feed. Gnats were not observed in close association with horse flies that were not attempting to feed. Also, many times gnats actively burrowed down next to the mouth parts of the fly as they were penetrating the skin. During blood flow, the gnats fed on excess blood around the mouth parts of the horse fly, and after the fly left, they fed on the blood that oozed from the wound. Although the gnats were associated with all species of tabanids, greater numbers were attracted to such larger species as *T. proximus* Walker, *T. atratus* F., *T. americanus* Forster, and *T. abdominalis* F. than to smaller species, *T. lineola* F., *T. fuscicostatus* Hine, and *T. subsimilis* Bellardi. The difference may have been the result of the bigger wounds made by the larger species.

Gnats were also associated with feeding stable flies (*Stomoxys calcitrans* (L.), a relationship previously reported by Jay (1962), but in lesser numbers. The gnats were attracted also to the scabby areas on the animal's belly where large numbers of horn flies, [*Haematobia irritans* (L.)], had previously fed. Gnats were not observed near feeding mosquitoes, and it was established that the gnats were not attracted to the other insects either but to the wounds made by these insects. When superficial wounds were made on the animal's skin, the gnats clustered around and fed on the blood from such wounds.

Hippelates are known for their habit of feeding on the mucous membranes of animals and man, but only one report, that of Herms (1926), mentioned that these flies also feed on drops of blood on the skin and in open wounds or sores. No reports were found that indicated an association between *Hippelates* and Tabanidae.

Although *Hippelates* cannot be considered primary blood feeders, the association with Tabanidae is important to their potential for disease transmission. *Hippelates* flies are proved or suspected vectors of diseases such as conjunctivitis, yaws, and bovine mastitis (Sanders, 1940; Dawson, 1960). Recent work by Dimopoullos and his co-workers (1967) indicates that the role of these flies in the transmission of anaplasmosis in cattle should be investigated. Their study on routes of inoculation showed that it was possible to transmit anaplasmosis by the intraocular route. Two out of three splenectomized calves inoculated by flooding the ocular membranes with *Anaplasma*-infected blood contracted the disease. Thus, *Hippelates* that fed on blood from wounds caused by tabanids on cattle carrying anaplasmosis could be mechanical vectors of anaplasmosis when they later fed on the mucous membranes of the eyes of cattle susceptible to anaplasmosis. The possibility that a biological cycle might occur in the gnats should not be overlooked.

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THE SOUTH COOK COUNTY MOSQUITO ABATEMENT DISTRICT RIGHT HAND DRIVE IN SERVICE

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During its first years of operation the South Cook County Mosquito Abatement District used three-wheel motorcycles for catch basin spraying. Several methods of pressurizing the spray solution were used, but all were impractical and were a constant maintenance problem. The first method used was a fuel pump and pressure tank, but this did not have enough capacity. Next, independent gasoline engines and gear pumps were tried. This was more satisfactory, but required the extra engine which was an additional source of trouble. Another method tried was simply a glass-lined well system pressure tank that can be purchased readily and is inexpensive. The tank was filled at the depot and pressurized to 70 lbs. with the tire inflation system, but had the drawback in that the initial pressure was not quite enough for a full tank of solution and the operator was required to stop at filling stations for a recharge of air.

Probably the most annoying and time-consuming problem in using motorcycles was the motorcycles themselves. Inexperienced operators had trouble

FIG. 1—Catch basin wand spraying basin. During travel the wand is carried in the tube mounted on the side of the vehicle.

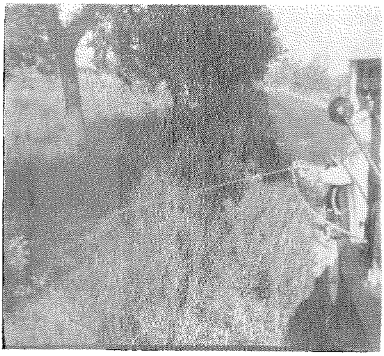

FIG. 2—Pistol wand treating a roadside ditch. The eight to ten foot distance is covered with ease.

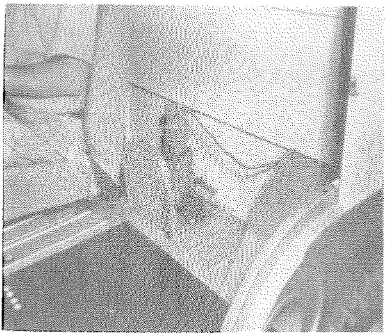

FIG. 3—1.44 CFM compressor mounted to the left of the operator and a copper tube taking the air to the rear tank. A check valve and pressure relief valve is included in this line.

starting and running them. The added weight of 400 pounds of solution caused many hours of down time and excessive clutch wear repair charges. Motorcycles are also dangerous to operate in heavy traffic in an urban area.

During the summer of 1966 The South Cook County Mosquito Abatement District put into operation two right hand-drive Kaiser CJ 5's for catch basin and roadside ditch spraying. For a pressure tank the same 25-gallon glass-lined well pressure tank was used with the addition of a small air compressor. The compressor was powered from the vehicles' rear power take-off and was located inside the cab to the left of the driver. The driver can shift the power take-off in and out to maintain about 70 lbs. maximum pressure. During normal basin work the pressure is maintained easily during travel between basins. A long basin wand is used and with the right door removed the driver can easily maneuver the vehicle for fast treating. The drivers quickly become accustomed to the right hand drive. No difficulties were encountered in traffic.

The same vehicle may also be used for roadside ditches, but in this case a pistol type (Gunjet (R) #22) is used with a 0003 orifice tip. The solid stream produced travels 8′ to 10′ to reach the ditch and the stream breaks up well @ 50 PSI to cover the surface of the water. On long ditches the driver occasionally has to pause for a pressure build-up.

The same power take-off compressor system is also being installed on Essick hydraulic spray units to replace the independent engine, saving operator's time and maintenance costs.

The cost of these right hand units was $2,350 for the vehicle plus an equipment outlay of less than $75.

An experienced operator can average 400 catch basins a day.

A METHOD FOR ACCURATE COUNTING OF BLACKFLY LARVAE (DIPTERA:SIMULIIDAE)

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Various methods have been used in the past to estimate the populations of blackfly larvae in streams, and several of these have been reviewed in the literature (1). Each of these methods involves counting larvae attached to natural substrata such as rocks or vegetation, or to plates or cones placed in the stream beforehand. It is difficult to make an accurate count of attached larvae in the field without so disturbing them as to affect the validity of the test. If they are counted *in situ* the changing refraction of fast water precludes accuracy, and if the objects are removed from the water for long enough to count a heavy infestation the larvae begin to detach themselves and leave the site on re-entry into the stream. The method here described is an attempt to overcome the obstacles to a precise measurement of results.

The prepared substrata consist of strips of hardboard, painted matte white on both sides, ruled in 1″ squares on the upper surface, and fitted with an anchor of angle iron bolted firmly to one end. We used strips 10″ x 3″, but the size is optional. The angle iron is painted with luminescent orange to aid in recovery, and the station number is painted on it in black. The attached larval populations are recorded with a 35-mm camera on a tripod.

The plaques are placed in the creek bed at intervals of 0.1 mile and left until sufficient larvae have attached to warrant a test. They are dropped in suitable riffles, and the downward projection of the angle iron, coupled with its weight provides secure anchorage. Stations are marked by using a spray-can of luminescent orange paint on nearby rocks or trees.

Immediately before each test all plaques are