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**EXPERT COMMITTEE ON  
MALARIA**

**Report on the Fourth Session**

*Kampala, Uganda, 11-16 December 1950*

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WORLD HEALTH ORGANIZATION  
PALAIS DES NATIONS  
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## EXPERT COMMITTEE ON MALARIA

### Fourth Session

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The report on the fourth session of this committee was originally issued in mimeographed form as document WHO/Mal/70, 27 December 1950.

## EXPERT COMMITTEE ON MALARIA

### Report on the Fourth Session <sup>1</sup>

The fourth session of the Expert Committee on Malaria took place in Kampala, Uganda, from 11 to 16 December 1950, immediately following the meetings of the Malaria Conference in Equatorial Africa,<sup>2</sup> held under the joint auspices of WHO and of the Commission for Technical Co-operation in Africa South of the Sahara (CCTA), in accordance with the suggestion expressed at its third session.<sup>3</sup>

Sir Gordon Covell was elected Chairman, and Médecin-Général Vaucel Vice-Chairman.

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<sup>1</sup> The Executive Board, at its seventh session, adopted the following resolution  
The Executive Board

1. NOTES the report of the Expert Committee on Malaria on its fourth session;
2. THANKS the members of the committee for their work;
3. AUTHORIZES the publication of the report;
4. APPROVES the recommendations on the malaria policy of WHO, and
5. REQUESTS the Director-General to implement them as far as possible;
6. REQUESTS the Director-General to draw the attention of the competent authorities of the Member Governments responsible for the administration of African territories to the desirability of initiating experimental schemes of malaria control and eventually vector-species eradication, indicating WHO's willingness to consider giving technical assistance to an approved scheme;
7. NOTES the recommendation concerning the free flow of insecticides and requests the Director-General to implement it as far as possible;
8. REFERS the report, and in particular the section dealing with insecticides, to the next session of the Expert Committee on Insecticides, and
9. REQUESTS the latter to prepare, for the use of the Director-General, a specification chart of spraying apparatus;
10. TRANSMITS to the Special Committee established by the Third World Health Assembly to consider the draft International Sanitary Regulations, the recommendation concerning the prevention of the spread of anopheline vectors of malaria by international air transport;
11. INSTRUCTS the Director-General to appoint a working party from the Expert Advisory Panel on Malaria to prepare, by correspondence, a short monograph on the therapeutics of malaria;
12. APPROVES, in principle, the recommendation that a drafting group on standardization of procedure in epidemiological inquiries be convened, and
13. REQUESTS the Director-General to implement this recommendation when finances permit.

(Resolution EB7.R76, *Off. Rec. World Hlth Org.* 32)

<sup>2</sup> The report of the Malaria Conference in Equatorial Africa is published as *World Health Organization: Technical Report Series*, 38

<sup>3</sup> *World Hlth Org. techn. Rep. Ser.* 1950, 8, 24

The provisional agenda was adopted with the addition of section 3.2 on "Prevention of transport of anopheline vectors by aircraft".

At the request of the conference, the committee held a brief extraordinary meeting in Kampala on 30 November to consider the nomenclature of various degrees of malaria endemicity. A provisional set of definitions was adopted by the conference on the basis of those suggested by the committee.

The committee notes with pleasure that the Executive Board at its fifth session expressed its appreciation of the report on the third session and that the Director-General has taken appropriate action in implementing many of the recommendations put forward.<sup>4</sup>

## 1. MALARIA POLICY OF WHO

### 1.1 Present Policy

1.1.1 The committee considered in detail the malaria policy adopted by WHO on the recommendation of its second<sup>5</sup> and third<sup>6</sup> reports, and the steps taken by WHO to implement this policy during 1949 and 1950. It endorses this policy, the form of which has been justified by results.

It considers that progress has been made towards attaining the objectives outlined in its second report and that WHO policy has materially helped in this advance. However, it wishes to emphasize the continuing need for the active encouragement of malaria control by all means within the province of WHO, without which progress may not be maintained.

In particular, the committee notes that, in every case where malaria-control demonstration teams have been sent out, there has been a significant reduction in the local infant parasite-rate, which is the most reliable index for the assessment of malaria-control measures on a short-term basis. In the opinion of the committee, these promising results justify a continuation of this form of WHO technical assistance to underdeveloped areas.

There is also evidence that the granting of fellowships to selected personnel, the assignment of consultants to requesting countries, and the sending of lecturers to take part in malariology courses have been of very considerable value.

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<sup>4</sup> *Off. Rec. World Hlth Org.* 25, 9

<sup>5</sup> *Off. Rec. World Hlth Org.* 11, 43

<sup>6</sup> *World Hlth Org. techn. Rep. Ser.* 1950, 8

### 1.1.2 *Suggested modifications in policy*

1.1.2.1 *Malaria-control demonstration teams.* The committee foresees that a serious obstacle to the satisfactory working of such teams may be the fact that personnel engaged on a short-term basis would have no security of tenure. The committee believes that the personnel should be engaged on a long-term basis, so that when one assignment is completed they may be available to proceed to another without interruption of service. By this procedure not only would there be a reservoir of trained staff constantly available, but their efficiency for this type of international co-operation would be greatly enhanced by the experience gained in previous assignments. The committee believes that a small number of teams operating on this basis would be of far greater value than a larger number engaged on short-term contracts.

It has been found that, especially in underdeveloped areas, control measures can rarely be put into operation until several months have elapsed following the arrival of a team in the country where it is destined to work. Since the effect of control operations cannot be assessed with any degree of accuracy until they have been in progress for a period of two complete years, the committee recommends that the term of each team be of at least three years' duration. In some cases a term of four or even five years may be found necessary.

The committee believes that, as a general rule, teams should be sent only to underdeveloped areas where there has as yet been no adequate demonstration of the utility of modern measures of malaria control. It reaffirms its conviction that one of the chief functions of such teams should be to foster and assist in the development of local malaria organizations and particularly in the training of staff.

The committee considers that its original recommendation that the control programme of demonstration teams should be primarily carried out by residual insecticidal methods should not be interpreted to mean that this measure is necessarily to be used to the exclusion of all others. It is very necessary that each team should have directive professional staff capable of carrying out field research in order to arrive at a correct assessment of the value of the measures used.

The committee also believes that in highly malarious areas teams should not be burdened with other duties until the control of malaria is well established. As a general principle teams cannot hope to bring intense malaria under control if at the same time they are required to engage in other public-health activities such as nutritional schemes, infant and maternal welfare, and the improvement of water-supplies. In areas where malaria is essentially seasonal the inter-transmission period should be primarily employed in the training of subordinate personnel, the assessment of

results, the repair of equipment, and preparations for the next season's work.

