

## ROUTINE ORGANIZATION IN URBAN CENTERS

### Zoning

At the beginning of anti-aegypti work in any city it has been customary to divide the area to be covered into zones of such size that the inspector starting work on Monday morning may complete all of his routine visits by Friday evening, leaving half or all of Saturday free for return visits to houses found closed on the occasion of the routine visit. Any time remaining available on Saturday may be used for special problems of the zone in accordance with orientation given by medical directors or the chief inspector.

The extent of the zone varies with the interval between visits, the size and scatter of the houses, the density of aegypti breeding, and the training of the inspector. On an average it contains about six hundred houses. The zone should not be intersected by obstacles, such as rivers and large uninhabited areas, if this can be avoided. The real unit of the city is of course the block, which in most cases has definite limits that can be used to separate one zone from another.

The proper zoning of a city is a delicate matter which requires careful initial study to distribute equitably the work to be done, and repeated revision to adjust it to changing conditions. The procedure in zoning is as follows:

1. By using a stop watch and noting the time consumed in the inspection of representative samples of different types of house, the average time factor is established for each type. Small thatched mud huts with little ground and few containers can be inspected rapidly; houses of two or more stories take more time than do one-story buildings; and houses having large grounds are the most time consuming of all.
2. A rapid but complete census is made, by blocks, of the number of each type of house to be found.
3. The blocks in the city are numbered in series on a large-scale map. At the four corners of each block the number of the block is stencilled in figures about two and one-half inches high on a wall of a building in an easily visible position. (If a new block should be formed after the survey, it receives the number of the block of which it was a part, followed by a letter.)

4. Since initial work must be carried out on a weekly cycle, the zones are formed by grouping, on the basis of the house census, as many adjacent blocks as can be worked in 40 hours, or five eight-hour days.

The time necessary for the inspection of a block is determined by multiplying the number of buildings of each type existing therein by the average number of minutes required to inspect a building of that type; the sum of these products, plus the number of minutes necessary for the inspector to walk between buildings, gives the number of minutes allowed the inspector for working that block in determining the size of his zone.

At the beginning of an antilarval service, the inspectors find many breeding foci to destroy and much educational work to do, so that the zones must be smaller than they can be later, when mosquito breeding has been reduced and the public has become accustomed to house inspections. Therefore, at the end of approximately six months of service it is wise to make a survey of the zones and institute such modifications as are indicated. Owing to growth and changes occurring in any city over a long period of time such surveys should be repeated at intervals of not less than one year.

Five or six zones are grouped into a district with a district inspector in charge. The zone number always consists of two or more figures, the first one or two indicating the district to which it belongs, the last indicating the order of the zone in the district. Example: Zone 11 indicates Zone No. 1 of the first district; Zone 46 indicates the sixth zone of the fourth district; Zone 125 indicates the fifth zone of the twelfth district.

### Inspectors

The work of the zone inspector is the most important item purchased with the funds devoted to anti-aegypti work. The Yellow Fever Service must determine, by preliminary tests and examinations, that a prospective employee has the qualities required of a zone inspector and must, so long as he remains in the Service, check the work he does, for often there is a great difference between capacity and productivity. The

applicants chosen to be trained should be men of good physique between the ages of 20 and 30, possessing ordinarily good eyesight as tested by ability to read newsprint in a rather dark place, being able to write legibly and to do ordinary arithmetical calculations, and possessing no characteristics which might cause the public to object to their entering homes.

The work of the zone inspectors is supervised and checked by district inspectors, who in turn are responsible to the doctor in charge. In the larger cities the doctor in charge is usually assisted by a general inspector in the supervision of the district inspectors' work. The duties of the general inspector are the supervision and orientation of all the field personnel of the Anti-aegypti Service. (This includes all employees except doctors, office staff, and chauffeurs.)

The principal tasks of the general inspector are:




1. To keep record of, and report daily to the secretary, the presence or absence of each member of the field staff.
2. To prepare and send to the director the daily itinerary<sup>1</sup> of the Complementary Services (see pp. 45-64).
3. To provide substitutes for absentees.
4. To assign apprentices to various districts for training in the duties of inspector.
5. To supervise the Complementary and Special (pp. 64-97) Services.
6. To check the work of the district inspectors and verify whether they are taking due interest in the problems of their districts, and whether the results reported by them are trustworthy.
7. To superintend and check the inspectors' work in the zones as part of the checking of the district inspectors' work.
8. To submit for approval of the director proposed modifications in the work of the zones of the Complementary and Special Services.
9. To prepare notes on individual employees for the permanent record of field personnel.

<sup>1</sup> This form varies in different cities and may be modified according to local conditions. In Recife, for example, the form contains various sections in order to cover all the Complementary Services. The district inspector responsible for each service fills in the respective itinerary and hands it to the general inspector, who sends copies of all itineraries to the director. In the smaller cities the total itinerary may be mapped out by the general inspector.

10. To choose and present to the director groups of competent candidates for the field staff.

### Inspection Methods

Various methods of organizing house inspections have been tried in Brazil, including the so-called dragging (*arrastão*) or sweeping method, in which a number of inspectors work together, visiting different houses in the same block under the eyes of the supervisor. This method requires much more walking for the inspection of a given number of houses than other methods, and since the same inspector only accidentally visits any given house in successive cycles, individual responsibility for past work cannot be fixed. Inspectors have also worked in pairs, or worked with a helper; but accumulated experience shows conclusively that the best and most economical work is done by dividing the area into zones, each of which is worked by a single inspector who is individually responsible for the conditions in his zone. Certain problems, especially in the larger cities, cannot be handled by a lone worker without special equipment, and these are met by special services directly under the sector office.

To facilitate the orientation of the zone inspector in the field and the careful checking of his work by his district chief, conventional signs, indicating the order in which the houses in the block are being visited, are painted on a wall at each street corner, together with the block number. For example: "Block No. 105" will be marked  105 ● at the corner where work in the block must begin, and simply  105 (without the dot) on the other corners of the same block. The dot following the block number indicates the building at which the inspector commences his visits, and the vertex of the triangle indicates the direction the inspector must follow in working round the block. In badly defined blocks, the signal ●  is used to mark the last building belonging to the block. Where blocks are extensive, or where the position of the houses makes it difficult to find the number of the block at the corners, this number is painted on houses other than those at the corners.

Since the zone is composed of complete blocks which have signs indicating the course to be

followed by the inspector, the written itinerary for the week's work is reduced to a simple list of blocks in the order in which they are to be inspected on the different days of the week. The inspector is given an itinerary by numbered blocks covering his zone, with indication as to each day's stint as well as a map showing the location of the blocks of his zone. The district inspector, who is responsible for checking the work of five or six zones, carries a complete itinerary of his district and a map of each one of the zones for which he is responsible.

The motorcar used by the doctor in charge is provided with a map of the city showing the location of each numbered block and the grouping of blocks into zone districts, with complete itineraries of all inspectors of the city. The car also carries a list of points in the different districts where the inspectors meet with the district inspector at the beginning and at the end of the day's work.

To impress upon the inspector the importance of carrying out every detail of the work assigned to him on every round of visits, and to facilitate the continuous checking of his work, a fixed itinerary is plotted out for each zone inspector, any deviations from which must be reported in writing. An example of a zone itinerary is given below:

ZONE ITINERARY  
FIRST DISTRICT—RECIFE

Meeting Place: Rua José Rufino No. 1061  
Zone 11—Building 838

<i>Days</i>	<i>Blocks</i>
Monday	1, 2, 3
Tuesday	3, 11, 12, 13, 14
Wednesday	15, 16, 17, 18, 19, 21, 22, 23
Thursday	23, 24, 25, 26, 27, 28, 29, 30
Friday	31, 32
Saturday	Closed houses

In the large cities similar fixed itineraries are established for the Complementary and Special Services. The following is one day's itinerary of the Maritime Service in Recife, Pernambuco:

**Monday:** Dock workshops, Campina (the limit being the left of the railway), covering ironwork, cranes, buildings, and galleries up to Warehouse "A." From Warehouse "A" to Gyrotory Bridge, covering ironwork, cranes, warehouses, buildings, galleries, and

shipping alongside. Campina, the Old Customs House Docks up to Mauricio de Nassau Bridge, covering ironwork, buildings, and boats in repair.

The point at which each inspector begins work each day is marked with a pin on a map at district headquarters, and thus an inspector can be found at any time even if his routine had been interrupted by bad weather or holidays. This map is a valuable check on the inspector and leaves no margin for excuses if he is not found in his zone.

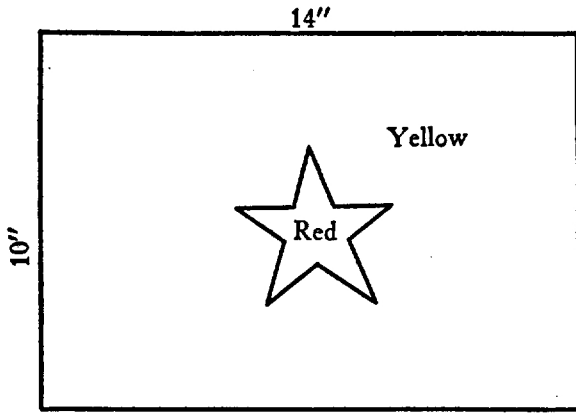
The district inspector leaves his itinerary for the day in a sealed envelope at the district headquarters. This itinerary indicates the zone and blocks which he intends to visit and also the approximate hour of each visit. Should the doctor in charge care to find the district inspector to check his work, he breaks the seal on the envelope containing the itinerary and countersigns the envelope to let the district inspector know that it was not opened by one of the inspectors.

For a proper recording of work done, beginning with the Inspector's Work Sheet, and especially for the careful checking of the work of the zone inspector by the district inspector, it is essential that every house have a number by which it may be promptly identified.

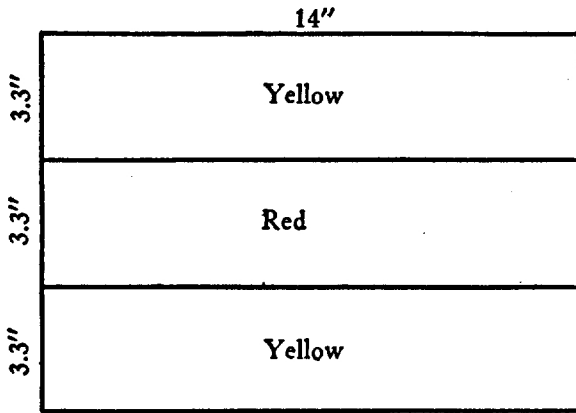
In so far as a regular official system of numbering exists, it is respected and used as the basis of assigning numbers to houses which lack them. The inspector carries a heavy lumberman's wax pencil and marks the new house numbers clearly in figures about two and one-half inches high on any easily visible part of the front of the houses, respecting as far as possible the desires of the occupants. Numbers are not written on doors or windows, since they would be invisible from the street when these were open.

The officer in charge of antilarval work must always remember that the efficiency of this service depends, in the final analysis, on the work of the zone inspector.

