

# A COUNTY-WIDE SCREENING PROGRAM FOR THE CONTROL OF MALARIA<sup>1</sup>

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## DESCRIPTION OF AREA

Lake County is situated in the most northwesterly corner of Tennessee. It is bounded on the west by the Mississippi River; on the north by Kentucky; on the east by Reelfoot Lake, and on the south by Dyer County. The county has an area of 122 square miles. The length is approximately twenty miles and the width varies from three to eleven miles. The county is traversed by a number of sloughs of considerable size and they contain water the year around. There are also numerous small sloughs and ponds, all of which afford ideal breeding places for mosquitoes.

The farm land is owned principally by about fifteen individuals, the total number of property owners being about 140. It is stated that one land owner pays one seventh of the entire taxes of the county. Farming is conducted on a rather intensive basis and the vast majority of all farms are cultivated by means of wage hands and "share crop tenants."

The 1920 census gives the population of the county as 9,208, exclusive of the two principal towns, namely, Tiptonville and Ridgley, the 1920 population was 7,248. The increase since that time has probably not exceeded over four or five hundred. The number of homes in the rural sections is estimated to be between seventeen and eighteen hundred.

## THE MALARIA PROBLEM IN LAKE COUNTY

For the years 1925, 1926, and 1927 the five counties in Tennessee bordering the Mississippi River led the state in malaria death rates as follows:

<i>Death Rates Per 100,000<sup>2</sup></i>	
Lake County .....	68
Obion County .....	31
Dyer County .....	30
Lauderdale County .....	28
Tipton County .....	24
Shelby County .....	23

Lake County shows much the highest mortality rate—more than twice as high as any other county. Very little malaria is found east of the Tennessee River except in a few localities. Although Lake County has a high death rate from malaria, the incidence rate is much higher.

<sup>1</sup>Read before the Tennessee Academy of Science, April 26, 1929.  
Meleney, H. E., Bishop, E. L., and Roberts, Frank L., 1929. Observations on the Malaria Problem of West Tennessee. Southern Medical Jour., April, page 382.

TABLE I.

Malaria Parasite Rate, Lake County Schools, March and September, 1928<sup>2</sup>

NAME OF SCHOOL	MARCH			SEPTEMBER		
	Number Examined	Number Positive	Percent Positive	Number Examined	Number Positive	Percent Positive
<i>White Schools:</i>						
Bessie.....	32	6	19	36	7	19
Phillipey.....	28	3	10	45	6	13
Sheep Ridge.....	30	4	13	18	2	11
Cronanville.....	21	1	5	17	1	6
Proctor City.....	26	3	12	24	5	21
Tiptonville.....	116	5	4	156	17	11
Keefe.....	34	6	18	25	1	4
Wynnburg.....	31	3	10	63	5	8
Mooring.....	43	6	14	53	2	4
Madie.....	48	1	2	23	2	8
Ridgely.....	154	6	4	126	11	9
Chandler's Mill..	33	1	3	25	7	28
Reelfoot.....	17	2	12	16	2	13
Peck's Mill.....	11	4	36	11	3	27
Hathaway.....	26	9	35	31	7	23
Cottonwood.....	37	9	25	30	4	13
Owl Hoot.....	..	..	..	22	6	27
Total.....	687	69	10.0	721	88	12.2
<i>Colored Schools:</i>						
Phillipey.....	..	..	..	15	4	27
Proctor City.....	..	..	..	29	3	10
Tiptonville.....	75	7	9	..	Not in session	
Origan.....	15	0	0	7	0	0
Keefe.....	27	5	19	..	Not in session	
Wynnburg.....	22	3	14	15	4	27
Madie.....	21	3	14	18	3	17
Ridgely.....	58	14	24	38	14	37
Total.....	218	32	14.7	122	28	23.0
Grand Total....	905	101	24.7	843	116	35.2

CHOOSING METHOD OF CONTROL

When the prevalence of a high malaria incidence is well established, the problem of proper methods of control may be studied. The drainage of mosquito breeding ponds and sloughs is most effective in reducing malaria and has been used extensively in West Tennessee as well as in other southern states. However, in Lake County drainage as a complete means of control could not be used because, "the county without a hill," is very low and level and it is doubtful if enough grade

could be obtained for proper drainage. The county is bordered by bodies of water on nearly two whole sides. With the many sloughs and ponds within its borders drainage would be a great economic problem, even should it have been possible from an engineering standpoint.

The apparent method of control was county-wide mosquito proofing of the homes, together with prophylaxis with quinine sulphate to free the malaria carriers of the malaria parasites. This method of control, however, had never been tried anywhere before on a county-wide basis, and was truly a pioneer undertaking.