1.1.2.2 *Courses in malariology.* The committee in its second report recommended that WHO provide technical assistance in setting up international courses in malariology in regions not provided with such facilities. It notes with satisfaction that one such WHO course is planned for 1951. It also notes that the Malaria Conference in Equatorial Africa recommended that the participation of WHO be solicited for the setting-up of a similar course in Africa, which is one of the areas specified by the committee as suitable in its second report. The value of such courses is once more emphasized and it is hoped that consideration may be given to the possibility of WHO assisting in the setting-up of three malaria courses in 1952; one in Africa, one in South-East Asia, and one in the Eastern Mediterranean region. The committee has heard with satisfaction of the possibility of a WHO-sponsored seminar for rural malaria control in the Far East to be held in Singapore in 1951. It agrees that it would be useful to invite to such a meeting the senior malariologists of the area together with one or two members of the expert committee.

1.1.2.3 *Fellowships.* The committee in its second report recommended that WHO provide fellowships and travel grants for training in malariology and it notes with satisfaction that WHO has been able to help a number of Member States in this way. It hopes that this policy may be continued and wishes particularly to emphasize the usefulness of short-term field fellowships. The latter would enable relatively junior malaria-control personnel to study in the field the practical aspects of projects with features bearing on the problems existing in their own areas. For example, the residual-spraying projects in Delhi and Bombay States, India, are successfully protecting large rural populations at a very low cost. It would be useful if some of the practical lessons to be learned in these areas could be made available to personnel operating in other parts of South-East Asia or even as far away as East Africa.

### 1.1.3 *Malaria in underdeveloped areas*

The committee wishes to emphasize once more the fact that in certain countries malaria still constitutes the greatest obstacle to development. It reaffirms its previous recommendations that in every WHO programme of technical assistance to highly malarious underdeveloped areas malaria control be given the highest priority.

The need for such priority was recognized at the Intergovernmental Conference of Far Eastern Countries on Rural Hygiene, in the following statement : <sup>7</sup>

<sup>7</sup> League of Nations, Health Organization (1937) *Report of the Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene*, Geneva, p. 90

"In those areas where malaria is the outstanding social and health problem, the resources of the health administration, specially augmented where necessary, should be directed chiefly towards malaria control, even if this should entail the restriction of other public health activities, until malaria is no longer of major importance."

Experience has repeatedly shown that in the presence of intense malaria it is extremely difficult to initiate other public-health work but that after malaria has been curbed the people welcome additional public-health projects.

#### 1.1.4 *Agriculture and malaria*

The committee considered a report<sup>8</sup> on the first meeting of the Joint FAO/WHO Working Party on Food Production and Malaria Control, and it also reviewed the pertinent sections of its own second and third reports.

It notes with appreciation that an active start has been made towards implementing some specific schemes and agrees with the working party's criteria governing the selection of areas for joint FAO/WHO projects for increasing food-production and raising standards of health in malarious areas. In particular, it considers that :

- (1) the San Andres region of El Salvador is a suitable area ;
- (2) suitable areas exist for joint projects of this nature in the Uva Province of Ceylon. The existing malaria-control schemes of the Ceylon Government do not obviate the need for control in Uva Province, but the experience gained in the Ceylon residual spraying campaign would facilitate the operations of a joint FAO/WHO project ;
- (3) suitable areas exist in Syria and in the Lebanon, notably north of Homs and south of Baalbec, but as the endemicity varies greatly from place to place in these countries, no further statement can be made without more detailed knowledge of the localities proposed ;
- (4) suitable areas exist in the land comprising Israel and Jordan, although a project in these areas might be complicated by the difficulties of operating in two countries at one time.
- (5) The negotiations with the Government of India concerning a scheme in the Terai were noted. Areas fulfilling the criteria concerning malaria exist in this territory and WHO operates a malaria-control demonstration team in it, in collaboration with the Uttar Pradesh Government and UNICEF. Should it be decided to implement a scheme in this area, the experience already gained by the team would be invaluable.

### **1.2 Planning Malaria Control in Africa South of the Sahara**

1.2.1 The committee acknowledges its appreciation of the privilege of attending the Malaria Conference in Equatorial Africa convened under

<sup>8</sup> Unpublished working document MH.1010.50

the auspices of WHO and of the Commission for Technical Co-operation in Africa South of the Sahara (CCTA). It congratulates WHO and CCTA on having assembled the conference. Important recommendations were made and much scientific information was disclosed and discussed, and these should form a basis for the initiation of new campaigns against malaria in this part of Africa. The committee not only approves the recommendations of the conference<sup>9</sup> but it considers that the report with its recommendations should serve as a basic document for governments and for WHO in formulating policies on the control of malaria in Africa south of the Sahara. The committee recommends that WHO impress on CCTA and Member States responsible for territories in Africa the importance of implementing these recommendations.

1.2.2 The committee recommends that WHO draw the attention of Member States to the extreme importance of establishing malaria-control organizations within the territories for which they are responsible, as advised in section 6.1 of the conference report. The evidence presented to the conference showed that the importance of malaria control in Africa justifies a special financial allocation for the establishment of such organizations.

1.2.3 A specialized malaria-control service can function successfully only if, as recommended by the committee, it be "of adequate size, staffed by adequately paid and adequately trained personnel".<sup>10</sup> The committee considers that the number of adequately trained personnel now available in Africa is quite insufficient for the needs of the countries concerned and that this insufficiency applies to all grades of staff. Training arrangements will be necessary for the different grades and in most cases should be provided locally. Special training of upper grades of directive professional staff would be greatly helped by international courses such as those mentioned in recommendation 16 of the conference. Short-term fellowships (recommendation 17) would also be very useful to enable staff to visit successful schemes of control in countries other than their own.

1.2.4 The committee recommends that WHO suggest to CCTA specifically that it can render a valuable service in helping to select suitable personnel to attend these courses and to be given fellowships.

1.2.5 The committee particularly endorses recommendation 3.1 of the conference. The initial scale of malaria-control work and the priority with which it should be established in different areas will be determined by local considerations, such as ease of access to large populations; suitability of areas for economic development, especially when the immigration of

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<sup>9</sup> See Annex 1, page 25.

<sup>10</sup> *Off. Rec. World Hlth Org.* 11, 57

susceptible people is involved; and the concurrent institution of other public-health measures. The existence of a high degree of immunity should not delay the start of work in areas considered suitable on other grounds.

