

commercial companies better equipped to lay pipe than we, and other companies better equipped to install pumps, so these jobs are contracted out by the farmer. However, there is no one better tooled to construct the reservoir and drain ditches than we, so we recommend our equipment for this purpose; although, even here, the farmer may use his own equipment or contract with someone else. We know from experience that we can depend on our job, but not always on others. Relative costs to the district on a complete return-flow system may be as low as 10% for our part of the job; so it can be seen that we are important primarily in establishing the job and tying all phases together to assure a workable unit.

As would be expected, we have encountered many interesting problems in the development of our program. I would like to cite a couple of these:

Each year we have compiled our control cost records and developed a list of our mosquito producers, the highest producers appearing at the top of the list. We have then started at the top and made contacts with the individual farmers, requesting that improvements be made. Typical responses from the top producers have been:

"I am not interested."

"I cannot afford to do anything."

"Go ahead and do what you want, I'll pay for my share of the costs."

In 1955 we determined that 50% of all our spraying expenditures were created by only 27 farmers. We have made several to many contacts with all of these top 27, and have been permitted to do "cooperative" work on 10 of them. Reports from our spray operators indicate that in no case did our source reduction project (in these instances) help to reduce their work load — a very discouraging development. What was the problem? We simply were not obtaining cooperation. It was a one-sided arrangement in which the farmer refused to participate other than financially. Recall that cooperation calls for *collective action*.

Another problem which has concerned us is the matter of non-mosquito producers requesting help. As a result of our extensive experience and our educational program, we have developed a considerable reputation as specialists in water management and drainage problems. In determining those cases on which we believe we have responsibility, there is no distinction such as black and white, since there are many shades of gray. When we have done a job which appeared justifiable, we experienced the pleasure of embarking on a truly cooperative program, the willingness and interest of the farmer uniting with our technical knowledge and/or actual construction work in such a way as to assure success. In any case, we can assume that all source reduction projects undertaken have an actual or potential preventive value.

However, if we fritter away our time on non-mosquito producers, we have just that much less time to spend on the producers. We try to be careful in our selections, but we undoubtedly do some work which will have little direct influence on mosquito production. Nevertheless, in any of the cases of this type we have a satisfied farmer to boost our program, a farmer who has better water management as a result of our work. Without the support of the large majority of farmers, we do not believe we will ever be successful

in bringing pressure of one kind or another on the disinterested, heavy mosquito producer.

Our District believes that all the aspects of source reduction should be given careful consideration. Under our conditions, our policy is to minimize the use of legal weapons, or even the threat of their use. This philosophy may seem weak to some districts, but we believe our local conditions are such that, under our cooperative program in which we work together with agriculture, we shall achieve the desired ends with a greater assurance of permanent success and with less friction along the way. In addition, although we recognize that agriculture is the prime cause of our mosquito control costs, none the less we cannot, with judgment, place ourselves in the position of legally attempting to be the tail wagging the dog.

Mr. Gray: Thank You, Don.

There is only one thing I might remark on, Don, and that is that I have found quite a number of occasions that a legal approach which has held a very strenuous objection to do a job has a very educational possibility.

Are there any questions of Dr. Murray?

(No response.)

Mr. Robinson.

MOSQUITO SOURCE REDUCTION INTER-AGENCY

E. CHESTER ROBINSON

Manager

Alameda County Mosquito Abatement District

Water is California's greatest natural resource. The future agricultural and industrial growth of California depends on the conservation, proper allocation and distribution of this water. Local, State and Federal governments are spending millions of dollars a year developing it.

Mosquito abatement districts in California are only one of many agencies interested in the common problem of water management, the primary concerns of other agencies being irrigation, drainage, flood control, water conservation, soil erosion, protection of roads and property from flood, seepage damage and proper farm management. Included in the area covered by every mosquito abatement district are at least two of these other agencies, so let's take them in rotation and see how cooperative enterprises are of mutual benefit.

1. *Irrigation Districts*—Most irrigation districts have heavy equipment for constructing and maintaining ditches. They are interested in agricultural problems, drainage being one of them. The East Side Mosquito Abatement District and the irrigation districts in its area have entered into a number of cooperative projects. The mosquito abatement district furnished manpower for construction; the irrigation district, the pumps, valves and structures.

2. *Drainage or Improvement Districts* — These are formed where expenditures are too large or inadvisable for an irrigation district to handle, and in areas where drainage is the main problem. They are simple to form and enjoy a reasonable rate of interest and time for payment on improvements. Have you thought of assist-

ing the farmers in helping themselves, by the use of such a district?

