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DDT WATER EMULSION IN RICE FIELDS AS A METHOD OF CONTROLLING LARVAE OF *ANOPHELES QUADRIMACULATUS* AND OTHER MOSQUITOES [1]

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The control of anopheline mosquito breeding in rice fields is a perplexing problem to the malariologist. The extensive areas employed and the necessity of keeping the rice fields continually flooded assure an excellent habitat for anopheline larvae during most of the summer. Also, because of the extensiveness of the areas and the susceptibility of growing rice to injury, ordinary methods of larviciding are limited and expensive.

William R. Horsfall (*1*), using experimental field plots, found that a water-miscible oil in dosages as low as 4 p. p. m. gave complete control of the dark rice-field mosquito, *Psorophora confinnis* (L.-A.), but he stated that a method of practical application of this means of control on a large scale had not been worked out. Because of the extreme toxicity of 2,2 bis(p-chlorophenyl)-1,1,1 trichloroethane (DDT) to mosquito larvae, DDT being much more toxic than the water-miscible oil used by Horsfall, it was believed that this larvicide could be adapted to the successful control of mosquito breeding in rice fields.

Rice culture in the Stuttgart area of Arkansas, where this study was made, utilizes water pumped from deep wells or reservoirs and

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Assisting in this study were Senior Sanitary Engineer H. A. Johnson and Scientific Assistant John R. Jumper of the Office of Malaria Investigations of the National Institute of Health; Assistant Engineer (R) K. S. Krause, Associate Sanitarian J. H. Crawford, and Assistant Sanitarian (R) R. D. Murrill, all of the Office of Malaria Control in War Areas, U. S. Public Health Service.

The University of Arkansas Agricultural Experiment Station, through Dr. J. W. White, Assistant Director in Charge of the Rice Branch Station at Stuttgart, furnished for this study fields of growing rice, as well as laboratory and office space. Mr. Dwight Isely, Professor of Entomology at the University of Arkansas, served as a consultant.

routed to the rice fields through canals (fig. 1). Because the greatest part of the cost of ordinary larviciding is for labor utilized in obtaining proper distribution of the larvicide, any attempt to render ricefield larviciding inexpensive must materially reduce the cost of labor. The use of a DDT water-miscible larvicide introduced into the flooding waters at the pump, a process somewhat similar mechanically to chlorination, would eliminate the labor costs and should obtain proper distribution of the larvicide. Laboratory tests have demonstrated that 1 part DDT in 100,000,000 parts water is toxic to mosquito larvae and that water so treated would remain toxic for long periods of time, so that, theoretically, DDT added to the flooding waters at the pump at the rate of 1 part per 10,000,000 parts of water should be sufficient to kill larvae even though there were variations in the dosages when the flooding waters reached the farthest corners of the rice fields.

The University of Arkansas maintains a Rice Experiment Station near Stuttgart, Ark., and has been interested in controlling mosquito breeding in the rice fields (*1*). Also, the office of Malaria Control in War Areas of the United States Public Health Service was interested in the same problem because at Stuttgart itself there was an Army Air Field surrounded by acres of rice fields. Because of these similar interests, both of the above organizations have cooperated in this study.

The 100-acre field of rice, which was made available by the Rice Branch Station for use in this study, was divided into six plots of 12 to 18 acres in size (fig. 3), and was located along the west edge of the grounds of the Experiment Station. Each plot was roughly square in shape, and together they comprised a field a mile long and about 700 feet in width. These field plots were separated from each other by cross levees, permitting individual irrigation. Each plot was planted to a different variety of rice, registered seed being grown. The rice was planted early in May. About a month later, when the stalks were 6 to 8 inches tall, flooding began and continued about 20 days. As a method of controlling the rice water weevil, *Lissorhoptrus simplex* (Say), the fields are allowed to dry and in about 2 weeks the second flooding is started, and the fields then remain flooded until the rice has headed out and the heads turned over. For the short-season varieties this occurred in mid-August, while the slower-growing varieties were not drained until early September. The rice was harvested as soon as the field had dried.

Besides the 100-acre rice field, 30 small plots, one-twentieth of an acre in size, and adjacent to each other, were made available by the Rice Branch Station for additional studies of the effects of a DDT-emulsion larvicide. The same method of rice culture was carried out in these small plots as in the 100-acre field.

FIGURE 1.—Pump station where water was pumped into canals and larvicide applied.

FIGURE 2.—Inspectors making larval counts in rice field. The stakes denote sampling stations.

MATERIALS, METHODS, AND PROCEDURE

The DDT water-miscible larvicide was prepared according to the following formula:

DDT	1 part
Solvent [2]	3 parts
Triton X-100	1 part

Depending on the rate of operation of the dispensing apparatus and the desired rate of application to the rice fields, the stock solution was diluted with water to the desired concentration.