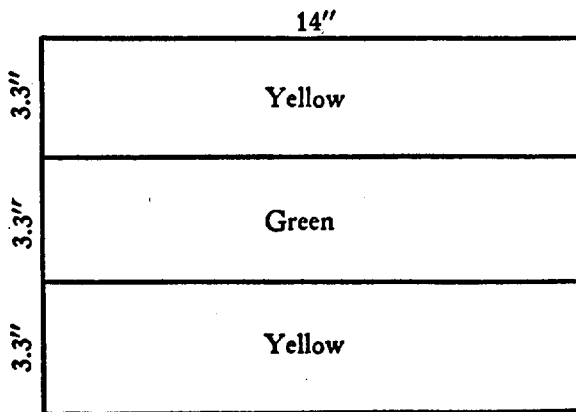
The so-called Complementary and Special Services take over certain problems which could be handled by the zone inspector only with great loss in time and energy. These services are truly complementary and do not relieve the inspector of any of his responsibility for the conditions in his zone. For example, the Adult Capture



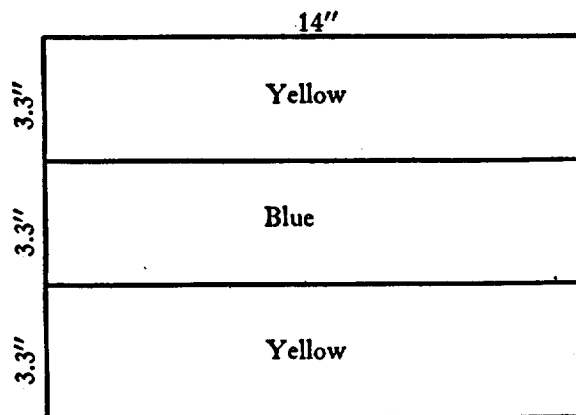
General Inspector



District Inspector

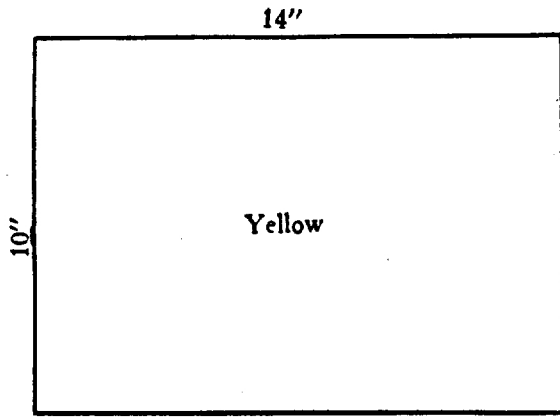


District Inspector: Captures

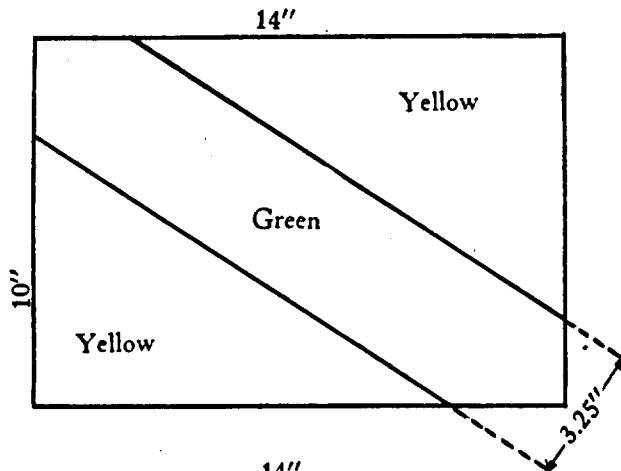


District Inspector: Producing Focus

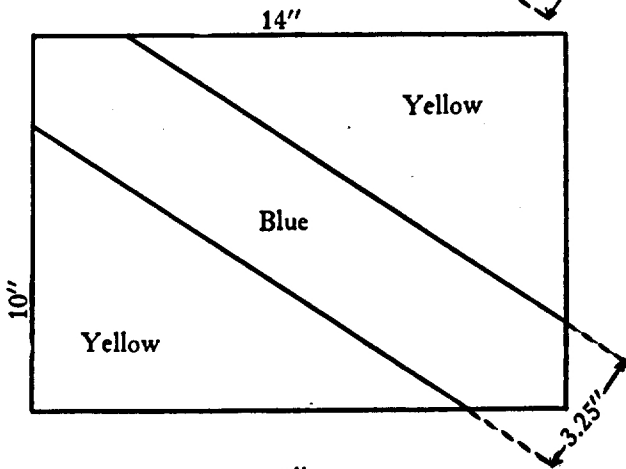
FIG. 9. Flags of the general inspector and the district inspectors of the Yellow Fever Service.



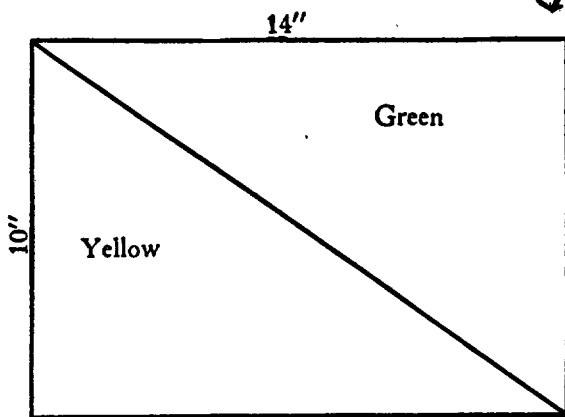
Zone Inspector



Zone Inspector: Captures



Zone Inspector: Producing Focus



Zone Inspector: Vacant House

FIG. 10. Flags of zone inspectors of the Yellow Fever Service.

and Producing Focus Services are of little value until a relatively low aegypti index has been obtained by the routine work of the inspector, but they are essential to the final reduction of this index to zero. Likewise, experience has shown that legal sanctions can be used only after the people become familiar with the object of the Service through the house inspection and educational work of the zone inspector.

Special attention has been given to the problem of making the checking of the inspectors' work as easy and as nearly automatic as possible. It has been found good business to put a district inspector over not more than five or six zone inspectors. Since the district inspector is responsible for checking the work of the zone inspectors he becomes responsible for conditions in the entire district. This personal responsibility for conditions in each zone in his district makes it impossible for him to protect negligent and inefficient inspectors; he must either report them or take the rap himself when the general inspector, the health officer in charge, or someone of the special services uncovers unsatisfactory conditions in his district.

There are two types of check visits made by the district inspector: one is for the purpose of working with the zone inspector; the other is for revision, or follow-up work. The reason for working with the zone inspector is to observe his technique and correct any faults which he may have. This is especially important in newly organized services and when inspectors are inexperienced. In dealing with experienced inspectors there is little need for this type of visit and revision gives better results. The experienced inspector knows how to work well; the check visit is made only to determine whether or not he is doing so.

Revision consists of a reinspection of the houses which have already been inspected. The revision is made, preferably, not later than 24 hours after the inspector's visit. If the check visit of the district inspector is later than 24 hours after the inspector's visit, it should not be listed as a revision but as a "surprise visit" made for the purpose of getting information regarding conditions in the zone when an inspector is not expected by the residents.

The use, in the written itinerary for each day in the week, of the block numbers marked both on the inspector's spot map and on each block corner of his zone enables the district inspector to find the inspector's flag at any time during working hours, if he is at work. After the inspector is found on a check visit, his work for the day is checked from his report (Form FA 2). By visiting a few houses already noted as inspected, and examining the water containers in them, the district inspector can decide whether the inspector's report is correct and whether he has been working properly.

The Autograph House Visit Record (Form FA 52), posted in every house inspected, enables the district inspector to check the rounds of the inspector against his itinerary. This form fails to give a picture of the work done but does oblige the inspector at least to enter the houses on his itinerary for the day and record the date, his name, and a note on the conditions found. Form FA 52 is equally useful in checking the visits reported by the district inspector, who is obliged to initial this form on all houses visited.

No matter how complete the reports and summaries of the inspectors' work may be, they are not a substitute for personal visits by the medical officer in charge. This officer therefore spends only part of his time checking records in the office and the rest of it in maintaining contact with the field service by making a certain number of revision visits himself. Only thus can he know the conditions under which his inspectors work and whether their reports are being adequately checked by the district inspectors.

### Aegypti Indexes<sup>1</sup>

The larval, or breeding, index is used to follow the progress of control measures over a period in a given place and to compare roughly the aegypti situation in different areas. Various criteria have been used in calculating aegypti indexes, but experience has shown that the most useful of these for general purposes is the house index. In calculating this index only two factors are taken into consideration: the number of

<sup>1</sup> Wherever the term "aegypti index," "house index," "larval index," or simply "index" is used the percentage of houses found with foci is to be understood.

houses inspected and the number of these found to have aegypti breeding foci. The house index is the percentage of houses inspected found with aegypti foci, irrespective of the dimensions of the house, the size of the grounds on which it stands, the number of containers found with larvae, and the intensity of breeding noted. This house index is referred to hereafter as the larval index to distinguish it from the pupal index, which is the percentage of houses inspected found with pupal foci.

In using indexes it must be remembered that breeding indexes can never be translated directly into terms of adult aegypti densities, which may vary widely at the same index level according to local conditions. And yellow fever is transmitted by adult mosquitoes and not by larval foci.

The house index has been criticized by some, who insist that the house is not the unit in the production of aegypti; for even though a house may have imperfect roof gutters or other defects which make the house itself a potential focus, the majority of houses are not, in and of themselves, breeding foci. This criticism overlooks the fact that the house index is used not as a measure of mosquito production but as a measure of the distribution of aegypti breeding with relation to the distribution of human population. Admittedly, even for this purpose, the house index is very imperfect, and valid conclusions cannot be drawn without taking into consideration many other sources of information. For this reason, the Summary of Local Anti-aegypti Work (Form FA 14) carries a summary of all potential foci, i.e., containers with water as well as containers with foci, arranged by type of container, and a house index for each zone and for the town or city covered by the report. This is important, since it is possible to have a low total index for the city but a high index for some special type of container or for one or more individual zones.

The aegypti index reported by the inspector, plus that found by the medical officer and the district inspector on their control visits, gives a useful idea of conditions from week to week until the area being worked becomes relatively clean. The classification "relatively clean" can be applied to an area in which the total index is not over 5 per cent, and in which very few pupal

foci can be found by the inspector and the district inspector.

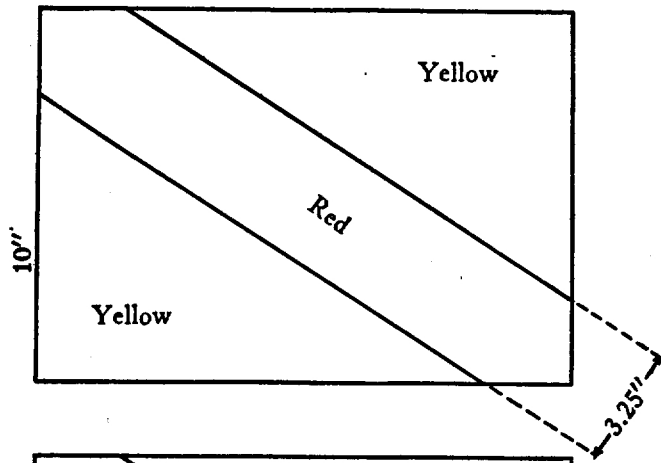
The water-container indexes, or the percentages of different potential breeding places in which breeding is taking place, are of value in the initial stages of the campaign to show the particular type of container against which special measures are needed in order to reduce the aegypti density in an especially infested area. However, once the service begins to function smoothly the house index is found to be much more useful as a measure of aegypti distribution in the community.

