However, I feel that we can say, along with the nited States Marines, that "the situation is well in and". Our offer of assistance in training personnel or local mosquito control work has been made to and ccepted by the local U. S. Naval Health units and he cooperative spirit now existing between the U. S. ivy, the U. S. Public Health Service and our own ity organization clearly indicates that "united we tand".

Another twelve months may bring us additional roblems which we cannot foresee today but I confi- ently predict that our local research and study in ooperation with the efficient organization of other orkers who have the same interest will effectively eet any situation which National Defense may ask us o face.

DEVELOPMENTS IN MOSQUITO CONTROL

Anopheles And The Light Trap

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The electric light trap appears to be the only eans by which a reasonably adequate notion of mosqui- oes on the wing can be reported day after day through- ut the entire active mosquito season. This instrument as been shown to catch representative samples of ulex, Aedes and certain Anopheles, as well as many of he less abundant and more sporadic species. Back of his statement lies a trapping experience covering the alk of the mosquito season from 1933 to 1940 inclu- ive, in the course of which 1,211,639 female mosqui- oes were taken and identified.

With such performance as these traps have given for the ordinary species of mosquito it is most surprising to find that they do not catch what is believed to be a representative sample of Anopheles quadrimaculatus, particularly in the southeastern states. That they do catch Anopheles quadrimaculatus there can be no question for of the 1,211,639 female mosquitoes 8,369 were Anopheles quadrimaculatus.

It seems to the writer that if the meaning of these figures in terms, first, of Anopheles quadrimaculatus on the wing, and second, of malaria incidence in regions where it is a malaria vector, can be worked out, a long step forward in the control of this disease-bearing species would be taken. The methods commonly employed for determining the density of the quadrimaculatus must be very time-consuming and not as accurate as could be desired.

Some steps looking toward the meaning of the figures derived from stable, outbuilding, and human dwelling collections have been taken and the most promising development with which the writer is familiar is the invention and use of the nail keg mosquito trap. It is quite possible that the electric light trap catches of quadrimaculatus represent the abundance of this species on the wing and that the catches in the nail keg traps, stables, outbuildings and human dwellings represent special concentrations. From the ways in which the nail keg trap has been handled, it seems probable that it is less of a concentrating agency than the others mentioned.

In view of the ease and accuracy with which the electric light trap can be operated and the rather complete representation of the various species of mosquitoes, both pest and disease-carrying, which can

caught by its use, a determined effort should be de to correlate the catching ability of this type trap with the nail keg, stable, outbuilding and man dwelling collections. Then the abundance of squitoes on the wing thus determined should be rrelated with the incidence of the disease of laria in regions where Anopheles quadrimaculatus is stinctly the vector of this disease.

This, it seems, is the first job. Then in due urse will come the treatment of the other species disease-carrying Anopheles.

S/V Culicide Oil

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During the past year, the Socony-Vacuum Oil ompany has been working in close cooperation with r. R. H. Sammis of the Nassau County Mosquito Exterm- nation Commission in the development of a new type of arvae killing oil which is now available under the ame S/V Culicide Oil. This material is produced ynthetically from natural petroleum and has the ollowing physical characteristics:

Gravity, °API	5.0-6.0
Sp. Gr.	1.366-1.0291
Flash, C.O.C.	300°F. Min.
Pour	0°F. Max.
S.U. Fisc. @ 100°F.	230" Max.

t will be seen that this product has an extremely high specific gravity for an oil having a 230" vis- cosity. This is due to its highly aromatic or cyclic

composition. No toxic materials are added to this o such as phenols or cresylic acids. It marks the fir time, to our knowledge, that a fluid mineral oil, heavier than water, has been proposed for the contro of water-dwelling insect larvae.