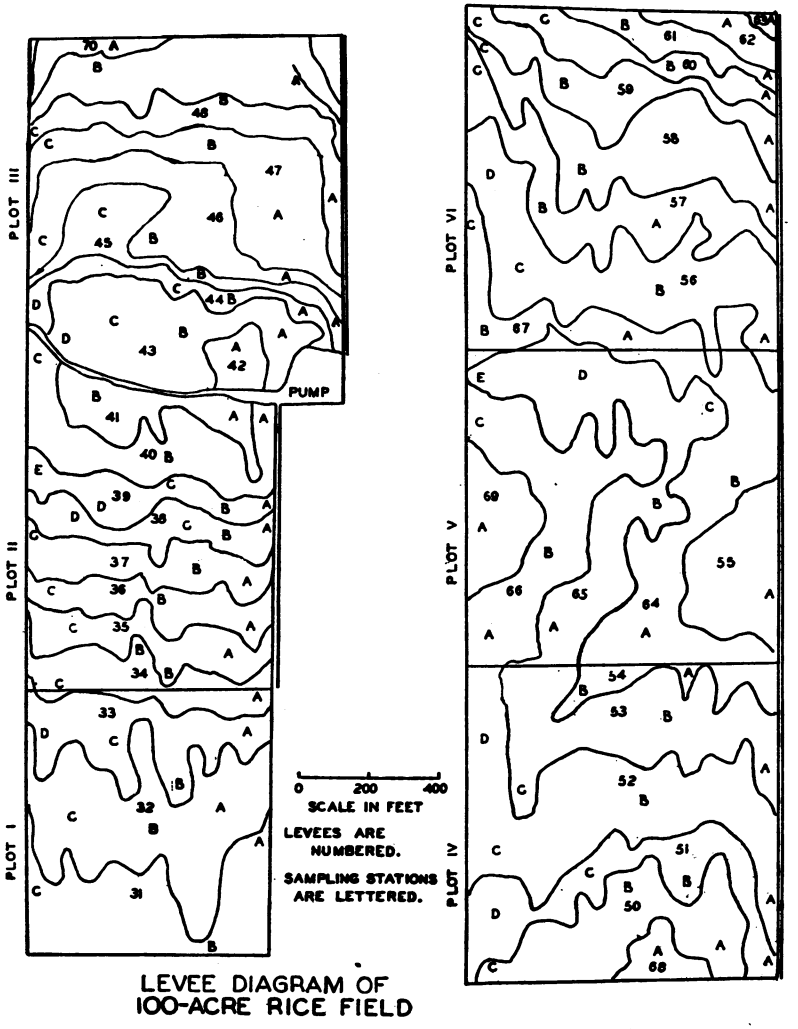

FIGURE 3.—Diagram of 100-acre rice field showing levees and sampling stations. For illustration purposes two fields are shown; actually, there was one long field, plot IV being adjacent to plot III.

[2] The solvents employed were xylene; Culicide Oil B, which was furnished by the Socony Vacuum Oil Co.; Dendrol, which is a product of Standard Oil Co. of Indiana; and a mixture of xylene and Culicide Oil B. Triton X-100, the emulsifier, is made by the Rohm & Haas Co.

The first dispensing arrangement consisted of a 5-gallon glass bottle containing the larvicide, inverted in a flat pan about 14 inches in diameter and about 2 inches deep. From this pan the larvicide was siphoned to a similar pan, and from the second pan siphoned into the water coming from the pump, the flow from both siphon tubes being regulated by raising or lowering the outlet. Evaporation from the pans and clogging of the siphon tubes demanded constant attention on the part of the operator in order to assure that the desired amount of DDT was released into the flooding water.

The arrangement finally used employed a pump (fig. 4) ordinarily used for chlorination, which pumped water into a airtight bottle, the

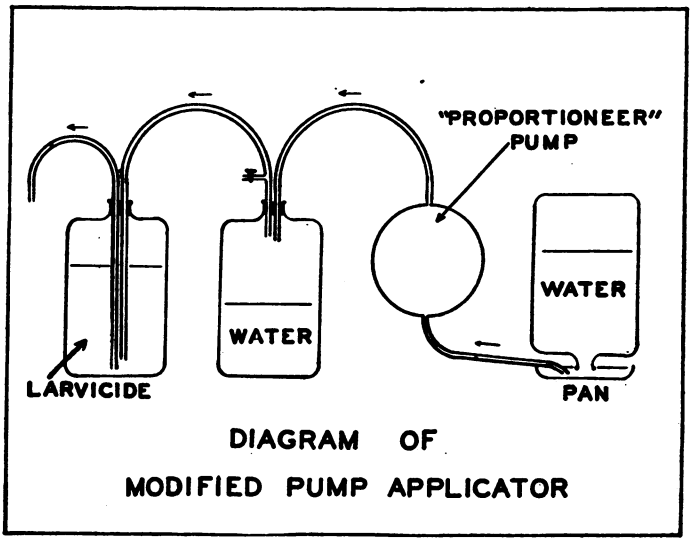

FIGURE 4.—Diagrammatic sketch of apparatus used for dispensing larvicide at a predetermined rate in flooding water at the pump.

displaced air being forced into another airtight bottle containing the larvicide, and equilibrium in the larvicide bottle being maintained by displacing the larvicide through an outlet tubing. The pump was belt-driven by a pulley attached to the well pump and was adjusted to deliver a constant amount of water. This water displaced an equal amount of air, which in turn displaced a constant amount of larvicide into the flooding water. This modification, instead of using the pump directly, was necessary because of the deleterious action of the solvents used on the pump. The applicator pump was adjusted to deliver 25 ml. per minute. This rate was checked and recorded every half hour at the delivery outlet by means of a 100-ml. graduated cylinder and a stop watch.

To determine the prevalence of mosquito larvae in the rice field, a routine sampling method was employed. Sampling stations were

designated in each of the levees contained in the six plots comprising the 100-acre field. The levees were numbered and the sampling stations indicated by A, B, C, etc., the A stations being nearest the water entrance of each levee, as shown in figure 3.

Sampling at each station consisted of enumerating the number of larvae in approximately 15 dips; that is, 15 negative dips were considered sufficient; if larvae were present but very scarce 20 dips were taken to get a better idea as to abundance; if larvae were very numerous 10 dips were sufficient, but this was the minimum. During the beginning of the season and following the second flooding, the larvae most commonly taken were *P. confinnis* (L.-A.) and *P. discolor* (Coq.), the rice field mosquitoes, since these larvae hatch very soon after flooding from eggs which have been laid in the drying fields. Following the suggestion of W. R. Horsfall (*1*), it was found that *Psorophora* larvae could most easily be captured by a rapid dipping or skimming with a stout-handled fine-mesh sieve. Later in the season when *Anopheles quadrimaculatus* Say larvae were most abundant and the rice taller, the conventional enamel dipper was used. Larvae of *Culex erraticus* D. & K. were also present at this time. Sampled larvae which were easily recognized as *Anopheles* or *P. confinnis* were counted and discarded; but questionable larvae were placed in small vials and later checked in the laboratory.

Because of the differing life cycles of the *Anopheles* and rice field mosquitoes, the first sampling was made on the day flooding was completed, the second 2 days later, the third 4 days later, the fourth 7 or 8 days later, followed by weekly samplings (fig. 2).

In order to obtain an indication of the normal prevalence of mosquito larvae in an untreated rice field, larval counts were made by 4 inspectors sampling at 4 different locations, and averaging 25 dips per station, in an untreated rice field adjacent to plots I and II, which were also inspected in the same manner for comparison.

DDT was applied to the 30 small, 1/20-acre plots in concentrations of 100, 10, 1, 0.2, and 0.1 p.p.m. in an emulsion employing either xylol, Culicide B oil, Dendrol, or a combination of xylol and Culicide B oil as solvents for the DDT. Two larval sampling stations were located in every plot, one at each end of the plot, and weekly inspections for larvae were made at each station.

Drying the rice fields between the first and second flooding is a method of reducing the number of root-infesting larvae of the rice water weevil (*2*). Water treated with DDT might provide another method of controlling the rice water weevil. Since the DDT-treated water does come into contact with these insects, both as adults and as larvae, samples of rice roots were examined in treated and untreated fields to determine the number of larvae present and evaluate, if possible, the effects of DDT on the larvae.