The female aegypti mosquito does not generally lay all her eggs at the same time, or in the same water container; but on the other hand her range of flight is limited. These factors both tend to increase the value of the house index and to lessen the relative value of the water-container index.

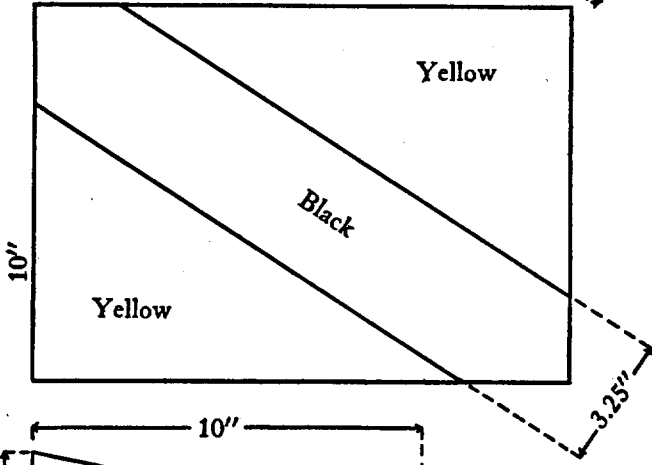
The following routine is used for the registry of indexes: "0" (zero) is used only when no breeding whatever is found; any index between 0 and 0.05, even when based on only one aegypti focus, irrespective of the number of houses inspected, is represented by 0.0. The indexes from 0.05 to 0.14 are represented by 0.1. For noting indexes on the various statistical forms (FA 14, FA 14A, FA 69, FA 140, and FA 141, see pp. 109 to 119) the approximation of the first decimal figure is used. When the second decimal figure is below 5 the first one is retained; but when the second decimal is 5 or more, the first decimal figure is increased by one digit. Example: 0.33 is registered as 0.3; 4.56 as 4.6; 0.95 as 1.0; 0.45 as 0.5; 4.73 as 4.7; 4.96 as 5.0.

Indexes represent only the percentage of houses, among those inspected, in which aegypti breeding *was found and reported* by the inspector. The index can never give an idea of the size, number, and productivity of the foci which were found, or of the scatter of the houses in which breeding was occurring; it can tell nothing regarding the distribution of breeding missed by the inspector, or found by him but not reported.

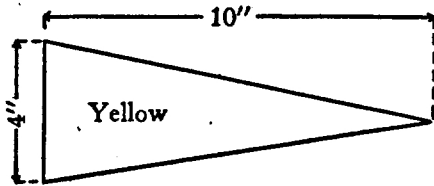
The efficiency and imagination of the inspector are important factors in determining the number of foci he discovers. The length of time he has worked in the zone, and his honesty, are



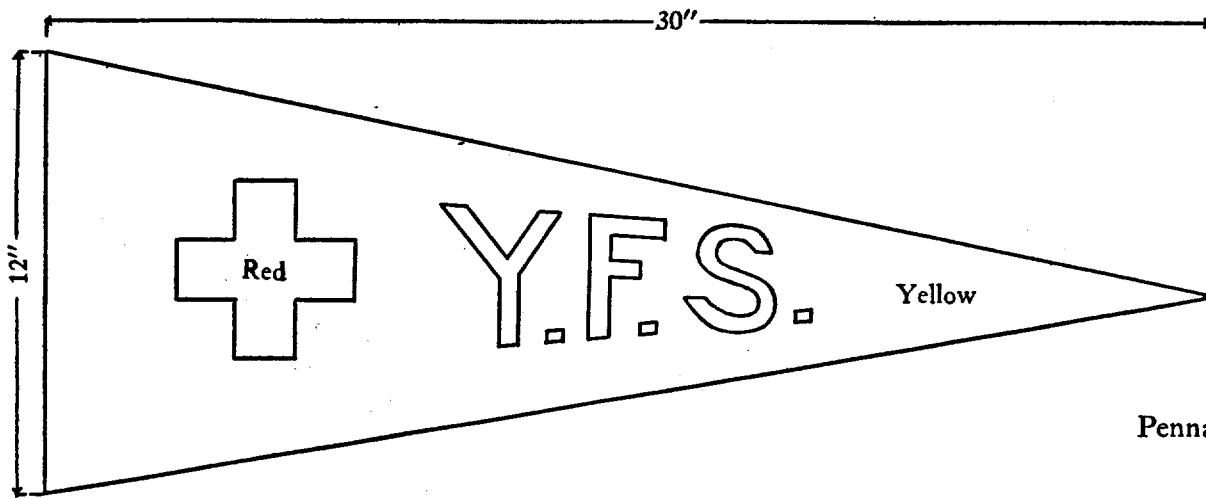
Zone Inspector: Roof Gutter Service



Zone Inspector: Cemetery Service



Zone Inspector's Pennant



Pennants for Boats

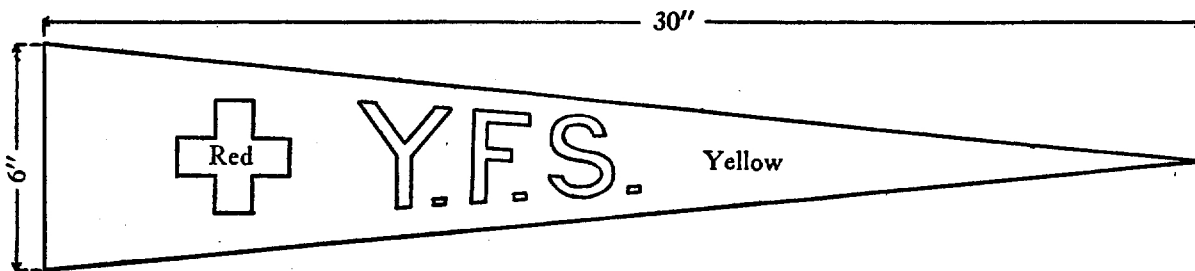


FIG. 11. Zone inspector's pennant, and flags and pennants of Special Services.



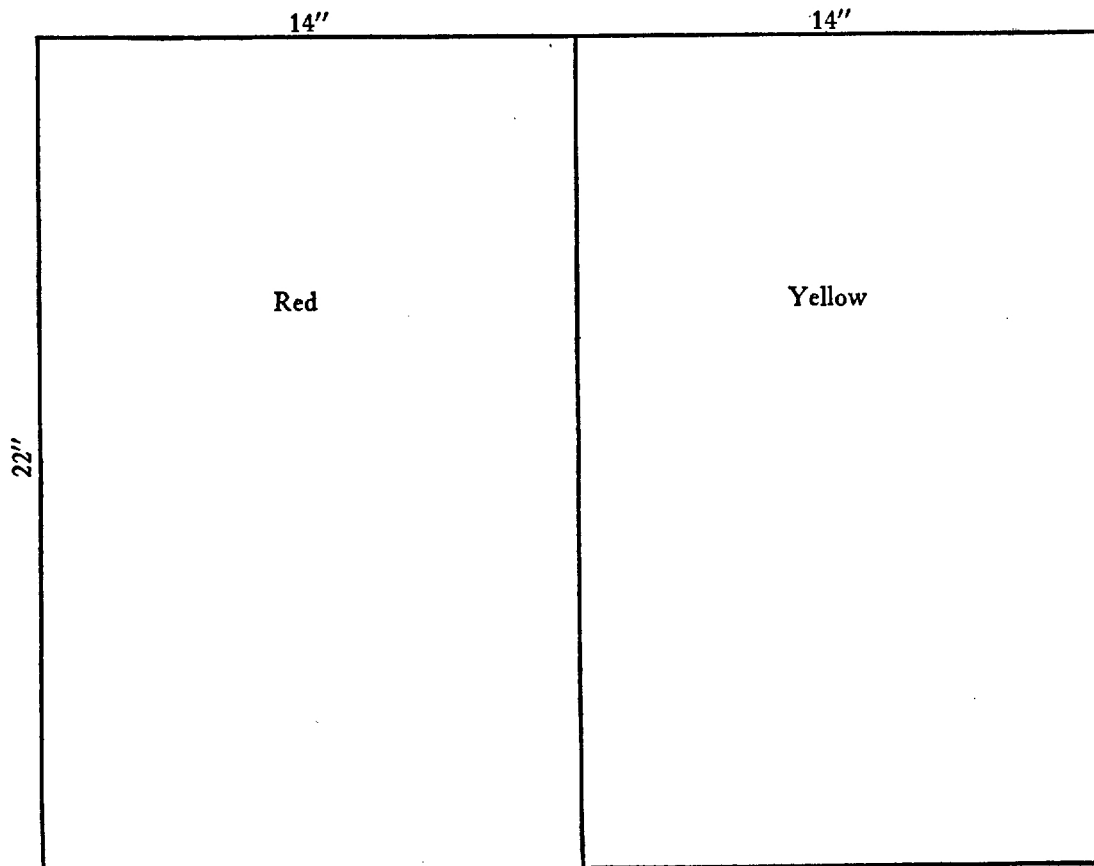
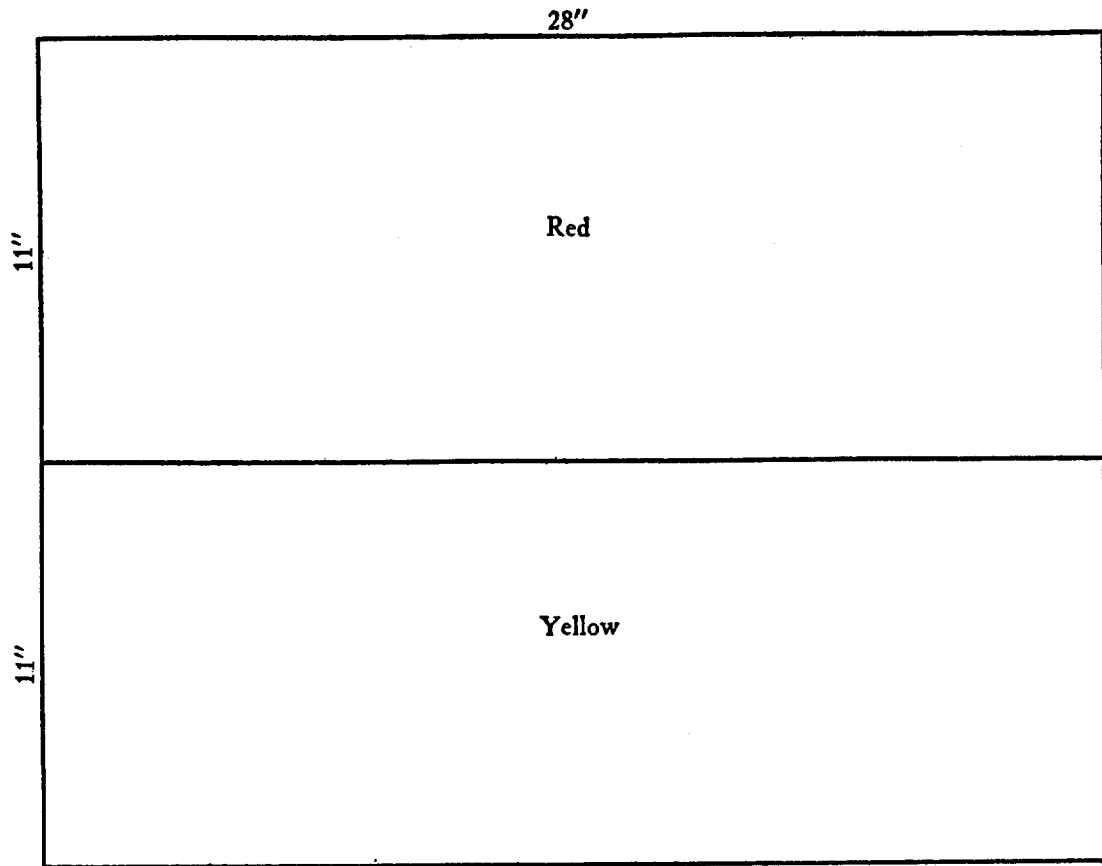


FIG. 12. Flag of Ditches and Wasteland Service (above), and of Maritime Service (below).

factors in determining the number he reports. It is natural for an inspector assigned to a new zone to be eager to report as many foci as possible to prove his activity and efficiency, since he is not responsible for any foci previously missed. As time passes he becomes reluctant to report all foci found, as that might reflect on the quality of his work.