1.2.6 The committee recommends that WHO suggest to CCTA that it could do valuable service by encouraging Member States, when instituting a control scheme in a large area in which the population appears to have a high degree of tolerance to malaria, to seek the advice of WHO in the assessment of the benefits that malaria control may bring about (as stated in recommendation 3.4 of the conference). The importance of this assessment might justify the assignment to the project for long or short terms of one or two experts of WHO. Other forms of assistance might become apparent after discussion with the governments concerned.

1.2.7 The committee notes the statement of the conference, embodied in recommendation 6, as regards methods of control by residual insecticides most suitable to Africa. It considers these methods particularly appropriate to rural areas, but suggests that their use should not preclude the employment of other measures of local value. It emphasizes the need to initiate schemes of sufficient size to be economical in relation to the numbers protected, and considers that such schemes should be maintained in continuous operation for a considerable period after a satisfactory degree of control has been achieved. It also draws attention to the need for further research as recommended by the conference.

1.2.8 *Species eradication in the absence of natural barriers*

At its second session the committee stated that there are two main concepts in modern malaria-control programmes: species eradication, and the prevention of malaria by the use of insecticides without attempting actual eradication of vector species. The first had been attempted only in places where natural barriers existed to prevent reinvasion, and the committee suggested an experiment in the absence of natural barriers in Africa.

At its third session the committee deferred further consideration until after the Malaria Conference in Equatorial Africa, which has now been held and at which the matter was discussed but no specific recommendations were made.

Few malariologists would now consider that the two concepts named are as distinct from each other as was considered the case in 1948. Experience since then has shown that the essence of an economic anopheline eradication scheme is prolonged persistent attack, and a school of thought maintains that prolongation of effort is more likely to lead to success than great concentration of effort in a short time, though the latter has

been shown to be effective in some cases. On the other hand, the possibility of normal control schemes by modern methods securing a progressive diminution in anopheline breeding has seemed more hopeful than it once did. The two concepts thus tend to merge.

The details of the Ilaro anopheline control scheme in Nigeria were explained to the conference and it was stated that it was instituted as an effort to implement the relevant recommendation of the committee. It appears to be an adequate original exploration of the subject and should be accepted as such though it is not financed or otherwise supported by WHO. Data on the subject are also being supplied by the Mauritius anopheline eradication scheme (although this applies only to an island).

The committee wishes to see similar projects carried out elsewhere in Africa, using variations of the methods used in Ilaro, or different ones. The principles of such work should be :

(1) The original careful choice of an area, infested by *Anopheles gambiae* and not containing any major economically unmanageable tract.

(2) The careful survey of the area to secure the maximum possible numerical data on the prevalence of malaria and of vector anophelines, both adult and larval, at all seasons of the year.

(3) The institution of carefully supervised control measures, either larvicidal or imagocidal or both, associated with careful numerical checks on anopheline density and distribution, adult and larval.

(4) Experimentation, as dictated by circumstances, in changes in control routine which might result in a progressive decrease in anopheline breeding, with adoption of promising techniques in practice, no preference being shown for either antilarval or anti-adult measures.

The committee does not now recommend the specific institution of such a scheme by WHO. It recommends the general principle to the attention of governments as an experimental elaboration of normal control schemes and considers that WHO should encourage any such scheme and, if necessary, give it technical assistance. It also wishes to express its obligation to the Government of Nigeria for undertaking the Ilaro scheme as an experiment of this nature.

## 2. MALARIA CONTROL BY RESIDUAL SPRAYING

The committee wishes to emphasize that, as noted in its third report, experience has proved residual spraying to be a measure of major importance. This form of attack on the adult vector, when used alone, has resulted in excellent malaria control in parts of Venezuela, British Guiana,

Brazil, Argentine, Peru, Italy, Mauritius, Ceylon, India, and elsewhere. The committee is of the opinion that when such results can be obtained it is not, as a rule, economical or useful to undertake larvicidal measures. The committee does not, however, wish to imply either that larviciding is not in some areas a method required in addition to residual spraying and in other areas even the method of choice instead of residual spraying, or that it is not in some situations wise to carry out permanent drainage or filling as antilarval measures. Local conditions vary greatly, and those measures of control should be adopted which best suit specific needs from the standpoint both of economy and of efficiency, taking into consideration the behaviour and habitats of the vectors. Nevertheless, the committee believes that practical results in many communities justify residual spraying being given a trial in antimalaria projects however unfavourable the local conditions may appear to be.

The committee is aware that residual spraying has not been universally successful in rapidly reducing malaria incidence. In some areas of Africa, in the Philippines, and in a few other places, there have been reports of disappointment in its use. DDT in Africa and benzene hexachloride (BHC) in Malaya have been reported to exert an excitant effect on certain vectors. This so shortens the time of contact with the toxicant that a proportion of the mosquitos alighting on the treated surfaces may not die. Certain other variations in the behaviour of the adult mosquito vector may tend to lessen the usefulness of residual spraying and should be the subject of further critical study. A knowledge of the biology as well as the taxonomy of the mosquito vector is in most cases indispensable in residual spraying.

The committee believes that any failure to obtain malaria control with residual spraying needs to be carefully re-examined, particularly in view of the newer knowledge of the importance of crystal size and shape and of formulation and dosage. It is also important to study the effects of environmental and other factors on the duration of residual action. The committee further believes that in areas where larviciding is the cheapest method of malaria control, some appraisal should be attempted of the residual-spraying benefits derived from the destruction of such household insects as fleas, lice, cockroaches, and flies. In certain areas, as for example in some of the less malarious parts of Ceylon, a notable decline in infant mortality following residual spraying may have been due to a reduction in bowel infections as well as in malarial fevers.

In regard to the destruction of other insects in the course of malaria control by residual spraying, the committee in its second and third reports noted the occurrence of resistant strains of houseflies. It is now apparent that in most areas there are strains of flies which are resistant not only to DDT, but also to other insecticides of the chlorinated hydrocarbon

group. Such strains replace the original fly population after a few years and are very disturbing to a community which has become accustomed to spectacular relief from fly nuisance in the early sprayings. Unfortunately, there is no other residual insecticide which can be recommended at the present time for the dual purpose of killing resistant houseflies and malaria vectors.

Frequently, residual-spraying projects are so quickly successful in reducing the incidence of clinical malaria that a false impression of safety from this disease is created. The committee desires to point out that, so long as there is any focus of malaria in the area, or endemic malaria existing on its borders, it is not wise to terminate a residual-spraying project even though clinical malaria appears to have become rare. There is real danger of reappearance of malaria in the previously treated area under these conditions. Moreover, as noted above, it is often wise to continue residual spraying as a measure of household disinfestation.