Samples were taken by means of a 4-inch-wide post-hole digger so that the muddy soil surrounding the rice roots would be included. Two samples were taken in each of the 30 small plots. Because of the generally light infestation, samples were not taken at random, but an attempt was made to locate the more heavily infested "stools." Plants which appeared to be stunted, yellowish, and with characteristic feeding scars caused by the adult beetles were preferred. It was noted that isolated stalks or clumps of stalks suffered the highest infestations so that these were selected when possible. Hence the number of stalks included in each sample varied from 1 to 2 and part of a third, but the size of the soil sample was constant.

Each sample was placed in a 5-gallon jar of water. The roots were rinsed free of mud and inspected. Generally the weevil larvae did not remain on the roots but were washed off with the mud and could be discovered when the muddy rinsings were poured through an 18-mesh sieve. This sieve would not hold first instar larvae, but, according to

TABLE 1.—*Number of anopheline larvae per 10 dips for 6 plots for various treatments at different distances from water entrance*

Plot No.	Treatment		Flood period	Distance in feet from water entrance							
	Solvent	DDT (p. p. m.)		0–200	200–400	400–600	600–800	800–1,000	1,000–1,200	1,200–1,400	1,400–1,600
				Number of larvae per 10 dips							
I	X	0.1	1st	1.2	1.4	0.9	0.8	----	----	1.4	----
	X	0.1	2nd	0	0	2.4	2.9	----	----	4.6	----
Aver.[1]				0.4	0.4	1.9	2.2	----	----	3.5	----
II	X	0.05	1st	0	0.1	0.3	0.6	6.6	3.8	11.9	0
	B	0.2	2nd	0	0	0.5	0.6	2.1	1.9	2.3	1.4
Aver.[1]				0	0	0.4	1.0	3.4	2.4	5.4	1.2
III	X	0.2	1st	0.2	0	0.4	6.0	0	0	0	0
	D	0.2	2nd	0.3	0.5	1.1	1.2	0.6	0.9	1.0	2.1
	BX	0.2	2nd	0	0	0	1.5	0.3	0	0.7	0.2
Aver.[1]				0.2	0.2	0.4	2.3	0.4	0.3	1.1	0.8
IV	X	0.05	1st	0.8	----	4.0	2.8	2.6	1.8	0	----
	B	0.1	2nd	0.3	----	1.9	2.9	7.2	3.9	2.7	----
Aver.[1]				0.4	----	2.3	2.9	6.2	3.1	3.3	----
V	X	0.2	1st	0.6	0.1	1.0	0.4	0.4	0.5	1.5	----
	X	0.2	2nd	1.8	2.1	2.5	4.4	4.2	4.2	5.3	----
Aver.[1]				1.3	1.2	1.9	2.8	2.5	2.7	3.8	----
VI	X	0.1	1st	0.5	0	0.5	0.8	0.6	2.4	1.9	1.2
	D	0.1	2nd	0	0	0.2	0.8	0.6	0.7	0.1	0.3
	BX	0.1	2nd	1.4	2.6	2.6	4.4	4.4	8.8	8.4	7.2
Aver.[1]				0.7	0.9	1.4	2.0	2.2	4.6	3.4	3.2

[1] Averages weighted according to the number of samples per flood period.

Solvent legend:

X=Xylol
B=Culicide Oil B
BX=Culicide Oil B-xylol mixture
D=Dendrol

Isely and Schwardt (*2*), stools taken so late in the season should have but 5 percent of the infestation as first instar larvae, while 50 percent should be third instar (mature) larvae. Most of the larvae actually taken were nearly full grown. Two pupae were noted.

RESULTS AND DISCUSSION

The distance from the point of entrance of the water into each plot to each of the sampling stations within the plot was determined from the diagram in figure 3, by measuring the approximate path the water followed from its entrance, along the levee, to the station. Inspection stations were then grouped into intervals of 200 feet, measured from the plot water entrance. The average numbers of larvae per 10 dips (calculated from approximately 28,000 dips) for these 200-foot intervals for each of the 6 plots, and for the treatments and flooding periods indicated are summarized in tables 1 and 2. Table 1 gives the data for *A. quadrimaculatus* larvae, and table 2 for culicine (*Psorophora* and *Culex* spp.) larvae.

TABLE 2.—*Number of culicine larvae per 10 dips for 6 plots for various treatments at different distances from water entrance*

Plot No.	Treatment		Flood period	Distance in feet from water entrance							
	Solvent	DDT (p. p. m.)		0–200	200–400	400–600	600–800	800–1,000	1,000–1,200	1,200–1,400	1,400–1,600
				Number of larvae per 10 dips							
I	X	0.1	1st	0	0	0.1	0.2	--------	--------	0	--------
	X	0.1	2nd	0	0	1.6	3.0	--------	--------	4.7	--------
Aver.[1]				0	0	0.9	1.7	--------	--------	2.5	--------
II	X	0.05	1st	0	0	0	0	0	0	0	0
	B	0.2	2nd	0	0	0.1	0.1	1.6	0.5	1.0	4.7
Aver.[1]				0	0	0.1	0.1	0.9	0.3	0.8	2.8
III	X	0.2	1st	0	0	0	0	0	0	0	0
	D	0.2	2nd	0	0	0	0	0	0	1.8	0.2
	BX	0.2	2nd	0	0	0	0.1	0	0.3	1.4	0.5
Aver.[1]				0	0	0	0	0	0.1	1.4	0.4
IV	X	0.05	1st	0	--------	0	0	0.1	0.5	0.2	--------
	B	0.1	2nd	0	--------	0	1.6	2.0	1.8	1.8	--------
Aver.[1]				0	--------	0	1.2	1.2	1.2	1.2	--------
V	X	0.2	1st	0	0	0	0	0	0	0	--------
	X	0.2	2nd	1.3	0.6	0.2	2.9	2.8	3.6	8.3	--------
Aver.[1]				0.8	0.3	0.1	1.6	1.5	1.9	4.4	--------
VI	X	0.1	1st	0	0	0.2	0.1	0.3	0.9	0.4	0.2
	D	0.1	2nd	0	0	0.7	6.8	6.4	5.4	2.7	6.0
	BX	0.1	2nd	0.5	0.4	1.6	3.4	2.9	5.0	5.0	5.7
Aver.[1]				0.2	0.1	0.8	2.9	2.7	3.3	3.1	3.5

[1] Averages weighted according to the number of samples per flood period.