The officer in charge of anti-aegypti work should never be greatly surprised if, in a relatively clean zone with a true low aegypti index, he and his district inspector find, when visiting houses with the zone inspector on his regular inspection, double the number of foci usually reported in the same number of houses when the inspector works alone, and if reinspection or revision of the zone inspector's work reveals as many additional foci as he reported for the same houses. This is often due to the greater activity and intelligence of the revising inspector rather than to any dishonesty of the zone inspector.

Experience shows that the aegypti index may vary with the day on which the inspection is made. The people in the zone come to anticipate the inspector's visit on a certain day of the week and clean out their water containers in preparation for his arrival. This destroys some larval foci which might have given evidence of the presence of producing foci in the neighborhood. Any change in the inspector's itinerary usually brings with it an increase in the index, since his visits are unexpected. The index based on the routine work of the inspector gives no information on foci which may have been cleaned up by the occupants of the houses on the eve of his regular visit. This is especially important to remember when surveys are being made in areas where control measures have been discontinued. Almost invariably such surveys show a disproportionately high percentage of all foci found in the first few houses inspected in each community, before the news of the survey has spread.

After the first few weeks of work the production of adult aegypti, on which the maintenance of the species depends, comes from those foci which the inspector fails to find, whereas the aegypti index represents the foci found and reported by him. During the initial stages of the work many pupal foci are found, indicating adult

production; in the course of time the routine inspection causes a great reduction in the total number of foci found and a very marked and exaggerated reduction in the number of pupal foci found, as compared with foci of larvae only. This is often due, in part, to the desire of the inspector to cover up his previous failure to locate and destroy all foci in larval stages, since pupae are very seldom found on weekly visits except in foci missed on the previous visit. However, most of the disproportionate decrease of pupal foci is due to the fact that the foci which are easily found and destroyed on each visit of the inspector never reach the pupal stage. It is the repeatedly undiscovered foci which develop and produce the adults; and these in turn lay eggs in the accessible water deposits, forming the larval foci which go to make up the inspector's regular aegypti index. The hidden pupal focus which continues to produce adults is called a "producing focus." The hidden producing focus is a most important factor in maintaining the species in places where anti-aegypti measures are in force, and a special service for its elimination has been organized, guided by the distribution of larval foci reported by the zone inspector and by the distribution of adults reported by the special Adult Capture Service.

In small towns of the interior there are relatively few exceptional water containers of the type which form hidden producing foci in the cities; and most of the foci are easily accessible to the inspector. In the large cities, and especially in the old ones, there are many hidden water containers, such as abandoned wells, pits, latrines, etc., which can be found only with real effort and the use of some intelligence.

It was observed many years ago that yellow fever disappeared from a city long before the aegypti index was brought to zero, and that an intensification of the anti-aegypti measures then in use did not bring about the species eradication of the vector. Under these conditions there was no great profit in reducing the aegypti index very much below the threshold at which yellow fever disappeared. As long as anti-aegypti work consisted of temporary campaigns for the elimination of yellow fever an extremely low index was unnecessary and was even termed a "luxury

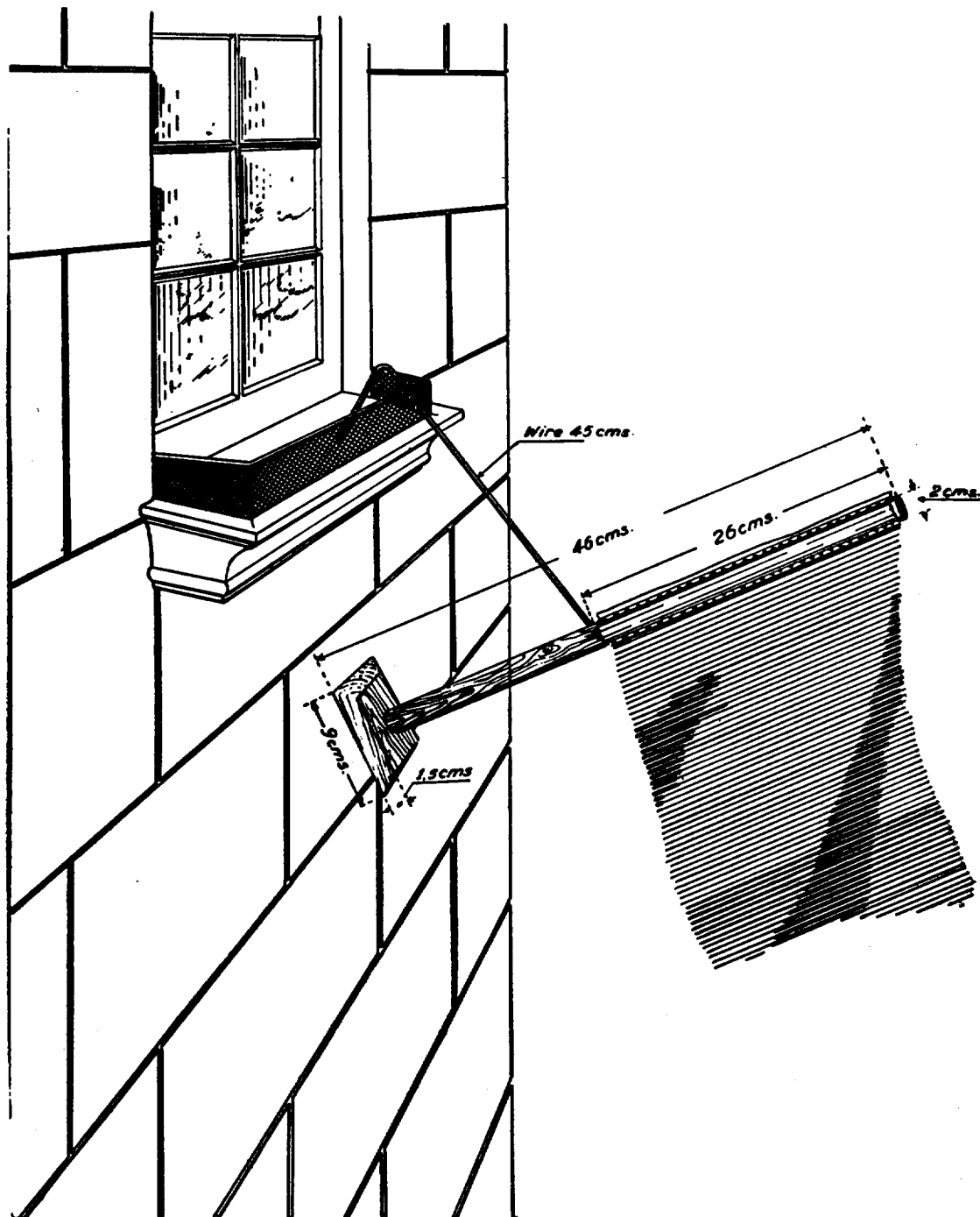


FIG. 13. Support used for placing Yellow Fever Service flag on a building where an inspector is at work.

index." The recognition in recent years of the permanent threat of reinfection of cities, inherent in the existence of jungle yellow fever, obliges the responsible authorities to organize anti-aegypti measures on a permanent basis. Factors which have made possible the eradication of the aegypti mosquito from numerous Brazilian cities, counties, and even states, are:

1. The special Producing Focus Service for the discovery and destruction of hidden pupal and producing foci. This Service is effective in the final stage of aegypti eradication in places where the index has already been greatly reduced by the efficient work of the zone inspector (see pp. 81-89 for full details on this Service).
2. The special Adult Capture Service, which checks on the presence of the aegypti mosquito by searching for and identifying adults caught in houses (see pp. 89-97).
3. The routine application of a mixture of oils to all water containers found breeding mosquitoes.

### Oiling

Oiling not only kills aegypti larvae but causes the destruction of the eggs adhering to the wall of the container oiled above the water line. During anti-aegypti work in an area all mosquito foci found by the inspectors are subjected to routine oiling, with the exceptions mentioned below:

1. Routine oiling is generally begun only after two or three inspections have been made and the householder has been advised, either by the inspector or by means of a handbill left at the house, that routine oiling of all containers with foci will be undertaken on and after a given date. During this initial period, before the routine oiling is begun, foci are destroyed by emptying the water from the offending container. (This often fails to get rid of small larvae and of course leaves the eggs on the walls, so that the breeding is only interrupted and not prevented.) When yellow fever exists in or threatens to invade a locality, routine oiling of all containers found with foci starts immediately *during the first inspection without previous notice.*
2. Certain large containers, such as cisterns, which are to be protected immediately by fish, are not oiled, since oiling would make them unsuitable for fish.
3. Certain large ground foci of mosquitoes, other

than aegypti, are not oiled when not of sufficient importance to justify the cost.

4. Oiling may be omitted when the householder prefers to destroy the offending container in the presence of the inspector. (Strangely enough some people develop such a deep-seated antipathy to oiling that they prefer to destroy the container even though it may have some value.)
5. Abandoned containers without value are destroyed rather than oiled.

Routine oiling has been the most forceful measure in persuading the householder to protect water containers from mosquitoes. Its punitive action is direct and immediate and falls on the person responsible for the care of the containers found with mosquito breeding. The oil used in Brazil, a mixture of fuel and Diesel oils, is disagreeable enough in taste and appearance so that all containers oiled are thoroughly washed out before renewed use; scrubbing of the containers removes any eggs which may have escaped the direct action of the oil. Thus it has become axiomatic in Brazil that the only aegypti breeding which resists routine oiling is that which occurs in hidden, undiscovered, and hence unoiled foci. However, oiling should be considered as an emergency or temporary measure to be used only until such time as the container is permanently protected.

Each zone inspector carries a flask or a can with from approximately 300 cc. to one liter of oil, according to local conditions. The Yellow Fever Service mixture is excellent for preventing aegypti breeding and is cheap, but it is not satisfactory for use in spray pumps for outside oiling. In Rio de Janeiro the inspector has a special liter can with a spout and with a device for holding a small flask of paste for putting up notices (see Fig. 14, p. 42).

The inspector uses a stick with which to stir the oiled water to insure thorough spreading of the oil not only over the entire water surface but also well up on the walls of the container. Such stirring is better than the use of excessive amounts of oil. It is difficult, at times impossible, to get oil to form a film on the surface of water which contains soap or certain fatty substances even in very small quantities. This difficulty is encountered with highly volatile oils such as

gasoline and kerosene, as well as with fuel oil. It must be taken into consideration before condemning an oil as unsatisfactory because of reports that it does not spread easily.