#### THE PROGRAM

First a plan for financing the undertaking had to be worked out. The cost, of course, was to be borne by the land owners. Then a factory site was to be obtained, materials purchased, and the actual making of the doors begun. Next was to be the getting of the doors to their proper homes and there hanging them and the screening of the windows. After this was the collection of money for the same. Many houses are built of cypress boards nailed vertically to the house frames, with slats over the cracks. Even after the doors and windows were screened, because of the type of construction, many of the homes were still not mosquito proof. Very few of the houses are plastered. Papering of the houses was decided upon and after much investigation it was decided to make use of used cotton sample wrapping paper because of its toughness and cheapness. It was put on with tacks.

#### PUTTING THE PROGRAM INTO EFFECT

Early in 1928 the larger land owners in Lake County were invited to a meeting. Several members of the county court attended. At this meeting the County Anti-Malaria Committee, consisting of five principal land owners, was formed. A committee representative was chosen from each section of the county. This committee provided for a rotating fund of \$600.00 and a ninety-day credit allowance. This was equivalent to approximately \$2,000.00, to be used by the committee through its local full-time county health department in the manufacture of screen doors and screening of windows. A factory site in Tiptonville was provided free of charge and equipment for the same was furnished by the American Red Cross.

*Detailed House Survey.*—A careful survey and record was made of each house in the county. The record showed the house location, owner, agent or tenant, number and sizes of doors to the nearest inch, whether they were to swing right or left, and measurements of the windows. The record also showed entire materials, cost data, both for doors and windows, and it was indicated whether the owner would be responsible for the hanging of the doors and tacking the screen wire on the windows, or whether this responsibility would be delegated to the committee by the house owner.

*Manufacturing the Screen Doors.*—The doors were patterned exactly in accordance with the design developed by the United States Public Health Service.<sup>3</sup> The actual making of the doors, including the buying of materials and hiring of labor, was done by the local county health department. The doors were made in a factory especially equipped for the purpose. Unskilled labor was used; at first negroes and later high school boys during vacation. The screen door frames were made out of one-inch by three-inch cypress with mitered corners and two cross bars of the same material some eighteen inches apart near the middle and lower third of the door. All eight joints were braced on both sides with heavy galvanized sheet iron, with nails going clear through the door and clinching on the other side. The doors were constructed to withstand the most severe treatment and abuse. Sixteen mesh galvanized wire was used. The doors were sold for \$1.50 at the factory.

*Hanging the Doors.*—Most of the houses had been built for a long time. This meant that many door frames were "out of square," or that it would be difficult to attach a hinge to the house door frame with any degree of security. Therefore, the hinges were attached to a cypress hinge-strip, one inch by three inches, and running the full height of the door. The hinge strip was then nailed firmly to the door casing and the door was securely hung. The doors were made one inch larger all around than the casing and swung against the same from the outside. This took care of any "out of square," of the house door frames as well as warped or crooked frames. Then around the outside edge of the screen door frame at the top and side was nailed a strip one inch by one inch which insured mosquito proofing of the screen door, as no mosquitoes could get in around any of the edges.

*Screening the Windows.*—Windows were made mosquito proof by tacking the wire netting over the entire window opening. If only half a window is screened a window pane in the unscreened portion of the window may get broken and the effect of the screening be minimized.

*Mosquito-Proofing Walls, Ceilings, and Floors.*—Mosquito-proofing of walls and ceilings is now being done as rapidly as possible with the used cotton sample wrapping paper. This paper is light brown in color and makes a very pleasing appearance. The paper is four feet wide and the pieces vary in length from two feet up. The land owners pay for the paper and the tenants put it on. The paper is being distributed at one and one-half cents per pound, which makes the cost of papering a two-room house with rooms averaging, say 12 feet by 14 feet, and 8 feet high, about forty-nine cents for the *paper*. This paper will withstand wetting and drying by rains without breaking for years. Cracks in floors were stopped with strips of tin. The tin will be nailed down over crack on top of the floor.

<sup>3</sup>U. S. Public Health Report, Vol. 42, No. 16, April 22, 1927.

*Results accomplished by Screening in Lake County, Tennessee,  
to November 1, 1928*

## DOORS

Doors made for homes in Lake County.....	2,152
Doors made for Camp Markham (Boy Scouts).....	167
Doors made for Lauderdale County.....	167
Doors rescreened for Lake County.....	58
Doors made for commercial establishments.....	4
Doors made for churches.....	2
Doors made for county schools.....	36

Total doors ..... 2,457

## SCREEN FRAMES

Schoolhouse window frames.....	211
Frames for tents, Camp Markham.....	144
Churches . . . . .	8
Houses . . . . .	7

370

## HOMES SCREENED

Homes screened, Lake County, 1928.....	880
Homes screened, 1927, Lake County.....	165

Total . . . . . 1,045

Estimated per cent of Lake County homes now screened... 59.7  
Paper for about 100 homes has been distributed.