RECLAIMING RIVERBOTTOM LAND IN CONTROLLING *AEDES VEXANS* IN THE LODI, CALIFORNIA AREA

ROBERT H. PETERS

Manager, Northern San Joaquin County Mosquito Abatement District

The Northern San Joaquin County Mosquito Abatement District located in the central part of California has a general mosquito control problem similar to other districts in this region of the state. To date some 17 species have been the target of our efforts over an area of approximately 200 square miles.

However, a special problem area in the form of the Mokelumne River bottom lands was found to produce hordes of mosquitoes particularly during the late spring and early summer snow-melt runoffs. Entomological checks have revealed the presence of three *Aedes* species: *A. vexans, A. sticticus* and *A. increpitus,* of which the greatest number have been *A. vexans.*

On the advice of Mr. Ernest Campbell, initial manager of the district, our Board of Trustees was quick to realize the values of inaugurating a permanent control program in this river area which was covered for the most part with an impenetrable jungle growth varying in width from a few hundred feet to more than a half mile in places. This intermittent jungle extends along the twisting Mokelumne River for approximately thirty (30) miles following an east-west pattern through the most populated areas in our District.

For the benefit of any skeptics it should be pointed out that this jungle cover has thrived for scores of years. Tree growth includes oak, cottonwood, poplar, ash, willow and locust, some with diameters to over six feet; smaller growth includes the wild grape, berries, roses, nettles, poison oak, tules and numerous other weeds and grasses. Human penetration is virtually impossible except with a machete or similar blade.

In the fiscal year 1945–46 our cooperative mosquito control and reclamation program was begun with the acquisition of two D-7 Caterpillar tractors equipped with 13½ foot blades and two 12-yard carry-all scrapers. This phase of the program was set up on a cost basis which was supported entirely by funds derived from work done by District equipment. The scope of this work, apart from the mosquito control aspect, includes reclamation of this potentially fertile river bottom land to agricultural or other useful purposes. Since these lands are improved for the individual with a consequent increase in real value it was concluded that tax monies could not be justly used except in rare instances for this type of work. As such, this work has successfully operated on this basis for the past five years and this unique approach has attracted considerable interest as a sound method of permanently eliminating the sources of *A. vexans* while beneficially reclaiming land.

Needless to say, this is a long term program and much repetitive work must still be done in conjunction with the heavy equipment work along the river; however, each year finds the problem simplified and the day will sometime come when the river bottom will cease to be the source of countless mosquitoes and a very costly control problem will be eliminated.

Steps taken in this land clearing program involve the following:

1. *Survey and recommendation to land owner:* This is generally done by the manager in conjunction with the Senior Operator to ascertain the area involved and estimate the work required in line with the anticipated use of the reclaimed land. When desired, maps or sketches of proposed work are submitted to the land owner; and work agreement forms are signed.

2. *Brushing:* This involves the open-

ing up of the area by the tractor operators with their blades which remove all growths including trees up to about a foot in diameter which can be felled without digging out.

3. *Digging around trees:* This step prepares the trees for felling and loosens the soil to enable the trees to be removed in their entirety (including the roots).

4. *Tree felling:* With the soil loosened the trees are felled by pushing the medium sized trees over with one or both tractor blades. However, the larger trees must be felled by cable in which both tractors pull the trees down. This step involves the use of a cable crew who raise the cable to sufficient height to provide leverage to down the larger trees.

5. *Piling and disposal of trees:* While some of the oak trees are removed and sawed up for firewood, the majority of brush and trees having no value are piled and allowed to dry where they are later burned. In some instances, however, these larger trees are lined along the levee in order to provide a buffer for high water flows.

6. *Filling and rough levelling:* Both the blades and scrapers are used in this step where the land is levelled to eliminate the holes and swales which at one time were the source of our *A. vexans.*

7. *Leveeing the river bottom land:* This, the final step completes the work on the greater part of the cleared land except where the land is utilized only for pasture. Although some variations exist, the levees constructed average a twelve-foot crown with a three to one slope on the river side. Levee placement is an important part of the job since allowance must be made for maximum river flows. Compaction with the scrapers in the process of construction produces a satisfactory dirt levee.

To date the Northern San Joaquin County Mosquito Abatement District has completed the following types of work in our cooperative program.