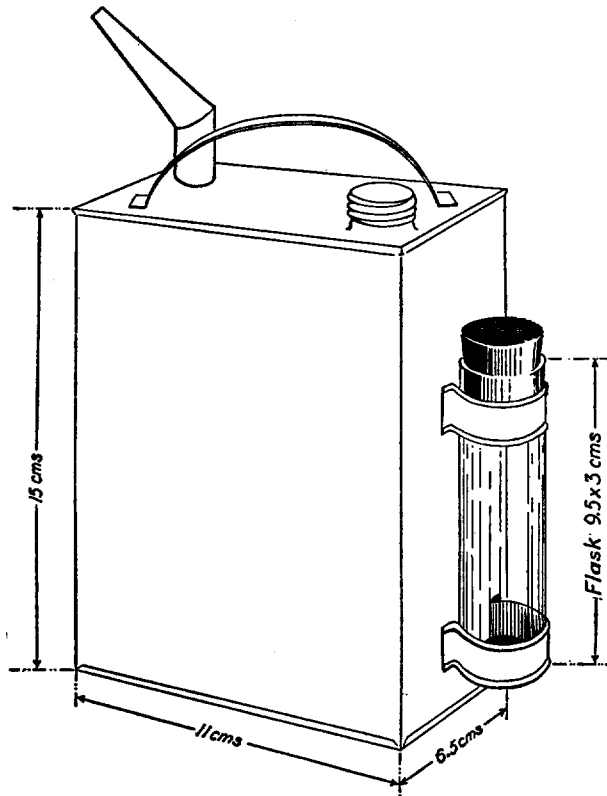


FIG. 14. Zone inspector's oil can.

The larvicide used is a mixture of 75 per cent Diesel oil with a specific gravity of approximately 0.861 at 60°F., and 25 per cent fuel oil with a specific gravity of approximately 0.985 at 60°F. The resultant mixture gives:

Specific gravity at 60°F.	0.8916
Saybolt viscosity at 100°F.	53 seconds
Flash point, Pensky-Marten C. cup.	170°F.
Water and bottom sediment, approximately	1 per cent

Should foci be too large to be oiled with the supply carried by the inspector he makes out a Note for Oiler (Form FA 66, opposite) and hands it to the district inspector. These forms are turned in daily and reissued to the Oiling Service (see p. 50).

**Inspection Cycle**

Under favorable conditions, the development of the aegypti mosquito from egg to adult takes

place in a period of seven to eight days, so that anti-aegypti campaigns must be carried out on a weekly cycle if the production of mosquitoes is to be maintained at a low level in cities where the breeding index is only "relatively" or "safely" low from the standpoint of yellow fever transmission.

When an aegypti index has been brought down to zero, or very close to that point, it tends to increase slowly, and under such conditions the inspection cycle may be lengthened or completely suspended without any untoward results.

In places where a true zero index of aegypti production has been achieved, reinfestation is generally due to (1) the return to use of clay vessels on the walls of which viable aegypti eggs are still present; (2) importation of water jars with aegypti eggs by families moving from aegypti infested areas; (3) the introduction of adult aegypti mosquitoes from infested areas, especially by boat and by train.

**ANTI-AEDES AEGYPTI SERVICE**

**NOTE FOR OILER**

Zone..... Block.....

Street..... No.....

Type of container.....

Date.....

\_\_\_\_\_  
Signature of Inspector

**OILING**

Date.....

\_\_\_\_\_  
Signature of Oiler

Where a very low, but not zero, aegypti index has been achieved, the rate of increase of breeding under a lengthened inspection cycle will depend in part on the care with which the zone inspectors have cleared their areas of potential foci, but even more on the subsequent work of the Adult Capture and Producing Focus Services.

Lengthened inspection cycles and suspension of routine house visits should never be authorized without provision for continued supervision by the Adult Capture Service, and for a renewal of house inspections should increased aegypti breeding be found at any time which cannot be eliminated by the Producing Focus Service.

Experience has shown that the adult index is a much more sensitive measure of the aegypti production in an area than is the larval or breeding index, even when the larval index is based on weekly inspections.

As has been emphasized above, breeding indexes cannot be translated directly into terms of adult density or adult production. Due allowance must be made for the interval between visits. The foci found by the inspector on his weekly rounds never become producing foci, but part of those found on a biweekly or a monthly visit may have produced adults during the interval between inspections. Once this interval becomes greater than the period required for the evolution of the aquatic phases of the mosquito, the foci found become potential producing foci which may build up a greater adult density than is possible from the hidden producing foci responsible for maintaining the species under the weekly cycle of visits.

Adult indexes are more expensive to determine than larval indexes and need not be used in places which are known to be infested or to be only "relatively" clean. The adult index is, however, indispensable in estimating actual conditions in areas believed to be infested and in areas with lengthened inspection cycles or suspended services.

As a preliminary to any lengthening of the inspection cycle in a large city, special care should be taken to eliminate the final hidden foci through the efforts of the Producing Focus Service oriented by adult captures.

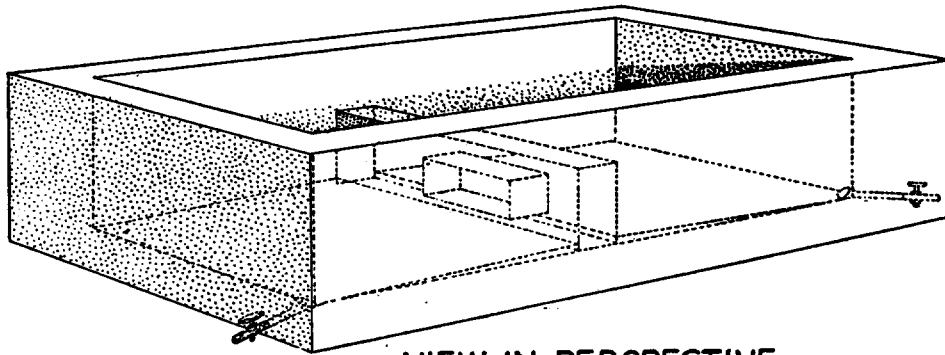
When the inspection cycle in a city is first lengthened there should be no immediate reduction in personnel; zone inspectors made available by lengthening the cycle should be used to reinforce the work of the Adult Capture and Producing Focus Service until the aegypti mosquito is eradicated.

Statistical reports should be made on the basis of a complete cycle of inspection, with an indication of the weeks of the year covered by each report. For places worked on a 14-day cycle reports are made every fortnight; for those on a 28-day cycle, every four weeks.

When various inspection cycles are employed in different parts of the same city, as often happens (7 and 14, 14 and 28; 7, 14, and 28 days), the summary report (Form FA 14) is prepared only at intervals corresponding to the longest cycle and carries data only for the last complete cycle of visits in each part of the city. For example, the report for a town, part of which is on a 14-day cycle and part on a 28-day cycle, summarizes all data from all of the district inspectors' work sheets (Form FA 4) for that part on a 28-day cycle, but only those data for the zones on a 14-day cycle which refer to the last inspection. The summary of data for the first inspection in the section on a 14-day cycle is prepared as a local report for the orientation of the local director only.

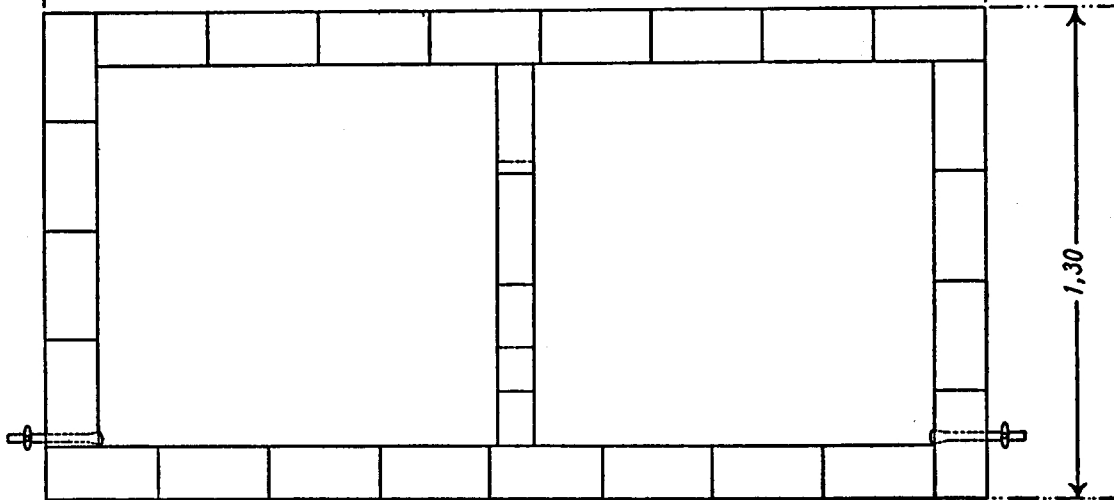
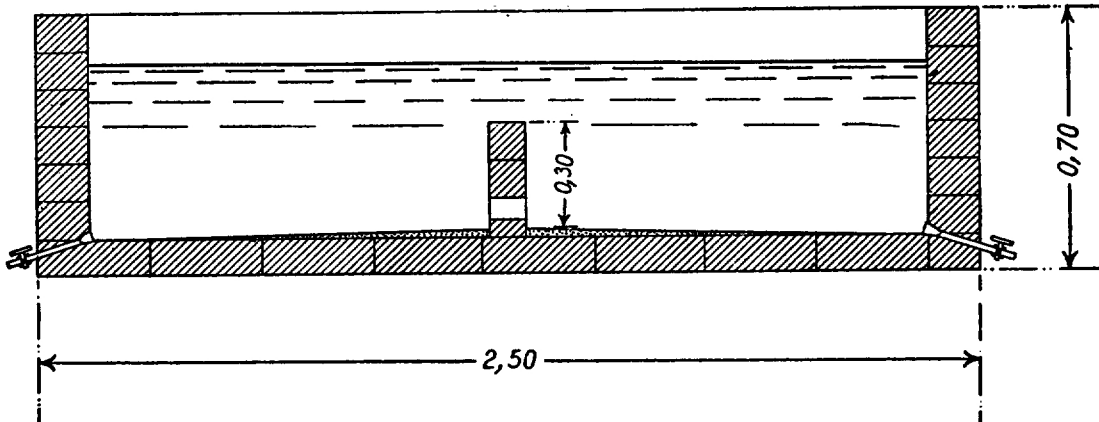
In the interior, the lengthened inspection cycle is feasible and essential to economical administration, but should be adopted only after a thorough study of local conditions, taking into consideration:

1. The actual aegypti index.
2. The behavior of the aegypti index (past fluctuations).
3. Presence or absence of adult mosquitoes reported by the Adult Capture Service.
4. Inspection reports of medical officers and district inspectors.
5. The percentage of containers requiring fish, which had been supplied with fish.
6. Number, nature, and condition of potential foci.
7. *The aegypti index of neighboring areas from which either adult mosquitoes or containers with eggs and larvae might be imported to reinfest the area for which a lengthened cycle is proposed.* (Zero indexes and lengthened cycles are most advan-



VIEW IN PERSPECTIVE

LATERAL VIEW



DIAGRAM

FIG. 15. Tank used at fish depots of the Yellow Fever Service for receiving fish as they are purchased, and for maintaining a reserve supply.

tageous when they exist simultaneously over an entire region.)

