

ASSOCIATION NEWS

REPORT OF THE MAY 24-25, 1946 MEETING, CONTINUED

The meeting was called to order by Perry W. Ruth, President, who expressed regret that the railway strike had kept away from the meeting so many who would otherwise have been present, including not only several of the scheduled speakers, but also the newly elected President, H. H. Stage, who was scheduled to preside.

Mr. Ruth then in succession asked the First Vice President and Second Vice President to take the Chair; but since both were scheduled to speak, both concurred in asking Mr. Ruth to preside throughout the meeting.

A preliminary report of the meeting, including reports of Committee Chairmen, was published in the June number of MOSQUITO NEWS, together with the statement that a further report of the papers read by discussion leaders and of the dis-

cussions which followed would appear in the September number.

Publication of the September number has been somewhat delayed while awaiting copy of papers and of the symposium discussions at these meetings. Delays in the receipt of copy, however, have made it necessary to print here only a part of the proceedings, and to carry over the remainder to the December number. For coherence, therefore, the opening papers and the symposium discussions on "The Importance of Particle Size in Sprays and Aerosol Fogs for Mosquito Control Work," and on the question "Should Mosquito Commissions Be Made Responsible for the Suppression of Other Pests Which May Require Community Action for Their Control?" will be carried over, and only the remaining papers read at the meeting will be printed here.

THE PAST, PRESENT AND FUTURE OF CHEMICAL MOSQUITO CONTROL

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I do not know who made the discovery that petroleum poured upon the water would kill mosquito larvae, but a review of the literature shows that by the turn of the century this fact was well known. In the control of the yellow fever outbreak in Havana in 1901-1902, "four to six ounces of petroleum poured into the cesspool" did the trick. In the work at Panama under Colonel Gorgas, in the outbreak at Rio de Janeiro in 1903, in Mexico, Japan, Algeria, Ismalia, Italy, India, and other parts of the world, petroleum was being used already as a mosquito larvicide.

Even that early, efforts were being made to improve the oil as a larvicide and the literature shows petroleum was mixed with cresols, lysol, creoline and similar products.

Perhaps we should consider what would be the ideal larvicide. The ultimate would probably be a chemical, within economical reach, which would kill the mosquito larvae within 24 hours, would not harm aquatic vegetation, fish or animals, and one application would last a full season. We might go further and include ovicide and pupicide properties; however, the attainment of the first would accomplish the rest.

That this ideal probably can never be attained is almost an undisputed fact. There are those conditions over which man has little or no control, which, even if such a chemical were discovered, would dissipate it. For instance, the movements of the water, the tides, the rain, and the wind.

In the early 1920s, research turned its thoughts toward the improvement of oils and information began to filter down to the control personnel. While it had been accepted that petroleum merely suffocated the larvae, it was shown that this was true largely of the highly saturated oils (those having hydrocarbons with few or no free bonds), but the unsaturated oils killed through a direct toxic effect on the insect. About the same time more thought was being given to the spreading qualities of the oil, whether it would maintain an unbroken film in the presence of vegetation penetrating the water surface, to the ovicidal and pupicidal effect, to the lasting qualities of one application, and to the repellent effect upon the adult mosquito, so she would not return as quickly to lay more eggs.

This information started the control organizations on a search for commercial cuts of oil which would come the nearest to attaining these results. They were on the whole successful, particularly when the advent of commercial and domestic oil heating became popular and the fuel oils or heating oils most nearly met the desired qualifications. It also sealed the doom of waste crank case or motor oil. Prior to that many organizations had maintained trucks for the purpose of picking up the waste motor oil from service stations, later to use as mosquito oil. The poor spreading qualities of this mixture from cars could not meet the test.

Many petroleum and chemical houses came out with "spreaders," to add to fuel or diesel oil to improve its spreading qualities primarily, but also to increase the toxicity and repellency. Most of these were too costly or experience showed they did not stand up to the claims under field conditions. There were many of these but perhaps the most widely known were special petroleum cuts sold by oil companies, some of the alcohols, pine oil, the cresylics and tar acids. The most widely used today are the cresylics and tar acids. A small amount will improve the spreading quality of fuel oil and some claims of

greatly increased toxicity and repellency are made.