Solvent legend:
X=Xylol
B=Culicide Oil B
BX=Culicide Oil B-xylol mixture
D=Dendrol

The average number of larvae per 10 dips for all of the inspection stations within each plot for the second flooding is given in table 3 for both *Anopheles* and culicine larvae. Also, there is given the mean distance of the stations to their respective water entrances and to the pump. These values, the average number of larvae per 10 dips for each plot, and the mean distance of the stations of each plot from the pump, are plotted in figure 5 for both *Anopheles* and culicines. Irrespective of the kind of treatment or the dosages of DDT, the average number of larvae increases as the distance from the pump increases, indicating that there is a reduction in toxicity depending on how far the plot is from the pump. Plots I and V received 0.1 p. p. m. DDT and 0.2 p. p. m. DDT, respectively, in xylol emulsion, yet plot V with a higher DDT dosage gave a larval count higher than plot I. Plots I, IV, and VI received 0.1 p. p. m. DDT, while plots II, III, and V received 0.2 p. p. m. DDT. (See table 3 and fig. 5.)

As can be seen by inspection of tables 1 and 2, stations near the water entrance have very low larval counts, or, in most cases, no

TABLE 3.—*Average number of larvae per 10 dips as obtained during the second flooding period and the average distance traveled by the irrigation water from applicator pump to sampling stations, averaged by plots*

	Plot No.					
	III	II	IV	I	V	VI
Average distance (feet) from stations to water entrance	750	824	660	609	596	890
Distance (feet) from water entrance to pump	84	400	990	1,350	2,412	2,732
Total mean distance (feet) from inspection stations to pump	834	1,224	1,650	1,959	3,008	3,622
Average number of *Anpoheles* larvae per 10 dips, second flooding	0.4	1.1	2.8	2.1	3.0	3.4
Average number of culicine larvae per 10 dips, second flooding	0.1	0.8	1.0	2.0	2.2	3.9

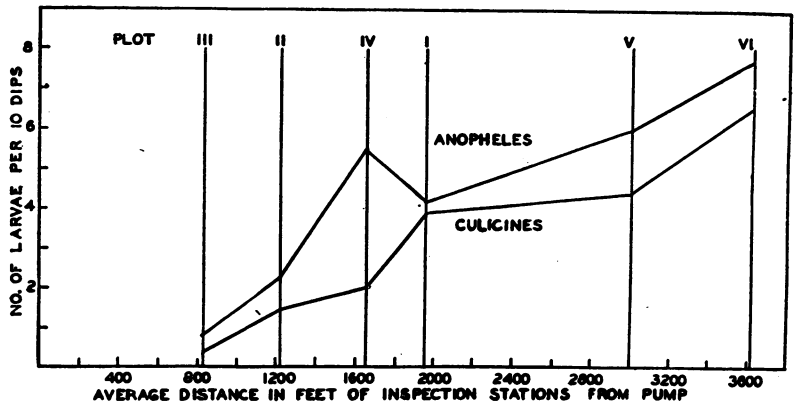

FIGURE 5.—Relation of plot position, distance from the pump, to toxicity of DDT larvicide as shown by larval counts. The curves shown are for data averaged by plots for the second flooding and including all treatments.

breeding. The average number of larvae per 10 dips for the combined 6 plots for each 200-foot interval is given in table 4 and plotted in figure 6. In this figure the increase in larval counts depends, in general, on the distance from the water entrance.

TABLE 4.—*Average number of larvae per 10 dips at 200-foot intervals from the water entrance for all plots, all treatments, and both flooding periods*

Kind of larvae	Distance in feet from water entrance							
	0–200	200–400	400–600	600–800	800–1,000	1,000–1,200	1,200–1,400	1,400–1,600
	Number of larvae per 10 dips							
Anopheles	0.5	0.5	1.4	2.2	2.9	2.8	3.4	1.9
Culicines	0.2	0.1	0.3	1.2	1.3	1.4	2.2	2.2

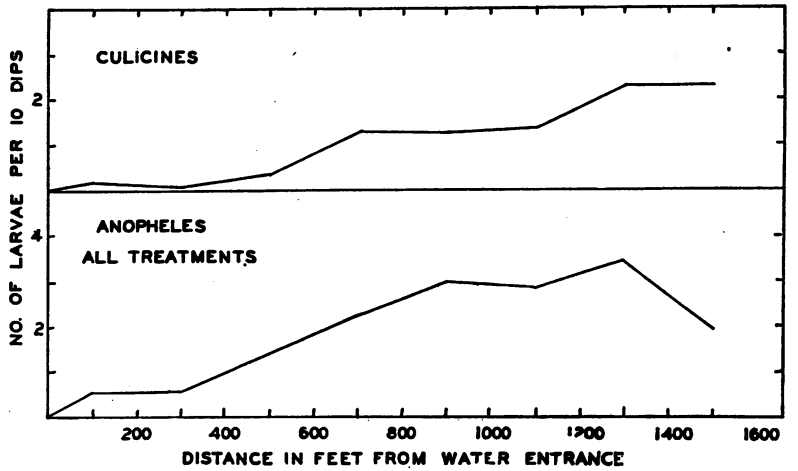

FIGURE 6.—Effect of all treatments on larval counts at different distances from the water entrance, as obtained from data for both flooding periods.

A comparison of the dosage of DDT for the various solvents used and their relation to the larval count and distance from the water entrance is plotted in figures 7, 8, 9, 10, and 11 from the data shown in tables 1 and 2. In general, the 0.2-p. p. m. DDT dosage shows lower larval counts than the 0.1-p. p. m. DDT dosage, and the decrease in toxicity with increase in distance is further emphasized.

To determine how the treatments were affecting the rice field in comparison with an untreated field, larval counts at four stations in the treated rice field and at four stations in an untreated adjacent rice field were made on two occasions, August 18 and September 5. The results are shown in table 5. The treated area shows 50 percent fewer *Anopheles* larvae and 72 percent fewer culicine larvae. In making this comparison, it should be noted that numerous *Gambusia* were seen in the untreated fields and none in the treated fields.

