

ANNUAL REPORT
ANTIMALARIA PROGRAM
YAZOO CITY, MISSISSIPPI
1922

I. H. B. Budget No. 61527

SURVEY

A preliminary survey of malaria control problems was made in Yazoo City, Mississippi, on January 13th. and 14th.

Doctor W. E. Noblin, Yazoo City's energetic and enthusiastic Health Officer, was highly in favor of conducting a malaria control program and made every effort and lent all assistance in forwarding the movement. His office records showed that approximately 1094 cases of malaria were treated by the physicians residing in the city during 1921, which was the lowest rate ever experienced in Yazoo City, records being available for four consecutive years. The general geographic conditions affecting anopheles propagation indicated a relatively high malaria incident.

The population of Yazoo City is approximately 6,500, the city being the county seat of Yazoo County, and located on the banks of the Yazoo River in what is commonly termed the 'Delta Section of Mississippi', this section embracing fourteen counties, approximately 25 per cent of the state's population, and 50 per cent of the state's malaria cases reported by physicians. The eastern and south-eastern sections of the city are hilly while the northern and western sections are low and flat, being affected by the annual over-flows and back-waters of the Yazoo River which are contributory to the spring floods of the Mississippi River.

Indications were that anopheles production was confined chiefly to the area embraced in the western section of the city and its environs. It seemed

that drainage, clearing, oiling, and the use of fish would undoubtedly place this section under anopheles control, and that by careful vigilance and well planned work satisfactory mosquito control could be obtained throughout the city.

PROGRAM AND BUDGET

An approximate amount of \$2,500.00 was estimated to be necessary to conduct a successful malaria control program. The data was placed before the City Council at their regular session in February with the recommendation that the city appropriate \$1,650.00, and one-half that amount offered from the State Board of Health in cooperation with the International Health Board. The program was unanimously adopted, and in support were the Parent Teachers Association, Chamber of Commerce, City Health Officer and several local physicians, and a number of business men.

Following the action of the City Council an accurate survey was made which included a detailed estimate of all proposed work. Of the existing drainage systems 10,800 feet required clearing and regrading; 9,300 feet of new ditches were necessary to relieve the water hemmed in forming swamps and other mosquito producing areas. This work together with proposed oiling, fish control, and incidental expenses required a budget of \$2,475.00.

PERSONNEL

As had heretofore been the custom for conducting malaria control work, it was decided to use available city labor, supervision, etc. After careful consideration of this method, and asking contractors for bids on the proposed work, it became apparent that considerable money could be saved by letting the work on contract.

With the exception of an inspector who was employed during the mid-summer months for premise control work, and a few minor jobs, all work was let on contract.



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DRAINAGE

Drainage formed the principal measure of control work. In all cases where it was possible mosquito producing areas were eliminated.

The photographs on the opposite page show the lower and mid-section of a drainage system which relieved a 500 acre swamp partly in the corporation and within anopheles flight of all sections of the city, and afforded an outlet for hemmed-in water in the northern section of the city.

A total of approximately 515 acres of prolific anopheles breeding areas widely scattered were drained, and outlets afforded for all rain water and drainage from commercial projects.

Three and one-fourth miles of ditches were dug at a contract price of \$820.78, or \$252.24 per mile, the unit of the rod being used in letting contracts. One and five hundred miles of streams were cleared and regraded at a total contract price of \$206.13, or \$196.31 per mile. Most of this work was through swampy territory which had held water for a score or more years, and the average cross-section of the principal ditches measured 3 feet by 3 feet. 3.25

MAINTENANCE OF DRAINAGE

Starting of maintenance of drainage canals was not necessary until late in September. A contract was let for this work, and considering the work done to place all the systems in good condition for the inactive, or winter months, a total of 7.71 miles were gone over for a cost of \$189.75, or \$24.62 per mile. 7.71

Owing to the soggy condition of the bottoms of the ditches which passed through the swamp areas the maintenance cost was somewhat above the average, but with the gradual drying after all the water was relieved, and the establishing of an even grade, the ditches became of a permanent nature. 1096

OILING

It was necessary to oil certain of the hill ditches which, with their steep grades, were continually being gouged by rains leaving uneven bottoms and pot-holes. Continuous rains which occurred at times made it necessary to keep certain small areas oiled. In the negro settlement of the city water was furnished by community hydrants. Although every effort was made to keep the hydrants from dripping the negroes were negligent, and sometimes [✓]adusive to the property, which made oiling necessary. X

Yazoo City was affected by the spring over-flow, the greatest in 40 years, half the city being inundated, and the basements of churches, schools and other public buildings became filled with seepage water. When the water receded these places were pumped dry, but until that time oiling proved to be the only effective method for controlling mosquitoes.