When S/V Culicide Oil is introduced into a tank of water containing either Aedini or Culicini larvae, the oil settles to the bottom in small droplets. A small amount of pressure will force the oil thru the water surface, and no appreciable oil film will be left to interfere with the respiration of the larvae. After some time the larvae, in searching around the bottom for food, encounter the S/V Culicide Oil and swallow small amounts. Death inevitably follows, though it may be a matter of some hours. Microscopic examination of many of the dead larvae has shown that in every case, oil is present in the digestive syste Pupae are, of course, in no way affected as they do not eat during their existence. However, it follows that if the larvae can be destroyed, there will be n pupae. These experiments were checked by an indepen- dent laboratory, as well as in both the Socony-Vacuum Oil Company and Nassau County Laboratories.

As soon as weather permitted in the spring of 1941, field tests were started in the salt marshes on the southern shore of Long Island in the vicinity of Jones Beach. Inspectors and other personnel of the Nassau County Mosquito Extermination Commission worked with representatives of the General Laboratori and the New York City Division. Several ponds were selected for test along with two drainage ditches. The amount of oil used in the treatment was roughly the same as the Commission normally used of the regu fuel type spray. In all cases, an untreated pond, le than 100 feet from the treated one, was left for con-

trol purposes. On the day of treatment in May, none of the ponds contained many larvae. An inspection was made after six weeks, at which time all ponds which had been sprayed with S/V Culicide Oil were entirely free from breeding, while controls were heavily populated. The same was true of the drainage ditches selected for test.

Another six weeks were allowed to pass before the second inspection. At this time, July, the ponds treated early in May, though they had varied in size with weather conditions, were still 100% protected. The control ponds had become so completely infested during this period that the inspectors were forced to spray them with regular oil. Just eight days prior to our inspection a large pond had been treated with regular fuel oil and on the day of inspection needed another treatment. It was our experience throughout the summer's work that a surface oil was effective for not more than 10 days. Dry weather conditions made it impossible for us to carry out our original experiments beyond a twelve week period. We can definitely say then that a pond treated with S/V Culicide Oil will be protected from mosquito breeding for at least three months and that no pond thus treated failed to give complete protection.

Drainage ditches were protected as long as flood waters were not of sufficient violence to wash out the bottom.

The effect of S/V Culicide Oil on plants and green foliage is much the same as that of any other oil. That is to say that the plants will burn brown and die. In treating most marsh land this will not be too great a factor. If any fish are in the water, they are likely to be poisoned in their efforts to obtain food off the bottom. In the majority

of cases, however, it will not be necessary to spray oil when fish are present because the fish themselves are a very good mosquito control agency. Top feeding fish which are cultivated for mosquito control would probably be harmed less by S/V Culicide Oil than by the conventional surface oil. Ornamental garden pools containing gold-fish do not need any larvicide to keep down the breeding of mosquitoes.

The use of S/V Culicide can be recommended for use in either salt or fresh water ponds for the control of either aedini or culicini type larvae. No special type of equipment is needed to apply this material in spite of its viscosity of 230 seconds. When using regular fuel oil spray equipment, it will be noted that the oil emerges from the nozzle in one single fine stream instead of a fog or spray. This is the ideal condition as the stream will then have sufficient force to break through the water's surface and sink to the bottom. Very fine drops such as would be formed in a fine mist, would be held up by the surface film of the water. It is not at all necessary to have microscopic drops of oil because the larvae will feed from drops many times their size.

This oil, like all oils, tends to soften rubber hose. As its boiling range is too high to permit spontaneous evaporation, it is best to wash it out of hose if it is to remain idle for some time. S/V Culicide Oil is never diluted with other oil before spraying however, as the gravity balance would be upset and its value lost.

It is true that the cost of a single application of S/V Culicide Oil is higher than for conventional fuel oils because of its higher cost per gallon and because of increased labor charges resultant from slower rates of coverage. It is also a fact that the

ults of the above tests show that the use of S/V
licide over a season would result in important
nomies because only one application may be re-
red as compared to repeated sprays with fuel oils.
quent inspections would not be necessary. Further-
e, the adoption of S/V Culicide Oil may enable
tection of stump holes, catch basins and out-of-
-way places which heretofore could not be treated
nout incurring excessively high labor costs.

The credit for the development of this larvicide
s to Dr. James W. Ramsey, Captain D. E. Longworth
Milton Wise.