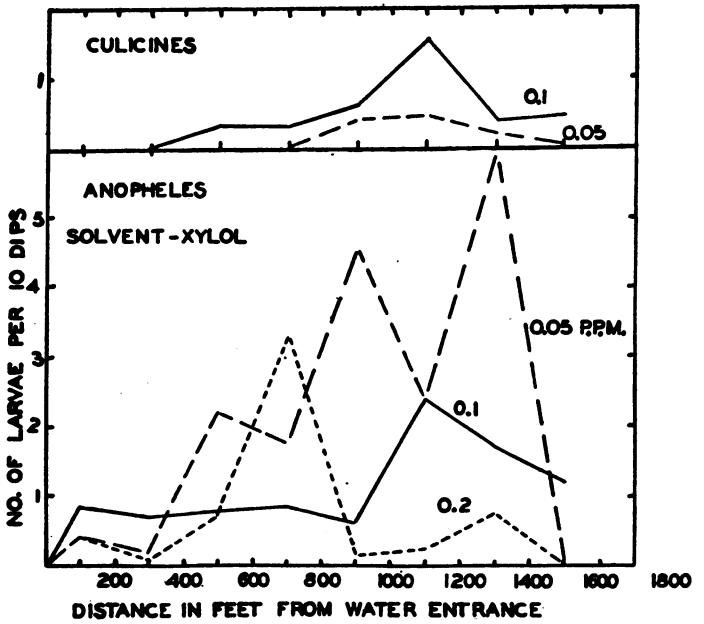

FIGURE 7.—Effects of various "DDT" dosages, using xylol as solvent, on larval counts at different distances from the water entrance, as obtained from data for the first flooding period.

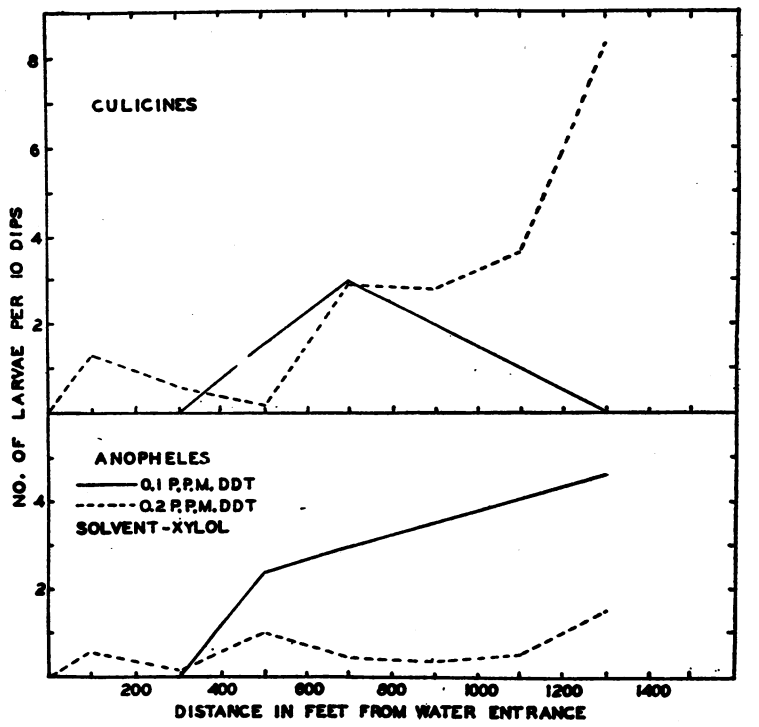

FIGURE 8.—Effects of two DDT dosages with xylol as solvent on larval counts at different distances from the water entrance, as obtained from data for the second flooding period.

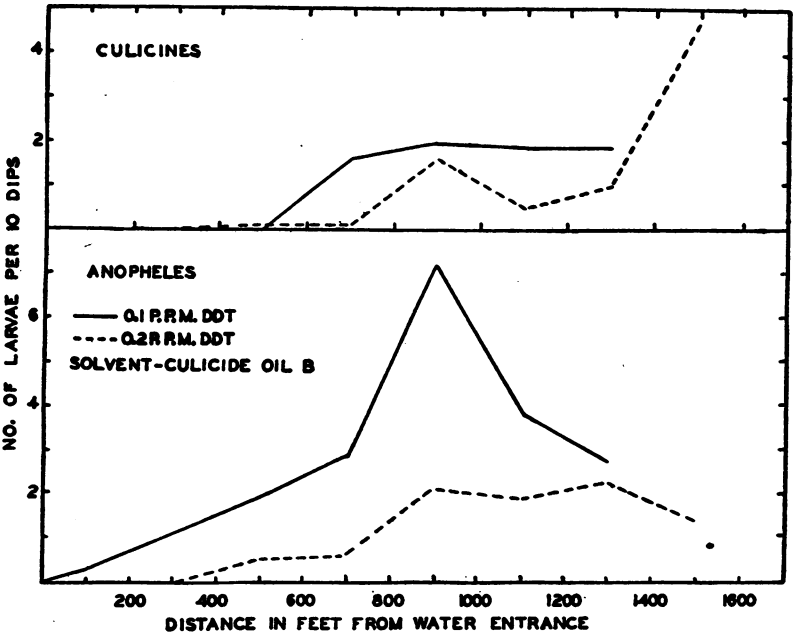

FIGURE 9.—Effects of two DDT dosages with Culicide Oil [B] as solvent on larval counts at different distances from the water entrance, as obtained from data for the second flooding period.

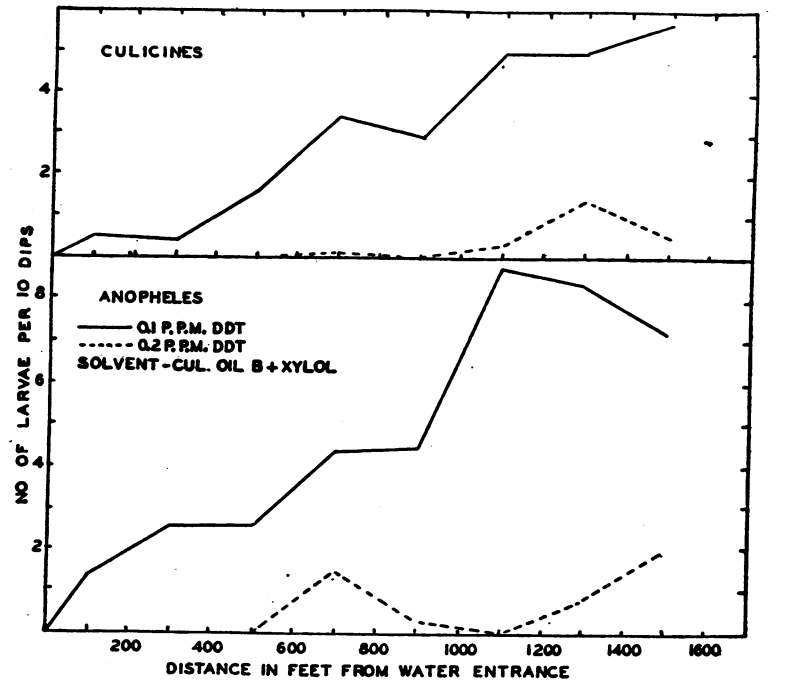

FIGURE 10.—Effects of two DDT dosages with combined xylol-Culicide Oil B solvent on larval counts at different distances from the water entrance, as obtained from data for the second flooding period.