In its last report the committee discussed the hazards of DDT to man and it reaffirms its opinion that DDT, as commonly applied for residual spraying, is harmless to man and animals, though it has noted that in some countries the authorities have deemed it wise to forbid the use of DDT in dairies on the ground that this may lead to the appearance of DDT in the milk. As previously stated, DDT and other insecticides should be used with due caution to avoid the contamination of food and of cooking utensils. Finally, the committee suggests that great caution should be observed in the experimental use of new insecticides which have not yet been shown to be free from danger to man and animals.

### 3. INSECTICIDES

#### 3.1 Report of the Expert Committee on Insecticides

The committee had an opportunity to study and to discuss the report on the second session of the Expert Committee on Insecticides.<sup>11</sup> It expresses its appreciation of the comprehensive and lucid text and technical annexes presented therein, and finds itself in essential agreement with the conclusions and recommendations.

In particular the committee notes the concurrence of the Expert Committee on Insecticides in the idea of rigid antimosquito sanitation of air- and seaports as an essential part of quarantine measures designed to prevent the spread of malaria vectors.

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<sup>11</sup> *World Hlth Org. techn. Rep. Ser.* 1951, 34

The committee is in agreement with the recommendations of the Expert Committee on Insecticides regarding the method and timing of the disinfection of aircraft and with the composition, dosage, and methods of distribution of insecticides in aircraft. It expresses the hope that in the next report of the Expert Committee on Insecticides there may be included an alternative formula or dosage for use in places where less pyrethrum is required than is admittedly advantageous in the disinfection of aircraft. It seems to the committee that there may be some waste of pyrethrum from the use of this single formula and dosage when the larger quantities are not, in fact, required.

The committee is particularly interested in the specifications laid down by the Expert Committee on Insecticides for spraying apparatus, and considers these to be of vital importance, worthy of wide dissemination to manufacturers, buyers, and users. It recommends strongly that a further step be taken by WHO to increase the practical value of the specifications, viz., that a specification chart of as many as possible of the types and models of sprayers now on the market be prepared from samples deposited with WHO by the manufacturers. This specification chart, as visualized by the committee, would consist of a factual analysis of the sprayers, part by part, with a presentation in tabular form of the conformity or otherwise with the specifications laid down by the Expert Committee on Insecticides in its second report. Such a chart would be of great value not only to buyers and users of spraying equipment, but also to manufacturers, who would no doubt tend more and more to meet the requirements which had been set up so carefully and which would be based on the practical needs of spraying procedures in the control of vectors of malaria and other diseases.

The committee also believes that there is need for more uniformity in the naming of types and parts of sprayers, and it suggests that some consideration be given to this point by WHO through the Expert Committee on Insecticides. The committee would also welcome any amplification of the details of sprayer construction.

The committee notes that additional data are being collected by the Expert Committee on Insecticides on stirrup pumps, and looks forward to the development of more-detailed specifications for this type of equipment. The committee also hopes that some consideration may be given to the question of specifications for apparatus suitable for applying dust insecticides.

Further, the committee suggests that it would be helpful to those engaged in malaria control if the Expert Committee on Insecticides could prepare detailed instructions and warnings as to methods of storage under varied climatic conditions, in order to avoid deterioration of insecticides.

The committee views with much satisfaction the very considerable measures already taken by WHO to develop specifications for insecticides,

and to ensure the conformity of insecticides supplied for insect-control programmes, and it hopes that this procedure may be extended throughout the world. It suggests to the Expert Committee on Insecticides the preparation of specifications for diluents for wettable powders of DDT, BHC, and similar toxicants. Such diluting substances now vary greatly as to particle size and particle hardness, and this has practical importance. If particle size is too great, the diluent may mask the toxic effect; if the diluting particles are too hard, they may destroy the usefulness of a nozzle in a very short time.

So, too, more study and emphasis seem to be required regarding the size and shape of crystals of such insecticides as DDT. It seems probable that in some cases conflicting results, reported by competent observers who thought that they were using essentially similar materials, have been due to unsuspected differences in the residual films actually obtained.

Finally, the committee concurs in the recommendations of the Expert Committee on Insecticides that WHO should draw the attention of Member States to the fact that, for the practical continuation of the control of insect vectors of human disease, an increase in fundamental research is imperative. The committee notes in particular the growing numbers of insect strains of various species found to be resistant to DDT, BHC, Chlordan, and Dieldrin, all of which may now fail to deal effectively with houseflies. While no species of *Anopheles* has yet been found to have any significant degree of resistance to insecticides, yet, in view of the occurrence of resistant *Culex* and *Aedes* species, it cannot be denied that eventually resistant strains of malaria vectors might be encountered. The committee points out the special need for research in which insect physiologists and organic toxicant chemists may collaborate in an attempt to determine the basic mechanisms involved in the relationship between insect, toxicant, and formulation.

### 3.2 Prevention of Transport of Anopheline Vectors by Aircraft

3.2.1 The committee considered the measures advisable for the prevention of transport of dangerous anopheline vectors of malaria by international air transport, bearing in mind the need to produce the minimum of interference with traffic compatible with the maintenance of public health.

The two most important dangers are :

(1) the spread of anophelines regarded as of major importance in the transmission of malaria to continents, or major sub-continental divisions, outside their normal range of distribution, as for instance the spread of *Anopheles gambiae* to the Americas, and

(2) the redistribution of any acknowledged vector of malaria within the zoological area to which it naturally belongs, as for instance by the extension of its distribution to nearby countries or by the reinvasion of areas from which anopheline species have been eradicated.

Quarantine and disinfestation measures should be so designed as to meet these two major risks. If possible, they should be adapted to prevent or limit any additional anopheline movement without imposing important restrictions on traffic.

3.2.2 The committee does not think that these objectives can be secured by the designation of countries or other large areas as infested areas, thereby giving a general right to other countries to enforce disinfestation. The principles of prevention should be based on the designation of international airfields according to the risk of anophelines invading aircraft on them ; and also the granting of the right to demand disinfestation to authorities governing airfields, if there is danger to public health from invasion by foreign anophelines imported by aircraft.

3.2.3 As noted above, and as stressed in its previous reports, the committee considers that the most effective means of avoiding transference of anophelines is through the rigid sanitation of airfields and their vicinity in order to remove the risks of anopheline invasion of aircraft, or of multiplication of imported anophelines.