FISH CONTROL

Inspections made during the survey revealed that *Gambusia affinis* were numerous in this territory, although in most instances they were not found in the secluded mosquito breeding areas. Six large size horse troughs with automatic feeds, one being fed by an artesian well, were in the city. *Gambusia* were effectively used in these places. At the time of high water the street gutters had no outlets and as the *Gambusia* did not get into them they had to be transferred. The shore edge of the overflowed territory was lined with these fish and remarkable mosquito control resulted. Viewing the situation in its natural state it is difficult to imagine the service *Gambusia* have been rendering Yazoo City in past years during the high-water months.

In the watering trough in front of the County Court House the *Gambusia* served to demonstrate their effectiveness for destroying mosquito larvae ^{as} to

many people, and the fish in the trough became pets of the employees there and had their united protection; only, however, after they had demonstrated their worth.

The total cost of fish control work for the season was \$7.83.

EDUCATIONAL WORK

Lectures relating to the various preventative measures applicable to malaria were regularly delivered in the schools of Yazoo City, the total student body being approximately 1,200 pupils.

The lectures were delivered in the simplest form, illustrated with black-board drawings showing the life cycle of the mosquito and its method of transmitting malaria fever. Simple control measures were explained and demonstrated in various ways.

The exhibit truck in use for the county-wide campaign was taken to all the schools and made general use of in the city.

A check was made of the value the educational work had been, and it was gratifying to learn that the vast majority of those who were present when lectures and demonstrations were given had received and retained the proper knowledge of the project, and as the season advanced that mosquito control in general was greatly aided by this work.

It is definitely believed that the proper kind of educational work proves the foundation for successful malaria control in a community where the work must be carried on after a demonstration has been made. Careful study is, however, required to determine the class of educational matter that will appeal and just how far to go with it to create and maintain interest, and, above all, action.

ANOPHELES INDEX

At the beginning of the mosquito season, part of the city being flooded, drainage blocked, and various other conditions contributing to

anopheles production, this class of mosquito, especially quadrimaculatus, were abundant in all parts of the city. Nearly all of the residential houses are built above the ground and it was a simple matter to collect a thousand or more anopheles under any such building.

Gradually the breeding areas were eliminated or put under control. The number of anopheles dropped to where it was difficult to locate even one in the shelters that theretofore had contained thousands. In fact it is considered that within a few months the anopheles index dropped from 100 per cent to zero per cent, or to record the low point in the actual per centage the decimal would be followed by at least five naughts, with no whole number.

This condition maintained at the close of the season.

PREMISE INSPECTION

The inspections of premises was turned over to the Boy Scouts at the beginning of the work. The city was divided into eight sections. A captain and four assistants were assigned to duty in each section and their duties were to locate and have corrected all mosquito production on private premises, and to report any mosquito nuisances that came under the jurisdiction of the city.

This work was carried on a short time only, about one month, the inspections being made on a specified day of each week after school. The Scouts were without a Scout Master, and as the base-ball season and the close of school came, they could not be held together without an organization. The work they did was most efficient, a credit to the city, and a monument to the boys.

The necessity for this work was great so during the months of July, August, and part of September one of the Boy Scouts was employed as an inspector.

The first inspection of the city showed that of 964 premises inspected 17.6 per cent were breeding mosquitoes in containers. The condition was brought to the attention of the occupants and corrections immediately made. A follow-up inspection revealed the value of this work, only 3.6 per cent of the same premises contained breeding. This constituted work done in July. During the month of August it was found that many mosquitoes were breeding in roof-gutters. An inspection of 1004 premises showed that 8.0 per cent were harboring mosquito breeding, mostly in roof-gutters. The inspection of roof-gutters was simplified by using a long bamboo fishing pole with a piece of wire at the top in the shape of a bent-over hook. The inspector carried a supply of small pieces of news-paper and by hooking a piece of this paper on the wire and dragging it along the inside of the gutter it was ^{asc}ertained if water was present by the paper becoming wet.

Corrections were insisted upon in each instance, and ^{as} a consequence the city was practically mosquitoless.

MOSQUITO ORDINANCE (FINES)

The model mosquito ordinance of the State Board of Health was passed by the City Council at the time the agreement was signed to engage in the work.

It was necessary to enforce its provisions in only one instance when after repeated attempts had been made to have a breeding area corrected the occupant of the premises refused to take action. A fine of \$7.50, and costs for correcting the nuisance, was imposed by the mayor.