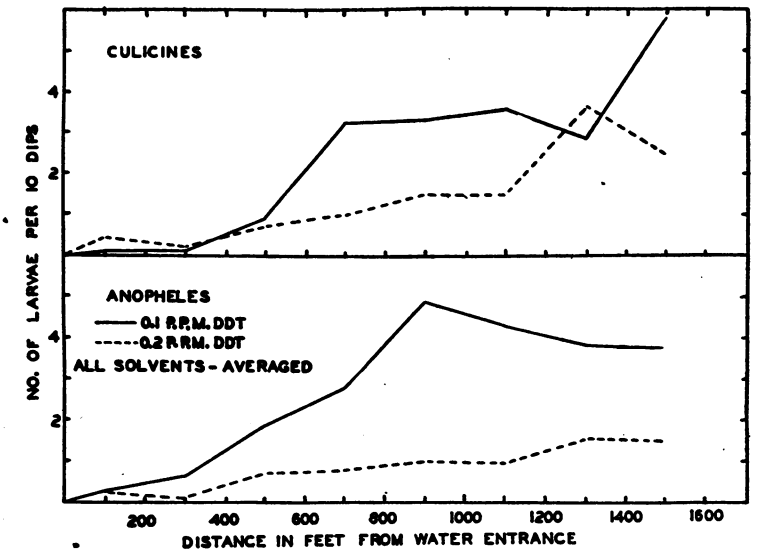

FIGURE 11.—Effects of two DDT dosages, with data for all solvents averaged, on counts at different distances from the water entrance, as obtained from data for the second flooding period.

TABLE 5.—*Comparison of larval counts, average number of larvae per 10 dips, in an untreated rice field and a field treated with DDT*

	Anopheles quadrimaculatus			Culicines (chiefly *Culex erraticus*)		
	Treated field	Untreated field	Percent reduction	Treated field	Untreated field	Percent reduction
First inspection, average	1.2	1.8	33.3	0.8	3.0	73.3
Second inspection, average	5.7	12.0	52.5	3.3	11.3	70.8
Average, both inspections	3.4	6.9	50.7	2.0	7.1	71.8

Because DDT was applied individually to each of the 30 small plots, the factor of distance from the point of application is eliminated and a direct correlation made between the number of larvae found and the DDT dosages. Larval counts made through the period are averaged as the number of larvae per 10 dips and the data arranged according to DDT dosages. These averages are shown in table 6 for various DDT dosages and for untreated plots. These data indicate that complete control of anopheline larvae is obtained at a DDT dosage of 1.0 p. p. m., and complete control of culicine larvae at a DDT dosage of 0.2 p. p. m. Table 7 shows that there was no residual toxicity when but one application of DDT was made.

Calculated yields in bushels per acre for small plots receiving various DDT dosages are shown in table 8 and indicate no significant differences among plots receiving various dosages or with the untreated plots. These data indicate that DDT treatments did not injure the rice, if yields can be taken as an index of injury.

TABLE 6.—*Average number of larvae per 10 dips correlated with various DDT dosages as applied to small plots*

Concentration of DDT in p. p. m.	0.1	0.2	1	10	100	0.2, followed by continuous flooding with water	0.2, followed by second flooding with water	Untreated
Number of plots included	5	5	3	3	1	3	3	3
Number of *Anopheles* larvae per 10 dips	1.01	0.14	0	0	0	2.82	5.59	2.20
Number of culicine larvae per 10 dips	0.34	0	0	0	0	0.48	0.33	0.94

TABLE 7.—*Average number of larvae per 10 dips at various time intervals in plots receiving 0.2 p. p. m. DDT in first flooding*

Days after second flooding	10	17	24	31	37	44	51
0.2 p. p. m., followed by continuous flooding with water alone	0.4	0.5	4.2	5.3	10.5	17.7	31.1
0.2 p. p. m., first flooding; second flooding with water alone	0.6	1.0	0.8	6.7	21.5	10.8	17.9
Controls (no DDT)	0.8	0.6	1.0	6.8	12.2	11.3	25.4

TABLE 8.—*Average yields for small plots for various DDT treatments*

Second flooding treatment (DDT p. p. m.)	100	10	1	1/5	1/10	Control
Yield (bushels per acre) (Zenith)	52.3	46.2	50.2	46.9	46.6	48.5

Effects of the DDT on the rice water weevil in the small experimental plots, as indicated by yields, are confused because of the readiness with which the adult weevil could migrate from plot to plot.

Sixty-two samples of soil taken from the small plots treated with DDT gave an average of 4.0 rice water weevil larvae per sample. Six samples taken and examined in a similar way from an untreated rice field showed 9.8 rice water weevil larvae, indicating that DDT-treated plots contained approximately 50 percent fewer rice water weevil larvae than did untreated fields.

Also, the adult rice water weevils were affected. Although no counts were made, many dead adults were seen when dipping for mosquito larvae.

Yields from the six field plots which were treated with DDT were obtained in order to estimate the injury, if any, of the DDT treatment. Yields as determined by the Rice Experiment Station are shown in table 9.

These yields are considered by the Experiment Station to be satisfactory and indicate that the rice suffered no injury from the DDT treatments. A comparison of these yields with those given by Adair, Kapp, and Cralley (*3*) for previous years on unspecified and untreated plots at the Stuttgart Experiment Station shows that the 100-acre DDT-treated field gave higher yields for each variety of

rice than the average or the highest yields reported by Adair, Kapp, and Cralley. Although better rice water weevil control, because of the DDT treatments, may have been the factor or one of the factors responsible for the increased yields, it is difficult to assign increased yields to any single factor or combination of factors because of the design of the experiment, which did not provide untreated fields.

TABLE 9.—*Yields of rice in bushels per acre for each of the six plots in the 100-acre rice field treated with DDT emulsion larvicide. The average and highest yields (3) on other fields at the Experiment Station for past years are shown for comparison*

Variety of rice	100-acre DDT-treated field		Untreated and unspecified plots		
	Plot No.	Yield (bushels per acre)	Years	Average yield (bushels per acre)	Highest yield (bushels per acre)
Arkansas Fortuna	1	[1] 70	1934–43	50.5	64.5
Early Nira	2	[1] 70	1935–43	44.7	55.0
Zenith	3	[1] 95	1934–43	52.7	64.8
Prelude	4	[2] 82	1940–43	55.8	58.1
Arkrose	5	[2] 66	1940–43	48.2	59.0
Kamrose	6	[1] 90	1941–43	51.6	60.3

[1] Yields on volume basis (combine).
[2] Yields on dry weight basis (binder and thresher).