No measures of disinfestation of aircraft can lessen the importance of these precautions.

3.2.4 As additional measures the committee recommends that the following steps should be taken.

3.2.4.1 WHO should prepare and maintain a list of anophelines considered to be of major importance on account of the risk of their transference to other continents or major subcontinental divisions and of their potentiality for causing dangerous outbreaks of malaria in the places to which they might be transferred. This list should be based on a consideration of anophelines as regards :

(1) their efficiency as vectors in their normal environment during the season of malaria transmission, as shown by sporozoite-rates ;

(2) their wide distribution within their normal zoological area, indicating ready adaptability to different environments ;

(3) their breeding-habits, it being considered that species breeding in such places as artificial water reservoirs, pools, and swamps are more likely to find opportunity of multiplication near airfields than species preferring such places as streams or forest surroundings ;

(4) any previous evidence of a tendency to extension of range.

This list should initially include *Anopheles albimanus*, *culicifacies*, *darlingi*, *gambiae*, *labranchiae*, *melas*, *sacharovi*, *stephensi*, *sundaicus*, and all the members of the *punctulatus* group. The list should be revised, when it appears necessary, by WHO after consultation with appropriate members of the Expert Advisory Panel on Malaria.

3.2.4.2 Airfields should be classified on the evidence of the governments concerned and with the approval of WHO as either :

(1) free from anophelines, that is without breeding of any known anopheline vector of malaria within a radius of 5 km, either naturally or as a result of control conforming to a system approved by WHO. If breeding of such anophelines occurs within a radius of 10 km, all buildings on the airfield should be sprayed with residual insecticide ;

(2) free from anophelines of major international importance, that is without breeding of anophelines listed as such within a radius of 5 km, either naturally or as a result of control conforming to a system approved by WHO. If breeding of such anophelines occurs within a radius of 10 km, all buildings on the airfield should be sprayed with residual insecticide ;

(3) protected against any serious anopheline invasion, that is with all buildings on the airfield treated with residual insecticide according to a routine approved by WHO and with adequate control of anopheline breeding within a radius of 1 km, or

(4) uncertified as regards risks of anopheline invasion.

3.2.4.3 Countries wishing to secure recognition of airfields within their territory, or a part of their territory, as specially liable to anopheline invasion and to enforce exceptional protective measures against the risk of importation of foreign anophelines should produce evidence to the satisfaction of WHO showing that :

(1) the terrain within 50 km of the airfields appears to be free from anophelines, or from certain named species of anophelines, and that

(2) potential and suitable breeding-places for anophelines, or for the named species, exist within 5 km of the airfields and cannot be readily eliminated or controlled, and that

(3) there is reasonable ground to fear an invasion by anophelines, or by the named species of vectors.

3.2.4.4 Aircraft on intercontinental journeys should be disinfested before leaving any airfield not classed as either free from anophelines or free from anophelines of major international importance, and, if required, on the next airfield at which they land.

3.2.4.5 Aircraft on international journeys but not travelling between continents or continental subdivisions designated by WHO should be

disinfested before leaving any airfield which is uncertified as regards risks of serious anopheline invasion, and, if required, on the next airfield on which they land.

3.2.4.6 Authorities governing airfields recognized under section 3.2.4.3 as specially liable to anopheline invasion should be entitled to require disinfestation of any aircraft which, since last obtaining a disinfestation certificate, has landed on an airfield not classed as free from anophelines.

3.2.5 It is of first importance to prevent the invasion by anophelines of the many islands in the South Pacific Ocean which together constitute a major zone of the world hitherto free from them, and which the committee considers specially liable to invasion. WHO is advised, in consultation with the South Pacific Commission, to define the limits of the zone now free from anophelines. On completion of this definition all airfields within this zone should be recognized as specially liable to anopheline invasion and the governments responsible given authority to enforce disinfestation as set out in section 3.2.4.6 without the necessity of producing evidence concerning each individual airfield.

### 3.3 Production and Distribution of Insecticides

The Expert Committee on Malaria considered with interest the action taken by the Economic and Social Council of the United Nations, the World Health Assembly, and other bodies, in connexion with the promotion of the free flow of insecticides and the waiving of customs duties on them—measures conforming with a recommendation in the committee's second report.

The committee is of the opinion, in the light of this information and that contained in the second report<sup>12</sup> produced by the Secretary-General of the United Nations on the availability of insecticides for the control of malaria, that the best means of implementing the pertinent resolution of the World Health Assembly<sup>13</sup> would be through the medium of an international agreement, as suggested by the Economic and Social Council of the United Nations.

## 4. MALARIA THERAPEUTICS

4.1 The committee wishes to repeat the opening paragraph of the section on modern antimalarials in the report on its third session:<sup>14</sup>

<sup>12</sup> United Nations Economic and Social Council (1950) *Availability of insecticides for the control of malaria* (Document E/1709)

<sup>13</sup> Resolution WHA3.43, *Off. Rec. World Hlth Org.* 28, 30

<sup>14</sup> *World Hlth Org. techn. Rep. Ser.* 1950, 8, 7

"A considerable amount of new evidence has recently accumulated about many of the new drugs, but the committee feels that none of these agents satisfies the ideal conditions, namely: that it be a causal prophylactic against all species of human malaria parasites; that it be a good therapeutic agent and, at the same time, be truly curative; that it possess low toxicity; and that it be readily available at moderate cost. In these circumstances, it is essential to point out that all the available antimalarial drugs have various limitations which must be kept in mind when considering the suitability of a chemotherapeutic agent."

In the third report, as well as in the report on the second session, a detailed account was given of the following antimalarials:

1. Quinine
2. Mepacrine
3. Chloroquin and other 4-aminoquinolines
4. Proguanil
5. Pamaquin and other 8-aminoquinolines

It is not thought necessary to include in the present report a similar review, but the committee reaffirms in general its previous conclusions with the addition of the following brief comments.

The committee considers that quinine still has a place in the treatment of malaria, especially for intravenous use, in cases of grave emergency, and in conjunction with one or other of the 8-aminoquinolines, in the treatment of relapsing vivax malaria.

Further experience of the 4-aminoquinolines, such as chloroquin and amodiaquine (which is now available commercially as Camoquin), has confirmed the great value of this group of drugs both for therapeutic and for suppressive use.

In the case of proguanil, further experience has shown its chief value to lie in prophylaxis, but for the treatment of clinical cases in non-immunes, especially of falciparum malaria, it cannot be relied upon without reinforcement with other more powerful schizonticides. It is still necessary to bear in mind the possible development of parasite strains resistant to this drug.