3. *Flood Control Districts*—Flood control districts' main objective is control of the winter run-off by constructing reservoirs, clearing and enlarging existing channels and constructing new waterways for the disposal of flood water. The mosquito abatement district, by cooperative effort can in many cases use these channels for disposal of irrigation and industrial waste water. Alameda County Flood Control and Water Conservation District and the Alameda County Mosquito Abatement District have cooperated by an interchange of equipment, plans and manpower to the advantage of both districts from an efficiency and cost factor. The Flood Control District's plans for new construction are reviewed by the Alameda County Mosquito Abatement District to ascertain if pipes, tidegates and other drainage structures are properly located to care for the Mosquito Abatement District's summer drainage.

4. *Soil Conservation Districts*—These districts construct drainage, dams and other structures to prevent water waste and soil erosion.

5. *Agricultural Stabilization Conservation Committees*—These agencies pay farmers from federal funds for constructing pipe lines, drainage ditches, for weed control and many other practices. The programs vary in each county, so see your committee and have them put the programs in which you are interested on the list for payments.

6. *County Road Departments, Railroads, and State Highway Departments*—Drainage is of primary importance to this group because of the damage to the roadbeds from impounded water adjacent to them.

7. *County Agricultural Extension Services*—Actually, these come under the educational division of this panel, but they are worth mentioning again as they are an advisory service, and can be of assistance to you.

I have not covered every agency, but only hit the high spots and given a few examples of inter-agency cooperation. Your time can be very profitably spent in personally contacting these and other groups, explaining your problems to them, and learning of theirs. Remember, they are just as interested in community betterment as you are, and sometimes two heads can solve a problem better than one!

Mr. Gray: Thank you, gentlemen of the panel.

I think that concludes it unless there are some questions to be directed, first to Mr. Robinson, and then we will give you a moment for others. Any questions?

(No response.)

I guess that covers it.

(Applause)

President Greenfield: Thank you, Harold.

There is now declared a recess until 3:35. We will start promptly with Dr. Bohart's talk.

(Short recess.)

President Greenfield: I said 3:35, and we are five minutes over now. I would like to get the Meeting adjourned this evening early enough so you will have a chance to relax and rest a bit and come back this evening to see the film on "The Rival World," PG&E's new film on water which, as I understand, is a very, very fine presentation.

I would like to make one other announcement at this moment, and for those of you who were not in the Business Meeting and are interested in civil defense

procurements, General Van Wyk will be here tomorrow to speak to the group at the end of the session; and that will be, we hope, approximately at noon, so it behooves all of us to stay to hear what the procedures are and what information he can give us relative to the types of equipment available and so forth.

I notice from our general discussions and bull sessions in the lobby and elsewhere that a number of us are either anticipating going into it immediately or have already had the resolutions drawn up or are actually participating in civil defense and are merely waiting for notification of the arrival of the materials. I think General Van Wyk can certainly clear up many of the questions that are still unanswered.

Now we can start our program.

If I may, I would like to introduce at this time Dr. Bohart, who has been working with us for a good many years. Dr. Bohart is going to tell us of some of the developments in culicidology this past year.

Dr. Bohart.

Dr. Bohart: Members of the CMCA: Before I start my presentation of this subject, I would like to give you just a little background on it and the reason I am giving it at all.

About two months ago a group of CMCA members belonging to our Culicidology Committee met at Davis, at the University of California, and discussed several things that were in their minds. The outcome of that discussion was that someone should give a paper before this Meeting on the subject of biological research and its importance to control, or something to that effect.

I suggested a number of people who might give that talk and, by some mischance, they chose me.

I have written a presentation which I have titled somewhat differently from what appears in your program. I have called it "Biological Studies, Mosquito Control, and the Entomologist."

I would like to speak to you more or less off the cuff, if I may, and I will just refer to the paper occasionally, and then we will see to it that it is published, and I hope you will all read it eventually in its more formal way.

BIOLOGICAL STUDIES, MOSQUITO CONTROL, AND THE ENTOMOLOGIST

R. M. BOHART, Ph.D.

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It is a truism to say that biological research on insects has provided the foundation upon which our control efforts have been built. Because it is a truism, this fundamental fact is often overlooked or taken for granted. It is not my intention to survey the important advances in biological research for the year 1956, although I would like to see such a presentation on future programs of the CMCA. Rather, I intend to point out some aspects of biology, mosquito control, and the entomologist. I would like to make clear that these are not my ideas alone, but have come out of discussions with members of your Culicidology Committee.

Much of our present biological information on mos-