SUMMARY AND CONCLUSIONS

A method of applying a DDT water emulsion at the pump to flooding waters of a rice field is described. Data obtained from 28,000 dipping records of mosquito larval counts are given according to DDT dosage, solvent used, and position of plot. Larval counts increased with the distance from the pump, indicating a gradual loss in the toxicity of the DDT-treated water as it flowed through the canals and rice fields.

In comparison with an untreated rice field, two plots of the treated field contained 50 percent fewer *A. quadrimaculatus* larvae and 72 percent fewer culicine larvae than the untreated field. In a series of 1/20-acre plots, complete control of anopheline and culicine larvae was obtained at DDT concentrations of 1.0 p. p. m. and 0. 2 p. p. m. respectively.

Samples of rice stools from treated and untreated fields showed approximately 50 percent fewer rice water weevil larvae in the treated than in the untreated field.

Yields of harvested rice in the DDT-treated 100-acre field were higher than the average or highest yields for previous years, from untreated fields, and indicate that DDT did not injure the growing rice.

Although these results indicate a reduction of mosquito larvae production by the application of DDT to the flooding water as it

enters the rice fields, it is well to note that this production of mosquito larvae was by no means eliminated.

ACKNOWLEDGMENTS

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MALARIA

Number of Cases Reported by State Health Officers, January Through April 1945, as Compared With the Data for the Same Period in 1939–44

Beginning in 1943, certain States, especially in the northern part of the United States, reported a sharp increase in the number of new cases of malaria. In 1944 and 1945, the increase was more marked. This increase could have been due either to the inclusion in the malaria reports of cases which had been contracted overseas by the military population or to a rising incidence of malaria in the civilian population. To determine the source of the increase, it is necessary to know the number of cases of malaria contracted outside of the continental United States. Therefore the State health officers were asked to report cases of malaria in this manner, beginning with January 1945.

The accompanying table shows, for January through April of 1945 and for the same period of 1939–44, the number of cases of malaria reported in the several States. The figures for 1939 through 1942 may be considered as civilian cases contracted in this country. The data for 1943 are believed to contain some cases in the military population. Only a few State health officers in 1944 reported separately cases in the military and civilian populations.

For the first 4 months of 1945, the health officers of most States have reported malaria cases either as requested (contracted within and contracted outside continental United States) or separately for the military and civilian populations. The cases reported for the military population have been considered as contracted outside continental United States. A few State health officers have stated that all cases

Number of cases of malaria for January through April of 1945 and of 1939–44 (from monthly reports furnished by the State health officers)

Division and State	Total cases reported									
							1945			
								Place contracted		
	1939	1940	1941	1942	1943	1944	Total	Within continental United States	Outside continental United States [1]	Information not supplied
New England:										
Maine	0	0	0	0	0	1	3	1	2	--
New Hampshire	0	0	1	0	0	1	0	0	0	--
Vermont	0	0	0	0	0	0	0	0	0	--
Massachusetts	4	4	2	1	2	205	321	--	183	138
Rhode Island	0	0	0	0	1	26	93	--	91	2
Connecticut	1	1	2	0	2	23	44	5	39	--
Middle Atlantic:										
New York	24	50	20	34	26	36	386	5	381	--
New Jersey	4	1	2	5	2	102	559	1	558	--
Pennsylvania	0	0	0	1	2	1	0	0	0	--
East North Central:										
Ohio	1	4	3	2	9	26	9	1	8	--
Indiana	2	4	0	0	6	190	398	4	394	--
Illinois	23	45	9	8	16	9	1	1	0	--
Michigan	0	16	1	3	56	126	46	1	31	14
Wisconsin	0	2	0	0	0	10	132	--	--	132
West North Central:										
Minnesota	2	1	0	1	0	11	34	0	34	--
Iowa	0	3	1	0	2	3	12	1	11	--
Missouri	7	12	15	7	17	7	136	22	114	--
North Dakota	0	0	0	0	1	0	0	0	0	--
South Dakota	1	0	0	0	0	0	0	0	0	--
Nebraska	0	0	0	0	0	2	0	0	0	--
Kansas	3	3	4	1	0	12	20	0	20	--
South Atlantic:										
Delaware	0	0	0	0	0	0	17	0	17	--
Maryland	1	0	0	1	7	0	310	2	307	1
District of Columbia	0	0	0	0	16	24	50	0	50	--
Virginia	8	15	6	2	15	134	293	1	134	158
West Virginia	0	1	2	1	0	1	50	0	50	--
North Carolina	158	29	42	28	42	76	148	--	--	148
South Carolina	1,844	1,278	1,232	1,136	1,243	1,660	2,440	--	--	2,440
Georgia	396	206	141	80	70	45	168	91	77	--
Florida	95	35	20	7	16	66	417	12	405	--
East South Central:										
Kentucky	8	2	6	1	0	9	567	1	566	--
Tennessee	60	109	35	11	14	10	50	15	35	--
Alabama	389	389	203	283	569	244	678	440	238	--
Mississippi	5,014	5,237	4,331	4,538	3,843	3,379	3,656	3,498	158	--
West South Central:										
Arkansas	533	336	226	207	78	169	356	146	210	--
Louisiana	69	29	79	56	60	135	554	98	372	84
Oklahoma	184	175	188	144	164	190	219	122	5	92
Texas	581	911	1,182	1,200	1,451	1,798	2,428	1,293	1,135	--
Mountain:										
Montana	1	0	0	1	0	8	9	1	8	--
Idaho	0	0	0	2	1	2	0	0	0	--
Wyoming	0	0	1	0	0	1	4	0	4	--
Colorado	0	0	0	1	4	15	283	--	216	67
New Mexico	3	3	0	4	1	1	29	1	28	--
Arizona	2	9	5	9	5	16	36	--	27	9
Utah	0	1	0	1	4	9	61	1	60	--
Nevada	0	0	0	0	0	1	0	0	0	--
Pacific:										
Washington	0	0	0	0	2	0	1	0	1	--
Oregon	2	3	2	2	7	6	52	--	1	51
California	27	27	35	12	92	705	537	15	491	31
Total	9,447	8,941	7,796	7,790	7,846	9,495	15,607	5,779	6,461	3,367

[1] Includes cases reported for the military population, considered as contracted outside continental United States.