4.2 The committee feels that most medical practitioners in malarious areas would appreciate having a booklet containing the most essential and reliable information upon modern antimalarial drugs, information which is now scattered through medical journals of various countries.

The committee therefore recommends the publication by WHO of a small authoritative brochure on the antimalarial drugs now in use and suggests that this task be entrusted to a small working party selected from the WHO Expert Advisory Panel on Malaria. It is suggested that methods of estimation of the various drugs in blood and urine might also be included.

4.3 The committee has noted with satisfaction that the Expert Committee on the Unification of Pharmacopoeias has drafted a monograph on amodiaquine.

## 5. STANDARDIZATION OF PROCEDURE IN EPIDEMIOLOGICAL INQUIRIES ON MALARIA

At its third session the committee stressed the desirability of standardizing procedure in epidemiological inquiries on malaria and decided that a drafting committee should be appointed to study the question in consultation with other members and corresponding experts, and to submit a report at its next session. The drafting committee consisted of Professor Swellengrebel, Chairman, Dr. Russell, and Sir Gordon Covell.

It was decided that, as an essential preliminary, the drafting committee should undertake a detailed revision of the "Report on terminology in malaria"<sup>15</sup> published by the League of Nations Health Organization. This task however proved very much more difficult than had been anticipated, owing to the numerous advances made in the past decade in almost every aspect of malariology. The report on terminology required not only a drastic revision but in many respects complete re-writing, and it was found impossible to proceed beyond certain limits by correspondence.

The drafting committee started its work by correspondence. A series of meetings, at which the group had the invaluable assistance of Dr. P. C. C. Garnham, was held in Kampala, and considerable further progress was made, but it became increasingly evident that the work could not be completed without a further meeting of the members of the drafting committee extending over a period of at least four complete days.

It is therefore suggested that such a meeting be convened early in April 1951 so that their report may be completed.

It is further proposed that the French version be prepared by a French-speaking drafting committee, the chairman of which should be Médecin-Général Vaucel and of which Professor Swellengrebel should be a member in an advisory capacity; Médecin-Général Vaucel should be entitled to invite the assistance of French malariologists in this task.

## 6. THIRD AWARD OF THE DARLING MEDAL AND PRIZE

The Expert Committee on Malaria has considered the relative merits of each of the candidates nominated and, in conformity with the second

<sup>15</sup> *Bull. Hlth Org. L.o.N.* 1940, 9, 131

paragraph of Article 3 of the regulations of the Foundation for the Award of the Darling Medal and Prize,<sup>16</sup> the committee has recommended that two awards be made. Having discussed in private the relative merits of the candidates nominated, the committee, in conformity with Article 7, has sent its recommendations by letter to the Secretary of the Darling Foundation Committee, the Director-General of WHO.

## 7. CONCLUSIONS AND RECOMMENDATIONS

### 7.1 Malaria Policy of WHO

Having reviewed all the activities in the field of malaria developed by WHO since its inception, and

Having recognized that these activities follow the lines of policy suggested by the committee at its second and third sessions and that their implementation has resulted in a material advance towards the objectives of WHO in this field ;

Considering that malaria remains the most important hazard to the health of the peoples of much of the world, that the progress made represents an advance towards but not the attainment of the objectives of WHO, and that the attainment of these objectives can only be achieved by an energetic continuation and expansion of the work which has been started, and

Considering that experience has shown that where malaria is a problem of major importance its control must precede any general improvement in the public health,

The Expert Committee on Malaria

1. RECOMMENDS that in the general planning of technical assistance to governments by the Organization, malaria control should still be given the highest priority ;
2. ENDORSES the past policy of WHO in this respect, and
3. RECOMMENDS
  - (1) that the assignment of malaria-control demonstration teams to underdeveloped areas should be continued ;

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<sup>16</sup> *World Hlth Org. techn. Rep. Ser.* 1950, **8**, 46

- (2) that a limited number of teams should be staffed with men engaged on a long-term basis and available for transfer ;
- (3) that the normal term of assignment of teams to underdeveloped areas should be not less than three years ;
- (4) that the teams be so staffed as to enable them to carry out the field research which will certainly be required ;
- (5) that assistance to training in malariology be increased, and in particular that greater support be given to the organization of international malaria courses and to malaria fellowships.

### **7.2 Malaria Conference in Equatorial Africa**

Having carefully considered the report and recommendations of the Malaria Conference in Equatorial Africa convened jointly by WHO and the Commission for Technical Co-operation in Africa South of the Sahara (CCTA) ;

Believing that in a large part of Africa malaria is gravely detrimental to public health, that the evidence produced at the conference shows that its control should be encouraged in the same way as in other parts of the world, and that special conditions make some form of international co-operation and assistance highly desirable if any advance in malaria control is to be attained,

#### **The Expert Committee on Malaria**

1. RECOMMENDS that WHO bring the recommendations of the conference to the attention of governments and CCTA with a strong plea for their implementation and in particular for the permanent establishment of malaria-control organizations within each territory, and also
2. RECOMMENDS that WHO, with the co-operation of CCTA, where relevant,
  - (1) assist in the implementation of the conference recommendations by all means within its ability ;
  - (2) co-operate in the establishment of an annual international course in malariology in Africa ;
  - (3) specifically offer help to one or more Member States undertaking a malaria-control scheme in a large area in which the adult population has a high degree of tolerance to the disease, in order to assess the benefits that may flow from malaria control to people in such areas.

### **7.3 Species Eradication in the Absence of Natural Barriers**

Considering it advisable to explore the possibilities of economical eradication of anopheline species in parts of Africa,

The Expert Committee on Malaria,

RECOMMENDS that WHO, when transmitting the report to Member States, should draw their attention to the desirability of initiating experimental control schemes as outlined in section 1.2.8 and indicate its willingness to consider giving technical assistance to an approved scheme.

### **7.4 Free Flow of Insecticides**

The Expert Committee on Malaria

1. NOTES with satisfaction the further action taken by the Economic and Social Council of the United Nations at its eleventh session and by the Third World Health Assembly towards promoting the free flow of insecticides ;
2. REAFFIRMS its opinion that the control of malaria and other insect-borne diseases of man would be greatly facilitated, particularly in underdeveloped countries, by the free flow of insecticides, insecticidal formulations, raw materials and equipment for their manufacture, and apparatus for their application, without customs or other restrictions,
3. RECOMMENDS that WHO continue its efforts towards this objective.