DENGUE FEVER

Information was received that Dengue Fever was present in the South and spreading over some of the states, Mississippi being in the zone. A special effort was made to keep under control the mosquitoes responsible for

the transmission of this disease, and while it is understood that Dengue Fever was present elsewhere in epidemic form there were but four suspected cases in Yazoo City during the year.

ADVERTISING

Advertising was conducted principally through the news-papers which rendered unrestricted cooperation. During the year thirty-seven news-paper articles pertaining to the campaign were published for the work in Yazoo City. Twenty-five such articles appeared in the city papers relative to the county operations, so in the aggregate sixty-two items were published.

The four large 10 ft. by 10 ft. signs painted on buildings for use in the county campaign were located in Yazoo City and served to assist the work there.

Various bulletins obtained from outside sources were used in the city, and 2,200 local circulars were distributed.

Local clubs were addressed from time to time.

The quinine sign advertising the 'Standard Treatment' was posted in all public buildings, drug stores, and in sections of the city where they would attract attention.

STANDARD QUININE TREATMENT

The local physicians cooperated in the use of the 'Standard Quinine Treatment' for malaria, and the drug stores kept this treatment for sale.

Druggists state that more quinine was sold this year than ever before, and that chill tonic sales decreased.

When the entire eight weeks treatment is prescribed the patient very seldom wants, or is in a position to spend the amount required and continues to buy in small lots which proves a drawback in controlling the infection.

STATISTICS

As the local physicians render a report to the County Health Officer covering total cases treated by them their reports contain the country cases as well as those from the city. It is not possible to make a segregation with any degree of accuracy as the plantation work and other country practice fluctuates from year to year.

As has been stated the anopheles index reached the zero point and was maintained there, so it is natural to conclude that with the means of transmitting malaria curtailed to that degree the number of new infections must have fallen off as compared to times when no work was attempted.

In an endeavor to arrive at some conclusion as to what the reduction in malaria was on account of the control campaign, a number of the prominent physicians who had practiced in the city for years were interviewed and asked how their practices had been affected.

No increases were reported, and the reductions were given from 10 per cent to 50 per cent, which gives an average of about 25 per cent reduction in malaria fever on account of the year's work.

EXPENDITURES

The total cost of the work during the season as compared to the approved budget was as follows:

	APPROVED BUDGET No. 61527 (Revised April 1st)	EXPENDED	UNEXPENDED
Item.			
1. Initial drainage and maintenance, ..	\$ 1,563.00	1,216.66	346.34
2. Oil application,	168.00	118.82	49.18
3. Cost of oil,	350.00	263.01	86.99
4. Tools and equipment,	45.00	21.77	23.23
5. Transportation,	130.00	119.92	10.08
6. Fish control,	25.00	7.83	17.17
6-a Sanitary Inspector,	150.00	108.77	41.23
7. Contingent fund,	44.00	38.51	5.49
TOTALS,	\$ 2,475.00	1,895.29	579.71

The unexpended balances shown for items 1 to 5 inc. indicate savings resulting from letting the work listed under those items by contract.

	DISTRIBUTION OF FUNDS			
	YAZOO CITY	STATE	I. H. B.	TOTAL
BUDGET,.....	\$ 1,650.00	412.50	412.50	2,475.00
EXPENDED,.....	1,263.53	315.86	315.86	1,895.29
UNEXPENDED,.....	386.47	96.62	96.62	579.71

The cost per capita based on the expended amount of the budget was \$0.2916.

CONCLUSION

The general attitude of the citizens of Yazoo City is that the malaria control campaign of 1922 was well worth while. Some view it from a health standpoint, some as a means of comfort from the absence of mosquitoes, and others add its commercial value.

The following letter from Hon. E. P. Swain, Mayor of Yazoo City, expresses in general the city's views:

Yazoo City, Mississippi,
January 26, 1923.

Mr. Geo. Parker.

Dear Sir:

"I have felt for some time that you deserved the thanks of the City for the manner you conducted and the success you achieved in the mosquito campaign you conducted last summer.

I of course know very little of the health conditions since we rely entirely on our physicians for that part, but from what I can learn they were entirely satisfied. However I can speak positively in regard to comfort. I can't recollect when we have been able to remain on our front porches without fighting the blood sucker until this summer. We were not bothered in the least until the latter part of the summer, and then I am satisfied it was my fault as we were raising the pesky little vermits in our roof gutters. I think your work was entirely satisfactory to every one, and we are going to make an effort this summer to keep up the good work. While it may not be on quite as large a scale as last season, I feel that we can't afford to drop it."

Thanking you again, I am

Yours truly,
(Sgd.) E. P. Swain.
Mayor.

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George Parker, Sanitary Engineer,
Mississippi State Board of Health.
January, 1923.