, and (b) to check prophylactic use of atabrine/mepacrine among civilians unless they are engaged in operational war work or have been ordered by military authority to take it. In the latter case atabrine/mepacrine will be supplied from military sources.

11. Finally the importance of malaria control is again stressed. It is a general administrative problem in which every officer in the Region must play his part. Regional Commissioners, Provincial Commissioners, and all Allied Control Commission Health Officers must do everything in their power to stimulate and facilitate civilian malaria control programmes. The highest priority will be given to work in the vicinity of Allied military installations.

DISTRIBUTION: "A".

MSL
M. S. LUSH,
Brigadier,
Executive Commissioner.

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PENINSULAR BASE SECTION
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AS 710 BMSD

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. Martin

D. W. MARTIN
Major, A.G.D.
Asst. Adj. Gen.

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Malaria Control in the Army

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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, Pontine Marshes, Balkans, Mesopotamia, India, Burma, South China, New Guinea, Bismarck and Solomon Islands are notoriously malarious. Thus for most theaters, including AFRICA, 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 25,000 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-Cora 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 NATOUSA 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 organs. 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 treatment, 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 NATOUSA 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 8 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 INDONESIA can fly up to two miles, twice as far as in the average tropical area. In INDONESIA, 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 INDONESIA, 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 INDONESIA, 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 imperiled 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 MALAYA 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) Technique 328

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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 diarrheas 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, (b) (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 gossypol; 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.O.G. Circular letter #22, of 16 January 1943, in FM 21-10 and FM 8-40, 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 encouraged to use them. For this reason, military malaria control is basically a command function and will be successful in large proportion to the degree to which line officers develop malaria control and 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 A

ARMY REGULATIONS, CIRCULARS AND DIRECTIVES HAVING SPECIAL
REFERENCE TO MALARIA PREVENTION AND CONTROL

a. 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 man. 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. 31) 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 100-80. 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 post sources on real property are necessary, the post commander or 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. CIB. #239. 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 #239 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.

(h) 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 100-20, 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. 66-1, 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 these 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-SMCT-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) NATOUSSA Circular No. 12. An example of a theater directive is NATOUSSA 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 NATOUSSA 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 28 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 B

SPECIAL 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 these 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 Malariaology at Fort Clayton in Panama where Medical and Sanitary Corps officers and Survey and Control Units will be given thorough training in malariaology. 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. Dunham, 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 Lta. E.S. Rose 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, M.C., and Mrs. 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 Microscopical

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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 Buna 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 11 September 1943, issued by the Surgeon, NATOU3A, deals with the pharmacology of atobrine, its rational therapeutic use, and the duration of hospitalization of malarial patients.

h. Bulletin. There is a NATOU3A 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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APO 394

Cross Reference Sheet

File: 710.

Subject: Designation of chief Allied adviser in Malariaology ^{Corsica}

Date: 12 April 1944

Allied Air Commander - CORSICA.

Commanding General, SOS NATOUSA, APO 750.

Commanding General, Northern Base Section, APO 386.

To: Commander-in-Chief, Mediterranean Allied Air Force, APO 650.

From: A.F.H.Q. Col. J. L. Tarr

Documents Filed: 370.43

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