### **7.5 Malaria Control by Residual Insecticides**

Having reviewed the progress of malaria control by the use of residual insecticides, and

Having studied the report on the second session of the Expert Committee on Insecticides,

The Expert Committee on Malaria

1. ENDORSES the report of that committee ;
2. RECOMMENDS that the present report of the Expert Committee on Malaria, and in particular its section 3.1, be brought before the next session of the Expert Committee on Insecticides, and
3. RECOMMENDS that WHO should prepare a specification chart of spraying apparatus.

### **7.6 Prevention of Spread of Anopheline Vectors of Malaria by International Air Transport**

Having considered relevant documents on the past efforts to secure international agreement on the methods to be adopted to lessen the risks to public health in the transport of anopheline mosquitos by aircraft, and

Having studied the recommendations of the second session of the Expert Committee on Insecticides on the techniques of disinfestation to be used for this purpose,

The Expert Committee on Malaria,

1. APPROVES the techniques recommended by the Expert Committee on Insecticides and
2. RECOMMENDS that international agreement be sought on the basis of the designation of international airfields according to their degree of infestation or their freedom from infestation, rather than on a basis of the designation of countries or other large areas in this respect.

### **7.7 Therapeutics**

Considering that it is desirable to bring together, for the benefit of the medical profession, factual information on the properties of the anti-malarial drugs now used,

The Expert Committee on Malaria

RECOMMENDS that WHO appoint a working party from its Expert Advisory Panel on Malaria to prepare a short monograph on this subject.

### **7.8 Terminology in Malaria**

In view of the notable advances made in almost every aspect of malariaiology during this last decade and the consequent urgent need for authoritative revision of the nomenclature employed in this subject,

The Expert Committee on Malaria

1. RECOMMENDS that a further meeting of its drafting committee on standardization of procedure in epidemiological inquiries, extending over a period of not less than four full days, be convened early in April 1951, and
2. RECOMMENDS that a four days' meeting be convened in Paris in the fall of 1951 for the drafting of the French version by the French drafting committee.

### 7.9 Award of the Darling Medal and Prize

Having considered the nominations submitted as stipulated in the Regulations of the Darling Foundation for the award of the Darling Medal and Prize,

The Expert Committee on Malaria,

RECOMMENDS that its report on the selection of the candidates be submitted by the Director-General of WHO to the Darling Foundation Committee, during the next session of the Executive Board, for their consideration and their final decision on the awards proposed.

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**Annex 1****RECOMMENDATIONS OF THE MALARIA CONFERENCE  
IN EQUATORIAL AFRICA<sup>1</sup>**

**Held under the Joint Auspices of the World Health Organization  
and the Commission for Technical Co-operation in Africa  
South of the Sahara**

*1. Biostatistics concerning malaria*

In the absence of trustworthy and comprehensive data relating to the effect of malaria on the population, the conference recommends that all governments should give the matter of biostatistical returns the most careful attention so that the development of control of malaria may be accurately assessed.

*2. Definitions of hyperendemic and holoendemic malaria*

The conference thanks the WHO Expert Committee on Malaria for convening an extraordinary meeting in order to consider the question of defining malaria endemicity in areas where populations have developed a high degree of tolerance. The conference has discussed the tentative classification<sup>2</sup> of the various degrees of malaria endemicity, submitted by the committee and modified by the conference, and recommends that this classification receive consideration and trial so that when the question comes up at a later date for final decision the committee may have the benefit of critical comments based on actual field use.

*3. Malaria control and degree of endemicity*

The conference, having considered existing information on the state of tolerance to malaria among adult Africans born and raised in areas of intense malaria; recognizing that the evidence on the cost in mortality

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<sup>1</sup> Reprinted from Part III of the report of the conference, *World Hlth Org. techn. Rep. Ser.* 1951, **38**, 45

<sup>2</sup> The conference proposes the following working classification of the various degrees of malaria endemicity:

(1) *Hypoendemic malaria*: spleen-rate in children 2-10 years of age, 0-10%

(2) *Mesoendemic malaria*: spleen-rate in children 2-10 years, 11-50%

(3) *Hyperendemic malaria*: spleen-rate in children 2-10 years, constantly over 50%; spleen-rate in adults, high

(4) *Holoendemic malaria*: spleen-rate in children 2-10 years, constantly over 75%; spleen-rate in adults, low; it is in this type of endemicity that the strongest adult tolerance is found.

and morbidity of infants and children necessary to acquire such tolerance is not yet precisely known, just as there is little evidence on the degree of health that malaria tolerance may permit in the adults ; being aware of the great benefits to economic and social life and to the public health in general that malaria control has already brought to populations of intensely endemic areas in other continents, indeed in parts of Africa itself:

(1) Recommends to governments responsible for the administration of African territories that malaria should be controlled by modern methods<sup>2</sup> as soon as feasible whatever the original degree of endemicity, and without awaiting the outcome of further experiments ;

(2) Points out that the higher the degree of endemicity, the more important it is to establish a malaria-control organization so that there may be continuation of the work until the progress of control might allow relaxation without danger of an outbreak of malaria ;

(3) Points out, however, that should such an outbreak occur it would be possible to control it by the use of insecticides and antimalarial drugs with reasonable speed, avoiding undue suffering by the people ;

(4) Recommends that governments request the co-operation of WHO to advise on projects in one or more of the larger areas in which the adult populations appear to have a high degree of tolerance and to assess the benefits that malaria control may bring to the population, not only as regards the prevalence or effects of malaria, but also in relation to general health and to economic and social welfare.

The conference emphasizes again the time-honoured and basic principle of malaria control, viz., that measures and methods chosen should be those best adapted to the local conditions, from the standpoint of both economy and efficiency, as determined by careful planning and surveys. The conference also calls attention to the fact that the success of newer chemical toxicants may sometimes obscure possible advantages which might be derived from agricultural, environmental, or naturalistic control-measures.

In all conditions, however, the use of antimalarial drugs both for suppressive and therapeutic purposes may be called for.

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<sup>2</sup> Modern methods of proven value for malaria control are classified as follows:

*General sanitation*: drainage, canalization, filling, reclamation, intermittent irrigation, etc.

*Antilarval measures*: the use of larvicides in suitable formulation as solutions, emulsions, or powders, etc., and applied with suitable equipment.

*Anti-adult measures*: the use of pyrethrum or synthetic insecticides in suitable formulation as solutions, emulsions, water-wettable powders, or aerosols, and applied with suitable equipment.

*Use of antimalarial drugs* for suppressive and therapeutic treatments.