1. Cleared approximately six hundred (600) acres of land along the river bottom where crops of tomatoes, beans, peas, sugar beets, corn, melons, squashes and grains have replaced the previous mosquito-infested jungles.

2. Constructed approximately 7½ miles of levee surrounding these fertile river bottom lands.

3. Constructed two groups of winery sumps, and disposal ponds; one group of cannery waste disposal ponds; and one group of effluent disposal ponds for a sewage treatment plant. All of these are continuous sources of *Culex* mosquito development and as such were designed and constructed with accessible jeep roads for control purposes.

In addition, a plan for the enlargement of the Lake Park of the City of Lodi, to include a possible two miles of this heretofore uncleared river bottom land, is being considered on a cooperative basis between the city and our Mosquito District.

Although it is apparent that the cost per acre for this type of land reclamation will vary, dependent upon many factors such as thickness of cover, number of trees to remove, size of holes to be filled, size and length of levees to be built, etc., the following information can be presented.

1. The real value of these river bottom lands has increased in value from about $75.00 per acre to $300.00 and more per acre after clearing and leveeing.

2. Costs for clearing, rough levelling and leveeing these river bottom lands have ranged between $125.00 to $150.00 per acre. This represents from 25 to 30 tractor hours per acre at a rate of $5.00 per hour.

3. Levee construction has averaged from 90¢ to $1.00 per running foot.

4. Rates of operation are about half the commercial rates for similar equipment.

This program has been designed to cooperate with, rather than compete with private enterprise in the heavy equipment field and it is our opinion that we have aided private contractors rather than interfered with free interprise. Since our equipment is restricted to areas where the mosquito problem justifies its use and

since we terminate our efforts with hole filling and rough levelling, it is apparent that every acre of ground cleared is another acre opened to private enterprise for finish levelling or agricultural preparation.

There is no question in the minds of our trustees that a great measure of the success of this permanent control program is attributable to the efficiency and close working harmony of the operators of our heavy equipment who have acquired a specialty in this type of work.

In summarizing this phase of our program we can only say that this course of permanent mosquito control work supported by the land owners themselves is the most sound means of eliminating a costly yearly control problem. Particularly with the present rise in cost of insecticides and the apparent resistance of certain mosquitoes to some insecticides, we feel that real economy is effected when we eliminate the source of our river bottom mosquitoes.

A BIRD'S EYE VIEW OF MOSQUITO EXTERMINATION IN AND AROUND WINNIPEG AFTER THE FLOOD OF 1950

DR. H. M. SPEECHLY [1]

President and Chairman, Greater Winnipeg Anti-Mosquito Campaign

This is in no sense a highly technical discourse. It begins with a brief picture of the geography of the Red River of the North, and my first remark is that Winnipeg, the capital city of the Province of Manitoba, derives its name from the Indian word "Winnipic," signifying "Muddy River." That describes the Red River exactly, but why this more aesthetic name was given to our river I cannot tell. However I do know that in the spring when the grass grows green upon its banks its muddy waters take on a reddish tinge.

I can hear somebody say, "But why 'Manitoba' as a name?" Back in the early 1880's we boys at school in England were told by a gallant Protestant missionary, Bishop Horden, that the name is a Cree compound of two words—Manitou "the Great Spirit" and Ba "the Country." I am free to admit that such a view of Manitoba is justifiable in early June before mosquitoes buzz, but dubious in mid-January!

I rather fancy that a good many of our mosquito controllers here present have only a vague conception of the geography of the Red River, even though it begins its existence as the small Ottertail River in Minnesota and then takes its usually lazy tortuous course for 300 miles north to become the western boundary between Minnesota and N. Dakota right up to the 49th parallel which is the International Boundary between the U.S.A. and Canada. After passing through Fargo and Grand Forks it gathers some volume and strength from a dozen or more insignificant looking tributaries but capable in some springs of rising to a surprising height and flooding alarmingly along its shallow valley. It crosses the International boundary at Emerson in Mani-

[1] Read by E. J. Stansfield, Assistant Manager. As noted in the March issue of *Mosquito News*, Dr. Speechly died on March 17, 1951. The present paper is one of the last—possibly the last—of his contributions to the literature on mosquito control. We note, in presenting it, that even here, in a factual treatment of serious moment, something is present of the genial personality and refreshing wit that made Dr. Speechly so well beloved among his colleagues in the AMCA.