8. Correlation of adult captures with the zone inspectors' aegypti indexes.

It must be borne in mind that a lengthened cycle of inspections is feasible only when guaranteed by routine oiling or destruction of each and every water container found with larvae and that a lengthened cycle is dangerous so long as aegypti mosquitoes are present.

The local director must not alter the cycle without previous authorization of the regional director. The regional director shall submit for the approval of the general director details of plans for any general change in the length of cycles in his region.

### COMPLEMENTARY SERVICES IN URBAN AREAS

The zone inspector's work, as has previously been stated, is the core of the anti-aegypti measures. There are, however, certain problems which cannot be handled advantageously by the zone inspector, and Complementary Services have been established to take care of these problems. The inspectors of the Complementary Services are carefully selected, are given special training, and carry special equipment for their tasks. Among the Complementary Services which may be useful at times in the large urban centers are:

1. Fish Service
2. Inaccessible Tank Service
3. Cemetery Service
4. Ditches and Wasteland Service
5. Oiling Service
6. Vacant House Service

#### Fish Service

Larviphagous fish were widely used for the control of aegypti breeding before the enforcement of routine oiling, with Diesel and fuel oil mixtures, of all water containers found with evidence of mosquito breeding. But the widespread use of fish in small household containers proved very costly and troublesome because of the high replacement rate, and it has been abandoned in favor of oiling, which is more economical and gives more immediate and more permanent re-

sults. Today, fish are used only for the easily accessible large water containers in which they can become self-sustaining, and where for special reasons other methods of control cannot be used. Most small species of fish, and the young of some large species, are more or less larviphagous; the selection of the species used depends on availability, adaptability to artificial containers, hardihood, cost, facility of transportation, etc.

The species most commonly used by the Yellow Fever Service in Brazil are those popularly known as "piabas"<sup>1</sup> and "barrigudinhos," especially adapted to muddy or turbid water. In some places "acaras" and "piaós," larger and more sluggish fish, are used.

Fish are generally contracted for locally, the price in Brazil ranging from \$.50 to \$1.50 per thousand. In some places the price varies with the species furnished. All payments are made on the basis of the number of fish alive and well 24 hours after delivery to the fish tank of the Yellow Fever Service. A receipt for fish received (Form FA 107) is issued to the supplier 24 hours after he has delivered them, with the number which have died in the meantime deducted from the total to be paid for. The accounting section reports the number of fish purchased each month in each locality. Where fish are easily secured, and the aegypti index is low, the householder gets fish from independent sources if he cares to use them in order to avoid the oiling of his water containers.

The life span of fish in domestic water containers depends to a great extent on the care given them. In practice it has been found best to have the householder, in whose container the fish are to live, go or send to the fish depot for the fish. Fish which have been fetched always get better care than do those gratuitously distributed by the Service. The Service may make direct distribution of fish to the home in the initial stages of emergency campaigns in localities where rapid reduction of the aegypti index is essential because of the presence, or threat, of yellow fever. In this case they are not issued against the Fish Requisition (Form FA 65), but

<sup>1</sup> Popular names of fish vary from place to place and several species may be grouped under a single name.





are noted directly on the Inspector's Work Sheet. The fish depots are carefully supervised to guard against falsification of the delivery records and to prevent avoidable mortality of the fish. The fish are paid for only on presentation of receipts from the keeper of the depot (Form FA 107). The Fish Tank Weekly Report (Form FA 40) is filed routinely at all depots, whether tanks or barrels, and the weekly summary of these reports is made regularly on Form FA 106. Deliveries are checked

against Form FA 107 and Form FA 65. Observance of the following rules is of value in maintaining a low mortality among fish at the depots:

1. Have plenty of clean water. A painted line a hand's breadth below the rim of the tank calls attention to the need for adding water when it falls below this level.
2. Wash tanks frequently and supply clean water.
3. Do not crowd too many fish into a tank.
4. Protect tanks against direct sunlight.
5. Always handle fish gently and only when necessary; handle only with a special net furnished for this purpose.
6. Always provide small containers with a piece of sewer pipe or broken tile under which the fish may take shelter.
7. Remove dead fish immediately.

The fish are transported in large buckets well supplied with water. Not more than fifty fish should be carried in each five-gallon tin. The transportation of the fish should take place in the coolest hours of the day, avoiding as much as possible exposure to direct sunlight. Care should be taken not to jar the tin, since violent motion of the water may cause a high mortality.

**ANTI-AEDES AEGYPTI SERVICE**

**FISH RECEIPT**

Fish depot at.....

Received..... fish on ..... at ..... o'clock

..... dead at end of 24 hours

..... total to be paid for

\_\_\_\_\_ Depot Caretaker

Place..... Date.....

Form FA 107

Receipt issued to fishermen supplying fish to the Yellow Fever Service. Payment against the receipt is made at the office of the Service.

After transfer from one place to another, or from the central tank to the local depot, fish should rest 24 hours before the final distribution. To allow for this initial rest period, depot tanks are divided into two sections and subsidiary posts are generally provided with at least two barrels.

The depot caretaker delivers fish only upon presentation of the Fish Requisition (Form FA 65) and only in the number indicated by the inspector. The number and species of fish delivered against each Form FA 65 is noted thereon and this form is filed at the depot as a receipt for fish delivered.

In supplying fish, care should be taken not to distribute more than are required: one or two fish are enough for most individual household containers; and even wells, cisterns, and small lagoons require only five to fifteen fish.

Large bodies of water, such as ditches and lagoons, may be supplied with fish. In these bodies of water the length of life of the fish depends relatively little on the householder.

Where fish are used on a large scale the Service maintains depots in various parts of the city, each supplying an area having a radius of about

one and one-half miles. Barrels are inexpensive, easily transported, and suitable as deposits for fish in places where the turnover is small; several barrels can be used where business is heavier. The central depot generally has a special tank for receiving fish as purchased and for maintaining a reserve supply (see Fig. 15). This tank can be cleaned easily without removing the fish.

ANTI-AEDES AEGYPTI SERVICE

FISH REQUISITION

Zone..... Block.....

Street.....

No. of fish needed.....

Species of fish.....

Type of container.....

Number of containers.....

Date.....

Inspector.....

The nearest fish tank is at

Street..... No.....

DELIVERY

No. of fish delivered.....

Species.....

Date.....

Delivered by.....

Form FA 65

The caretaker of the fish depot delivers fish on presentation of this requisition.

**Inaccessible Tank Service**

In cities where the water supply is not constant throughout the day, it is customary for houses to have one or more tanks which receive water when it is available, and act as pressure reservoirs when it is not. Regulations provide that these tanks shall be so placed as to be easily accessible to the zone inspector (Article 12 of Decree No. 21,434 of May 23, 1932), but many of those in old houses cannot be made accessible without undue expense.

Water tanks are classified as:

1. Accessible to the zone inspector, when their examination presents no special problems. Such tanks are inspected by the zone inspector and reported routinely on Form FA 2, and also under "Containers" on Form FA 14. In case a tank is properly sealed, the inspector need not verify whether it contains water or not but notes it on Form FA 2 as "inspected" and "eliminated" as a possible focus.

2. Inaccessible to the zone inspector, when, because of their height, a ladder is required for their inspection. The inaccessible tanks are recapitulated weekly under "B" on Form FA 15.

The number of inaccessible water tanks existing in his zone is periodically checked and reported by the zone inspector on Form FA 105. Whenever the zone inspector during his routine visits finds an unregistered inaccessible water tank, he notes it on his copy of Form FA 105 and also in his notebook, for reporting to the district inspector. Similar notations are made whenever a water tank is destroyed or removed. On the basis of the information contained on Form FA 105 special inspectors of the Inaccessible Tank Service are sent out.

The Inaccessible Tank Service is responsible for knowing the number, location, and condition of the water tanks which cannot be easily inspected by the zone inspector and for making them mosquito-proof. Inaccessible tanks are always sealed, as stocking with fish is unsatisfactory because of the difficulty of inspection to determine whether the fish are still alive. Only where sealing is completely impossible are fish used and then only after a screened overflow pipe has been installed to prevent their being carried over the top, and the outlet pipe has

<u>ANTI-AEDES AEGYPTI SERVICE</u>						
<u>FISH TANK—WEEKLY REPORT</u>						
Post.....			Municipality.....			
Fish tank at.....					Street, No.....	
Week from .....			to.....		19.....	
Days	FISH DELIVERED				Fish Received	Remarks
	Service	Public	Dead	Total		
Mon.						
Tue.						
Wed.						
Thu.						
Fri.						
Sat.						
Total						
Balance at end of last week.....						
Fish received this week.....						
Total.....						
Fish delivered this week.....						
Balance for next week.....						
Tank Keeper.....						
Form FA 40						

In the column "Service" of this form are noted the fish delivered to employees of the Yellow Fever Service for distribution, and in the column "Public" those delivered directly to the householders at the depot. Under "Dead" are entered the number of fish that die within 24 hours after delivery to the depot. The total of the column "Fish Received" must agree with the number which appears against "Total to be paid for" on Form FA 107. Fish dying within 24 hours do not appear as "Fish Received."

been screened and extended above the bottom of the tank so that the water is never all drained off. However, the Yellow Fever Service itself makes no effort to seal tanks; experience has shown that tanks sealed free of charge are opened on the slightest pretext, whereas those sealed by, and at the expense of, the householder remain untouched for months or even years.

The method of sealing varies with the type of tank. Sealing to be satisfactory must:

1. Offer an absolute guarantee against the entrance of mosquitoes over a relatively long period of time.

2. Be easily examined by the inspector on his routine visit.
3. Be easy to replace or repair.

Wooden covers are not acceptable, owing to their tendency to warp and crack.

The inspector of the Inaccessible Tank Service works with an assistant, who carries a ladder. He carefully examines the cover and the sealing of the tank, leaving a note of his visit and of conditions found, on the Autograph House Visit Record (Form FA 52), which must be pasted in a prominent place on the tank itself. Similar notes are made on Form FA 105. The following

abbreviations have been adopted to indicate the condition of inaccessible tanks:

MP: Completely sealed and mosquito-proof.

C: Covered but not mosquito-proof.

F: With fish.

DIS: Disconnected. The word "disconnected" indicates that the tank is completely empty and that water cannot enter it.

UP: Unprotected. This indicates that the tank is open, contains or may receive water, and has no protection whatsoever against mosquitoes.

Foci found are noted in the column "Inspections" on Form FA 105 and also on Form FA 2. If the tank is not in satisfactory condition a Note for Legal Summons (Form FA 63) is made out. Although subsequent inspection, following the delivery of the Note for Legal Summons may be made by the inaccessible tank inspector, the results of these inspections are not recorded on Form FA 105, which is reserved exclusively for the survey or census inspection.

For the guidance of those responsible for sealing tanks, the Service furnishes drawings (figs. 16 and 17), showing the best methods of closing different types of tanks. The inspector, when filling out the Note for Legal Summons, indicates whether the tank is of "A" or "B" type, as shown on the drawings, and attaches the corresponding drawing to the form handed to the householder.

When conditions in general are satisfactory, almost all of the tanks mosquito-proof, and the aegypti index of the area zero, the inspection cycle is increased to a quarterly, a semiannual, or an annual period. Inspection is often suspended indefinitely in places where the Adult Capture Service is checking the amount of adult aegypti production.