#### 4. *Economic importance of malaria*

The conference is of opinion that in Africa malaria has a very considerable, though not always immediately obvious, adverse effect on agriculture, industry, and transportation, and that it interferes with education and social welfare.

#### 5. *Man-made malaria*

Owing to the known frequency of man-made malaria due to public and private works in urban as well as in rural areas, the conference recommends a close co-operation between medical departments and all departments and persons responsible for these works, in order to avoid the creation of actual or potential breeding-places of mosquitos.

#### 6. *Residual insecticides and the control of malaria transmitted by A. gambiae*

The conference, after studying the data available, is of the opinion that it is possible to bring about a very large reduction in the transmission of *gambiae* malaria by the application of residual insecticides in human habitations and other mosquito shelters, using either :

- (1) the gamma-isomer of benzene hexachloride at a dosage of not less than 10 mg per square foot (about 0.11 g per m<sup>2</sup>) every three months, or
- (2) DDT at a dosage of 200 mg (about 2.2 g per m<sup>2</sup>) of the *p, p'*-product every six months.

The conference is also of the opinion that it is possible to prevent transmission of *gambiae* malaria completely

- (1) in some highland areas above 6,000 feet (1,830 m), and
- (2) in areas where transmission is confined to relatively short seasons.

There is some evidence that other insecticides or mixtures of insecticides may have an equivalent value and there is a possibility of the introduction of other products.

There is still an urgent need for research into the relative value of these products, into their modes of action, into the most effective form of the insecticide and formulation, and other related problems.

The conference, therefore, recommends

(1) the adoption, with suitable equipment, of the use of either the gamma-isomer of benzene hexachloride or DDT in the doses and at the periods mentioned above for the control of malaria in Africa, unless local inquiry shows that other combinations of dose and period are effective ;

(2) the continuation and extension of work on the properties of insecticides potentially effective against African anopheline vectors of malaria.

7. *Malaria-control projects in rural areas*

The conference notes with appreciation the extension of malaria control to rural areas which have been reported to it, and hopes for a further rapid extension of this work.

8. *Agricultural development and malaria*

The conference is of the opinion that in all developmental schemes, especially for agricultural improvement, close co-operation between all departments, in particular the agricultural and medical departments, is essential.

Further, the conference points out that, owing to recent technical advances in malaria control, the menace of malaria should not delay such schemes.

9. *Malaria control and human welfare*

The conference feels that, in the development of malaria-control projects in Africa, it is advisable to enlist the active co-operation of other agencies concerned with human welfare.

10. *Storage of antimalarial supplies*

The conference is of the opinion that the attention of health administrations carrying out malaria-control schemes should be drawn to the advisability of maintaining reserves of insecticides and antimalarial drugs to avoid risks of their work being interrupted by possible shortage. Attention is also drawn to the necessity of exercising adequate caution in storing insecticides with a view to avoiding deterioration.

11. *Spraying equipment*

This conference recognizes the serious deficiencies in equipment at present available for the spraying of residual insecticides and low volume larvicides and recommends that research and development aimed at the production of new equipment specifically designed for these purposes be initiated by WHO as soon as possible.

12. *Chemotherapeutics of malaria*

The conference, having outlined in its report some of the practices most widely employed in Africa for the treatment and the suppression of malaria, is of the opinion that WHO should stimulate and co-ordinate trials as to the value of antimalarials in various African territories, according to the basic principles outlined in the report on the third session of the Expert Committee on Malaria.

### 13. *Research*

The conference recommends to research workers the study of the various problems which have been indicated in section 5.2 of its report and which, in the opinion of the conference, have particular importance for acquiring a more complete knowledge of African malaria or for improving the methods of malaria control.

### 14. *Uniform reporting*

The conference recommends that, in reporting field research in malaria control, an attempt should be made to achieve a certain degree of uniformity, and therefore of comparability, and suggests that the various points specified in Annex 3<sup>3</sup> be followed when drafting such reports.

### 15. *Uniform graphic symbols for anopheline species*

The conference, considering that in mapping the geographical distribution of anopheline species in Africa the use of graphic symbols designating every species would be advantageous, has adopted the symbols given in Annex 4<sup>4</sup>, originally drawn up jointly by the Malaria Service, Nigeria, and the Service général d'Hygiène mobile et de Prophylaxie of French West Africa, and recommends that these symbols be employed when mapping anopheles surveys in Africa.

### 16. *Malaria courses in Africa*

The conference, recognizing the necessity of extending training facilities in malariology for directing and assisting professional staff in Africa, and considering the difficulties of the establishment of training courses in various territories at the same time, recommends :

(1) that, wherever possible, a course open to persons from countries in Africa south of the Sahara be established and that, every year, a system of rotation provide for the course to be held in another territory, according to a suitable geographical distribution and the facilities available ;

(2) that the course be followed by field work and visits to areas with important malaria problems, to control schemes, and experimental areas ;

(3) that part of the training staff be selected from territories outside the country, but preferably from Africa.

The conference also recommends that the participation of WHO be obtained to advise on the organization of the course and to support it

<sup>3</sup> See *World Hlth Org. techn. Rep. Ser.* **38**, 63

<sup>4</sup> See *World Hlth Org. techn. Rep. Ser.* **38**, 69

financially as already recommended by the WHO Expert Committee on Malaria.

Finally, the conference suggests that the first course of malariology be held at the Headquarters of the Malaria Service, Nigeria, if relevant authorities agree.

*17. Fellowships and exchange of personnel*

The conference recommends that WHO consider the granting of more fellowships to malaria workers in Africa and the giving of assistance in order to enable a greater exchange of personnel in African territories.

*18. Vote of thanks*

The Malaria Conference in Equatorial Africa, in the last meeting which took place in the Town Hall, Kampala, resolved by acclamation to address a vote of thanks to His Excellency Sir John Hathorn Hall, Governor of Uganda, and to Lady Hall, for the hospitality given to the conference in Uganda and the kindnesses extended to the members of the conference.

The conference also resolved to address its thanks to the Mayor of Kampala who, by putting the Town Hall at the disposal of the conference, contributed effectively to the organization of the conference; further, the conference wished to thank particularly the Director of Medical Services of Uganda, and the members of the secretariat, the members of the Municipal Council, the Town Clerk, the Medical Officer of Health, the Town Engineer, and the members of the municipal staff of Kampala, for invaluable assistance; and the President and members of the Kampala Club Committee, who kindly put the club at the disposal of the conference during the days on which the Town Hall was not available.