One of the most recent of the newer petroleum cuts discovered was the Culi-cide Oil; in 1939. This is a heavier-than-water oil which, upon application, broke into fine pin-point droplets and fell to the bottom of the water. Sufficient was held on the surface by water tension to kill surface feeding larvae. On the bottom of the water its action seemed to be one of physical contact. A mosquito larva, coming into contact with a droplet, would become attached due to the very sticky nature of the oil, and could not release itself, finally ingesting the droplet in an effort to be rid of it. The toxic qualities of the oil in the stomach of the larva caused its death. This oil gave excellent control for prolonged periods upward of two months in water locations where there was no tidal or stream action. However, the oil was by nature heavy and the mechanical difficulties of spraying it, other than by hand, were not overcome. Also the oil stained clothing and could not be removed.

It was shortly after 1900 that the first attempts to compound larvicides resulted in oils emulsified in water. The first wholesale larvicide so used was the Panama Larvicide. In my personal experiences I was surprised to find in 1944, while stationed at Panama with the U. S. Army, that this same larvicide was still the standard. This Panama Larvicide is made from a heavy black oil, which, in its natural state, is tar-like in its consistency. It must be heated in the process of making it miscible in water. This material is black as coal when sprayed and the damage to vegetation would make it prohibitive for most control organizations to use in this country.

Other attempts at emulsified larvicides included the phenols, which were thought well of in certain sections for a time. Their main claim to fame was that a small concentrated amount could be carried into the field, there to be mixed with water and sprayed. This feature was not suffi-

gives us the time, the name of the child, and proclaims its superiority over its brothers and sisters. To say we are tired is putting it mildly. We are walking the floor with 1068, with TDE (or DDD), with 3956, with NR-70, and several others are on their way. We have no recollection of fathering this crop of off-spring, like many other husbands nowadays, we can just blame it on the army.

But what of tomorrow? What is to be the future of mosquito control? Are the old rules to be forgotten? Will control of the adult mosquito supplant larval control? Will drainage be abandoned?

Already we have experiments based on that premise. A few agencies are going all out for aerosol fogs this season. Some of these agencies have heretofore not engaged in any mosquito control work, and are hoping to control mosquitoes and other obnoxious flying insects by this means. Perhaps they will succeed, let us hope so. However, I do not feel that aerosols, either applied by ground or air equipment, are going to be successful as the sole means of control except in relatively small areas, such as along a beach front or around a resort or park of a relatively few acres. Again, nature interrupts man's desires and the aerosol operator will find his control work is dependent upon the wind, rain, and related pranks of the weather. It has been our experience in Nassau County after thirty years of mosquito control that one's plans for control must go on "weather" or no. Airplanes will be grounded for days on end. The rate or direction of the wind will make it impractical to apply aerosols from planes or ground equipment for relatively long periods at the height of the season. Per-

haps we will reach the point in development where a single application will apply sufficient residual chemical to control for the whole season. That day has not arrived.

What should be the outlook of an organization like the Nassau County Mosquito Commission? Perhaps I am conservative. I feel the new larvicides and adulticides will be most valuable to us, but, like the 50 caliber machine gun, just another excellent weapon. Mosquito control on a wholesale scale will go on as it has, engaging in drainage and the elimination of breeding to the fullest extent, and the chemical control will still be based on the most vulnerable stage of the mosquitoes' life, the aquatic stage. DDT and the other new chemicals now coming onto the market will render larva control more effective than in the past. The spraying equipment, mechanical and hand, is already being adapted for their use.

The use of aerosols, mists and fine sprays fill in a gap which has long been apparent, a practical method of controlling those broods of mosquitoes which for one reason or another elude the well organized work of the control agency. They will supplement larviciding, and used in aeroplane or ground equipment will permit the spraying or fogging of large open marshes which has been impractical heretofore.

Maybe my conclusions are wrong, the picture is changing daily and that change may continue until we will hardly recognize what used to be. When that time comes, I am all for it, and from where I sit, I am looking through conservative glasses.