#### Cemetery Service

In many cities cemeteries constitute a special problem in antilarval work. The numerous graves and tombs, adorned with vases, urns, and jars of flowers, require careful inspection and adequate control measures.

The Yellow Fever Service distributes printed forms advising the public to use wet sand instead of water in all cemetery vases and jars. In

some cemeteries photographs are displayed at the entrance showing how the vases should be filled with sand. Sand piles are placed at convenient points in the cemetery.

Large cemeteries are worked by a special inspector equipped as are the inspectors of the Producing Focus Service and assisted by the necessary number of helpers (servants, oilers, etc.). He makes a thorough inspection for the discovery and destruction of mosquito foci and fills all vases with earth or sand. Annually, immediately after All Souls' Day, he makes a special visit to replace the water in the vases with wet sand.

In smaller cities, the cemeteries can be dealt with efficiently by the zone inspector during his routine visit.

#### Ditches and Wasteland Service

Cleaning ditches, cutting weeds on vacant lots, clearing brush on wasteland, removing rubbish, etc., is the responsibility of the property owners and to a certain extent of the municipality. Owners are warned to maintain their properties free of mosquito breeding, and the municipality is reminded of its obligation to prevent breeding on public lands and highways.

However, in certain emergencies the Yellow Fever Service organizes a temporary gang of men for the cleaning of ditches and wasteland. The organization, previous authorization for which is obtained from the sector director, and the administration of such work are carried out in accordance with local conditions in each case.

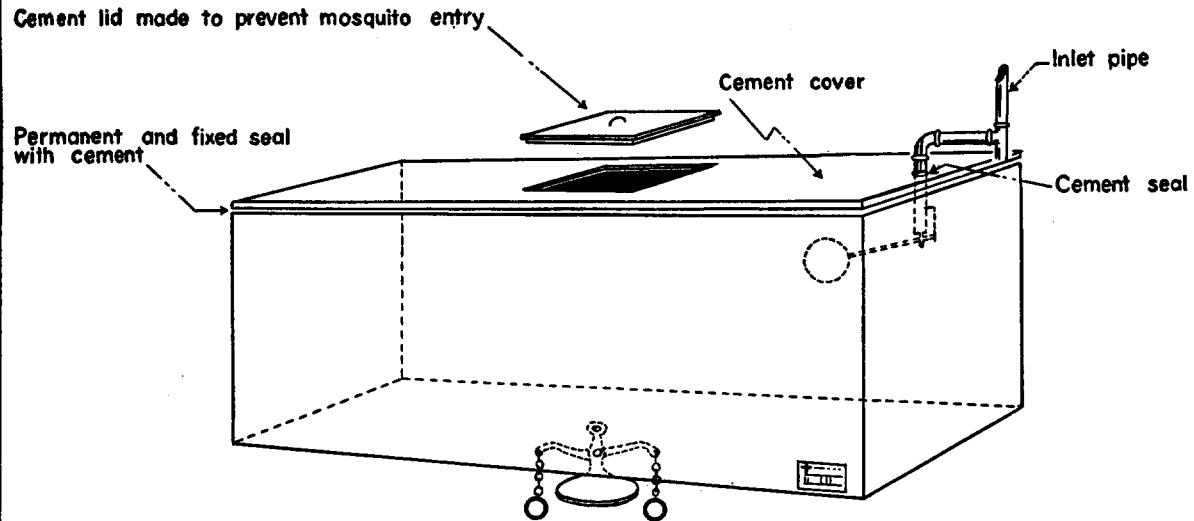
#### Oiling Service

In some places the Yellow Fever Service maintains oilers who use a spray pump of the "Panama" type. These oilers, in accordance with an itinerary, carry out the routine oiling of certain large breeding places, and also attend to the oiling indicated on Form FA 66 handed in by the inspector. When the oiler works on his itinerary he uses the Inspector's Work Sheet (Form FA 2) to record the work done. Where there are ditches, lakes, wells, pits, etc., requiring constant and costly oiling, measures are taken as soon as possible to ensure their definite elimination. Legal action is taken, when necessary, to oblige the

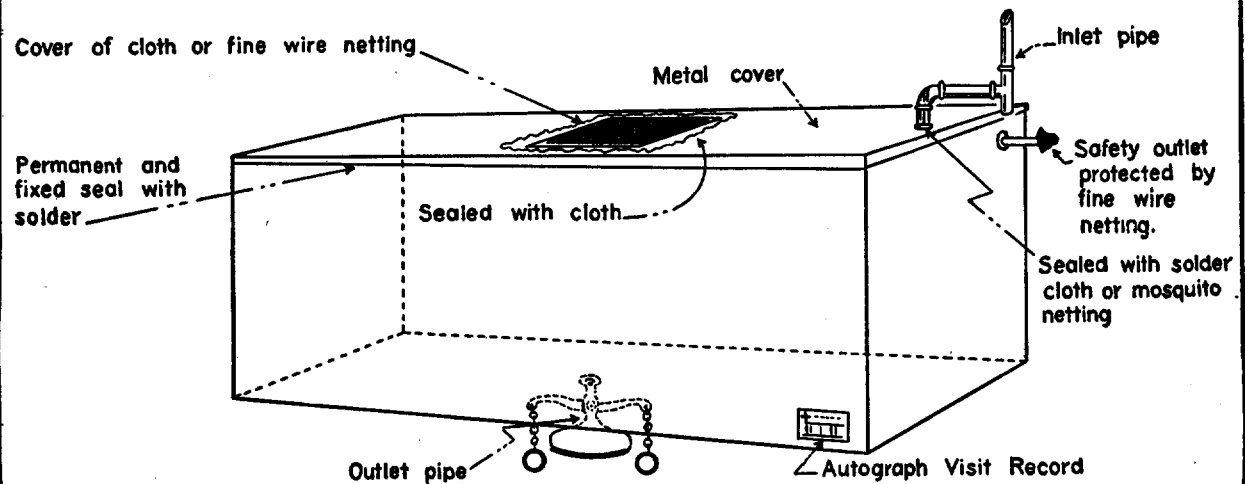


TYPE "A"

### WATER TANKS MADE OF REINFORCED CONCRETE MASONRY OR IRON



### WATER TANK CONSTRUCTED OF REINFORCED CONCRETE OR MASONRY



### GALVANIZED (USUALLY) IRON WATER TANK

NOTE: Wooden covers are not acceptable

FIG. 16. Methods of mosquitoproofing concrete and iron water tanks.

TYPE "B"

WATER TANKS MADE FROM BARRELS AND DRUMS

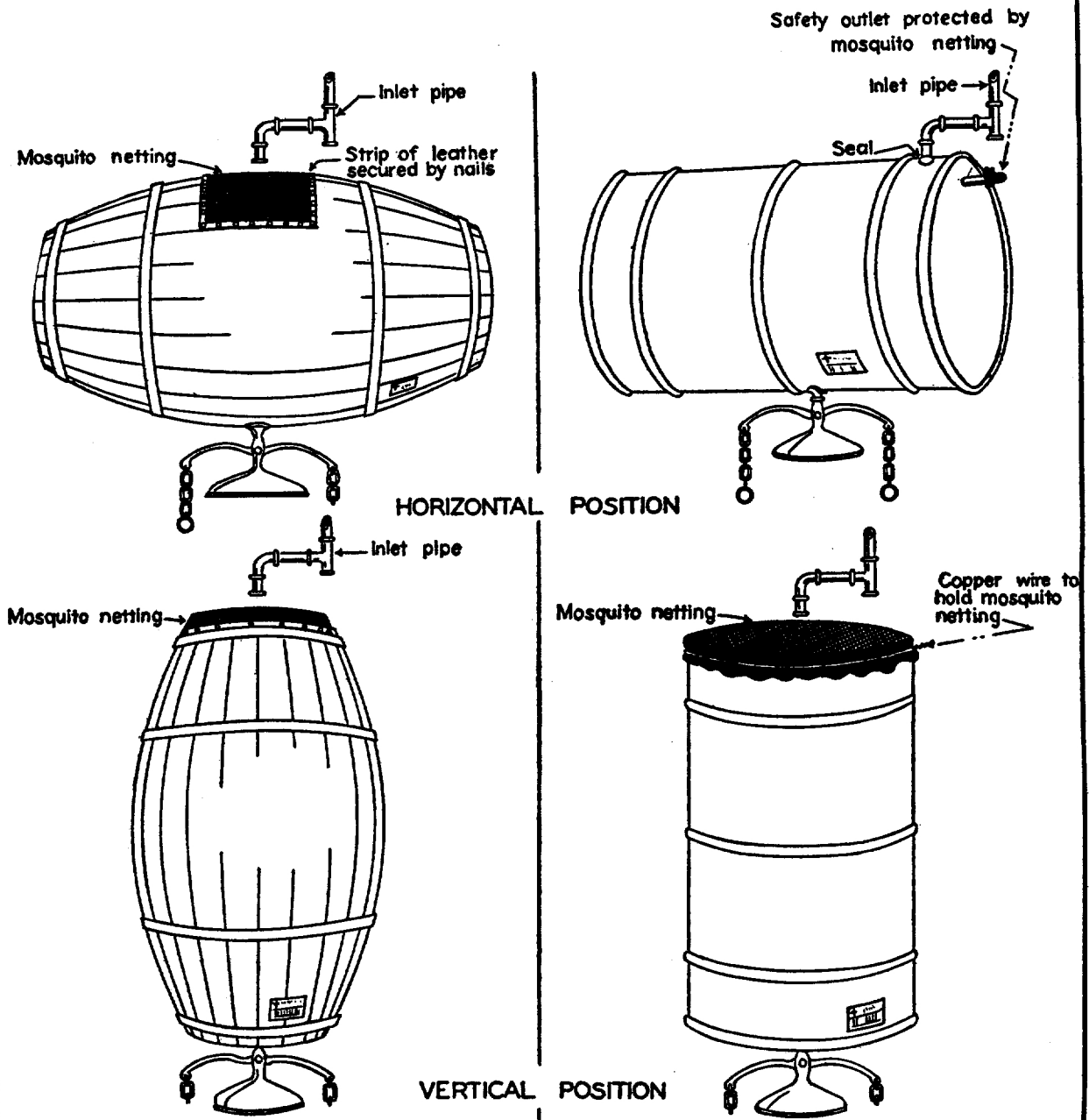


FIG. 17. Water tanks of the barrel and drum types, properly protected against mosquito entry.





owners to correct unsatisfactory conditions, instead of continuing with the oiling indefinitely.

Those superintending and checking the work should foresee the possibility of an unscrupulous oiler discharging the greater part of the contents of the pump into the first few containers to be oiled to lessen the weight of the pump, which results in insufficient oiling of the remainder.

In order to facilitate oiling, a number of oil depots are maintained at different points in the control area where the inspectors and oilers can obtain fresh supplies as needed. For the purpose of checking the use of oil a record of receipt and disbursement is kept at each depot in the cities worked. This Oil Depot Report (Form FA 42) is made up weekly, the total of oil issued being checked with Form FA 66 in order to verify whether the quantity consumed is reasonable.

Oil sent to depots in the interior (where the consumption is relatively small) is dispatched in used five-gallon gasoline tins and not in drums. These cans, full of oil of the type used by the Yellow Fever Service, may be closed by soldering without danger. Care is taken to ensure that the oil depots in the interior are never without oil, and also that they are never greatly overstocked, which might lead to waste.

The oil depots send a report on the last day of the month to the sector or local office showing the stock of oil on hand at the end of the preceding month, the amount received during the month, the amount issued, and the amount in stock at the end of the current month.

The quantity of oil issued by the depot must be frequently checked against the number and type of containers oiled, as reported on Form FA 14 submitted by the corresponding post.

#### Vacant House Service

The vacant house is differentiated from the closed house. The vacant house is unfurnished and unoccupied; the closed house is furnished and occupied, with its occupants temporarily absent.<sup>1</sup> The closed house is generally inspected

<sup>1</sup> In certain localities the summer vacation season finds many houses closed, with their occupants in the mountains or at the beach. Where the anti-aegypti work is well established this problem can be handled by the zone inspector, but in areas where the work is new he may require special assistance.

by the regular zone inspector, whereas the vacant house is at times handled by a special inspector. The vacant house which has not been made mosquitoproof is a dangerous source of aegypti production where the antimosquito campaign has not yet reduced the aegypti index to a very low figure.

The poorer types of vacant houses can generally be visited by the zone inspector, since the keys are usually with the neighbors. Where a piped water supply does not exist or is not connected the house often requires only a yard inspection. Vacant houses with a piped water supply and connected with a sewerage system are especially dangerous and must be very carefully inspected.

The work of the Vacant House Service is based on a quarterly census of vacant houses made by the inspector in each zone and recorded on Form FA 59. In taking the census of vacant houses the inspector includes only those he cannot work easily on his regular routine visit. A copy of Form FA 59 is made for the vacant house inspector, and the zone inspector keeps his copy up to date by noting vacant houses which may be re-occupied and occupied houses which become vacant. The inspector reports such changes daily through the district inspector so that the office list and the vacant house inspector's list can be duly altered.

In small cities the Vacant House Service is simple, but in large cities it becomes cumbersome and inefficient if it is not handled by carefully trained personnel. In large cities a special district inspector for the Vacant House Service supervises, orients, and inspects the squads of inspectors and procurers of keys. The district inspector and the key-men generally ride bicycles.

Getting the keys is the most difficult part of the work. The inspector, at the time he lists a house as "vacant," makes every effort to note on Form FA 59 the name and address of the person holding the key. The key-man receives a list of the houses for which keys are lacking and then organizes his itinerary (Form FA 108), listing the addresses of the holders of keys in the order in which they can be most easily visited. He leaves copies of this itinerary for the director



ANTI-AEDES AEGYPTI SERVICE

NOTICE

To the occupants of house No. .... Street.....

In order to facilitate the work of the Yellow Fever Service, the occupants of this house are requested to leave the keys with some neighbor whenever they are to be absent, so that the inspector's visit may be made at the regular time and they may avoid the penalty established by law.

A house which is vacant and cannot be inspected because the keys are not available, or because of delay or refusal to deliver the keys, or because of any other difficulties created by the holder of the keys, shall be sealed until after its inspection by the Yellow Fever Service. In such cases measures shall be taken to enter and inspect the building in the presence of a police officer, following which it shall be closed and again sealed. (Article 5 of Decree No. 21,434.)

Form FA 43

Request for keys, posted by the inspector in a prominent place on a house regularly found closed.

and for the general inspector, to facilitate the checking of his activities.

The key-man gives a receipt for each key (Form FA 39) and puts an identification tag on the key (Form FA 38). The keys collected one day are distributed on the morning of the following day to the special vacant house squads, who inspect the corresponding houses and return the keys to the office on the same day so they can be given back to their owners on the next day. Only in special circumstances do keys remain in the possession of the Service more than 48 hours. In cases of urgency, inspections are made and keys returned within a few hours.

When a key is returned, the recipient signs for

it on the reverse side of Form FA 38. This shows that the key has been returned promptly and serves as a protection against later claims that a missing key has never been returned. Receipts for returned keys are kept on file for three months or more.

Owners may refuse to give the keys and prefer to go to the house to open it at the hour marked for the inspection. However, rarely is the house open at the time agreed upon; and the Service always insists on getting the key, except when there are objects of great value in the house.

The purpose of the inspection of the vacant house is not only to find and destroy existing

**ANTI-AEDES AEGYPTI SERVICE**  
**KEY RECEIPT**

Received.....keys of house at  
No..... Street.....  
at.....A.M.....19.....  
P.M. month day  
Inspector.....

Form FA 39

Receipt given to the person supplying the key of a vacant house.

**ANTI-AEDES AEGYPTI SERVICE**  
**KEY TAG**

Zone..... Block.....  
Street..... No.....  
Key found at.....  
.....  
Name of owner:  
.....  
Form FA 38

---

Key obtained: Date.....  
Returned: Date.....  
Signature of recipient  
of returned key:  
.....  
Form FA 38 (reverse)

Front and back of the identification tag for the key of a vacant house.

foci but also to prepare the house so that it will be free of mosquito breeding during a period of at least 30 days.

The vacant house inspector works with a helper. Each squad carries the following equipment in addition to that carried by the zone inspector.

- Ladder
- Shovel
- Trowel
- Three-liter tin of oil
- Pail of paste or glue
- Strips of old newspapers
- Machete and iron hooks for lifting manholes
- Rope
- Cement
- Cheap cotton cloth
- Forms FA 45, FA 62, and FA 81

Work begins with the yard. Before entering the house, the water is cut off. All worthless water containers are collected, counted, and buried; movable containers of value are placed in such a position that water cannot collect in them. Immovable containers are filled with earth or sand. The bathroom is visited next. The toilet is flushed, and the toilet basin is oiled before being sealed. The chain of the flush tank is rolled up and placed on the top of the tank. The water tank is drained off, oiled, and sealed. A request not to break the seals on the toilet basin and tank until the house is occupied (Form FA 81) is pasted on the door of the bathroom and on the seat of the toilet basin. One to four ounces of oil are poured down each drain pipe.

Any pools of rain water found in the house are covered with sand or earth, and the responsible window or doorsill is plugged with paper; leaks in the roof are repaired if possible. When there are house defects of potential importance to mosquito breeding which cannot be easily corrected by the inspector, he makes a note for the legal summons of the owner. If stocking the tanks or cisterns with fish is indicated, a requisition for fish is prepared and given, with the house key, to the fish distributor. If the house is near a fish depot the inspector's helper fetches the fish immediately. The use of fish in vacant houses must be limited to containers which can



**ANTI-AEDES AEGYPTI SERVICE**

**REPORT OF VACANT HOUSE INSPECTION**

Zone..... Block..... Street..... No..... Floor.....  
 Keys left at.....  
 Name of proprietor.....  
 Address of proprietor.....  
 Date of inspections.....

**REINSPECTION**

Date of last inspection.....  
 State of sealing done during last visit.....

Water cut off..... Water tanks emptied.....  
 State of roof gutters..... Water tanks sealed.....  
 Containers buried..... Sanitary apparatus sealed.....  
 Containers put under shelter..... Windows sealed.....  
 Fixed containers filled with sand..... Fish requested.....  
 Legal summons to.....

Containers Found with Water	Cont. Inspected	ALL SPECIES		AEGYPTI		Cont. Eliminated	Cont. Oiled	CONTAINERS		
		F	FP	FA	FAP			With Fish	Provided with Fish	Fish Distributed
Inaccessible tanks										
Vats and tanks										
Clay vessels										
Barrel, drums, tubs										
Spec. art. cont.										
Roof gutters										
Trees and plants										
Wells and pits										
Other containers										
Totals										

In the space "Cont. Eliminated" show the number of sealed water tanks

Time of leaving last house.....  
 Time of arrival this house.....  
 Time of leaving this house.....

\_\_\_\_\_  
 Zone Inspector

The data from the column "Containers" on this form are included on Form FA 14. The number of vacant houses inspected in all zones during the week, and their respective indexes, are included at the end of the list of indexes of the zone on Form FA 14. Form FA 62 greatly facilitates the checking of the work of the squad.

**ANTI-AEDES AEGYPTI SERVICE**  
**INSPECTION NOTE FOR VACANT HOUSE**

Zone..... Street..... No..... Block....  
 Keys left at.....  
 Name of proprietor.....  
 Address of proprietor.....

Inspections	Date	Hour Ended	Inspector's Signature	Initials of Controller
First				
Second				
Third				
Fourth				
Fifth				
Sixth				

Form FA 45

Form posted on a vacant house for the recording of inspections.

**ANTI-AEDES AEGYPTI SERVICE**

THIS SEALING HAS BEEN DONE BY THE ANTI-AEDES AEGYPTI SERVICE  
 TO PREVENT MOSQUITO BREEDING WHILE THE HOUSE IS VACANT

**PLEASE DO NOT BREAK THE SEALS**

UNTIL THE HOUSE IS OCCUPIED.

BREAKING THIS SEAL IS PUNISHABLE BY FINE (ARTICLES 3 and 10  
 OF DECREE NO. 21,434 of MAY 23, 1932)

Form FA 81

Seal for toilet basin, flush tank, and bathroom door of a vacant house.



be given immediate protection in no other way, such as wells, cisterns in use, and large uncovered tanks.

Roof gutters and roofs are inspected. Tins and other rubbish on the roof are removed and buried. Gutters are cleaned of all obstruction and, if possible, corrected for defective slope.

Before leaving, the inspector fills in the Report of Vacant House Inspection (Form FA 62) in place of Form FA 2 and leaves an Inspection Note for Vacant House (Form FA 45) pasted in the house so that it is visible from the street, preferably behind a clear window pane or at some other place sheltered from rain and from tampering. On reinspection a note is added to the Form FA 45 already in the house. This form aids the medical officer and the district inspector in locating the squad at work, since a glance will show whether the day's inspection has been noted. The form also shows the date on which the house was last inspected.

In special cases where the Producing Focus Service cannot complete a neighborhood search because of one or more vacant houses, a note for "urgent" inspection is sent to the Vacant House Service. This Service finds the necessary keys and makes the inspections, reporting them not on Form FA 62 but to the Producing Focus Service, which includes them on Form FA 58, with a note stating that the work has been done by the Vacant House Service.

The work of the Vacant House Service is so widely scattered and so irregular that there is a constant temptation for employees to shirk. The work reported and the time spent on a given job are subject to constant checking, as is also the time spent in going from one house to another. By comparing the time of visit noted on one bulletin and the distance between houses it is possible to detect time wasted. An intelligently prepared itinerary is essential for efficient work. By using a spot map of the city, houses to be inspected can be listed on the itinerary in accordance with their location, and travel time between houses can be kept at a minimum. The itinerary for the collector of keys should be plotted in the same way.

The interval between inspections of vacant houses depends on the amount of aegypti breed-

ing in the area. Ordinarily a monthly cycle is sufficient, but where the aegypti index, especially pupal, is high the cycle may be shortened to a fortnight, particularly in those districts where a large number of foci have been found.

Care is taken to see that houses whose keys are easily obtained are not visited more often than is necessary while houses for which keys are difficult to get are neglected.

When conditions in a city improve, the cycle of visits to vacant houses is increased to two or three months or even suspended, with the previous authorization of the regional director. Suspension of visits to vacant houses is conditioned on a very low aegypti index and on the organization of an efficient Adult Capture Service. Since the aegypti hatching out in a vacant house go to neighboring houses to feed, the existence of breeding in vacant houses is revealed by the Capture Service.