A zero indicates a definite report. Leaders indicate that there may have been cases.

of malaria reported by them are in the civilian population. These cases have been considered as contracted within continental United States. In instances where the State health officer did not specify where the cases of malaria were contracted or whether they were among the military or civilian population, the cases have been shown in the table in the column headed "information not supplied."

For those States where the origin of all cases of malaria is known for 1945, a comparison of the number of cases contracted within continental United States with the number for the years 1939–42 indicates that there has been no increase in the incidence of malaria in this country. Four States—Maine, Connecticut, Missouri, and Louisiana—show a few more cases for 1945 than for the previous years. However, three States—New York, Illinois, and Mississippi—have fewer cases reported in 1945 than for any year between 1939 and 1942. The data presented here do not warrant the conclusion that malaria has decreased in certain States. Changes in the size and age distribution of the population must be taken into account before any such conclusions can be reached.

DEATHS DURING WEEK ENDED AUGUST 4, 1945

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 4, 1945	Corresponding week, 1944
Data for 93 large cities of the United States:		
Total deaths	8,152	8,140
Average for 3 prior years	7,942	
Total deaths, first 31 weeks of year	284,318	288,023
Deaths under 1 year of age	604	654
Average for 3 prior years	625	
Deaths under 1 year of age, first 31 weeks of year	18,846	19,218
Data from industrial insurance companies:		
Policies in force	67,374,816	66,691,894
Number of death claims	11,553	11,584
Death claims per 1,000 policies in force, annual rate	8.9	9.1
Death claims per 1,000 policies, first 31 weeks of year, annual rate	10.6	10.3

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED AUGUST 11, 1945

Summary

A total of 671 cases of poliomyelitis was reported for the week, as compared with 474 last week, a 5-year median of 420, and 1,016 for the corresponding week last year, an increase of 84 over the preceding week. Increases occurred during the current week in all of the 9 geographic divisions except the Pacific. States reporting increases of 10 or more cases each during the week are as follows (last week's figures in parentheses): Maine 12 (2), Massachusetts 28 (15), New York 111 (83), Pennsylvania 45 (31), Illinois 73 (26), Nebraska 13 (0), District of Columbia 13 (3), Virginia 27 (15), and Texas 56 (38). Decreases occurred in New Jersey (82 to 71) and California (18 to 10).

During the 10-week period June 3 to August 11, 2,773 cases have been reported, as compared with 4,463 for the corresponding period last year. The total for the year to date is 3,584, as compared with 5,008 for the same period last year and a 5-year median of 2,272.

Of the total of 92 cases of meningococcus meningitis, as compared with 118 last week, only 2 States reported as many as 8 cases each—New York and Texas. A total of 158 cases was reported for the corresponding week last year, and the 5-year median is 47. The total to date is 6,091, as compared with 12,944 for the corresponding period last year and a 5-year median of 2,354.

Of a total of 703 cases of unspecified dysentery, 620 occurred in Virginia where 634 cases were reported last week, and 292 for the next earlier week. Of 652 cases of bacillary dysentery, 409 occurred in Texas and 110 in Connecticut.

Deaths recorded in 93 large cities of the United States totaled 7,918 for the current week, as compared with 8,152 last week, 8,223 for the corresponding week of 1944, and a 3-year (1942–44) average of 7,867. The total to date this year is 292,236, as compared with 296,246 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended August 11, 1945, and comparison with corresponding week of 1944 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	Aug. 11, 1945	Aug. 12, 1944		Aug. 11, 1945	Aug. 12, 1944		Aug. 11, 1945	Aug. 12, 1944		Aug. 11, 1945	Aug. 12, 1944	
NEW ENGLAND												
Maine	5	3	0				3	2	12	0	0	0
New Hampshire	0	0	0				1	0	0	0	1	0
Vermont	2	0	0				1	4	14	0	0	0
Massachusetts	4	1	3				80	46	83	0	8	3
Rhode Island	0	0	0	25			0	0	4	1	0	0
Connecticut	1	1	0				12	9	9	3	4	1
MIDDLE ATLANTIC												
New York	8	6	7	(1)	[1] 1	[1] 1	26	129	208	8	22	9
New Jersey	1	3	1	1	1	2	19	38	66	0	9	6
Pennsylvania	10	7	7	1			106	34	47	6	12	2
EAST NORTH CENTRAL												
Ohio	4	1	2	1	1	3	12	21	32	7	8	2
Indiana	5	5	5	6	3	2	7	5	6	4	1	1
Illinois	0	4	11		4	2	85	18	40	6	8	1
Michigan [2]	7	9	2	1		1	62	37	88	5	8	2
Wisconsin	2	1	0	9	14	7	35	144	144	1	3	0
WEST NORTH CENTRAL												
Minnesota	4	4	0		1		3	12	12	1	1	0
Iowa	4	3	2				9	2	11	1	4	0
Missouri	0	1	1	3	1	1	7	29	16	0	11	0
North Dakota	5	0	0				0	0	5	0	0	0
South Dakota	6	0	1				1	0	2	0	0	0
Nebraska	3	1	1		2	2	5	12	10	0	0	0
Kansas	4	2	2				10	6	10	2	1	0
SOUTH ATLANTIC												
Delaware	0	0	0				0	0	0	1	1	0
Maryland [2]	3	0	2		1	1	0	1	5	2	5	2
District of Columbia	1	0	0		1		1	6	6	3	1	0
Virginia	6	9	9	74	23	37	4	11	20	1	2	2
West Virginia	1	10	4	4		1	0	1	5	2	4	0
North Carolina	25	11	10				7	31	31	3	2	1
South Carolina	12	5	7	86	57	101	11	8	8	0	0	1
Georgia	11	5	7	6	5	16	1	4	6	2	3	1
Florida	6	4	2	2		1	4	4	4	0	4	1
EAST SOUTH CENTRAL												
Kentucky	3	3	3		1	1	3	13	13	2	2	1
Tennessee	3	5	4	4	9	6	1	2	9	4	3	0
Alabama	12	5	8	33	3	9	3	3	8	1	3	2
Mississippi [2]	12	7	3							4	3	2
WEST SOUTH CENTRAL												
Arkansas	3	4	4	2	12	12	4	4	4	5	0	0
Louisiana	7	3	3	56	5	3	3	4	4	0	0	0
Oklahoma	3	1	1	12	2	6	6	22	10	0	0	0
Texas	29	30	22	376	210	201	50	75	52	8	3	2
MOUNTAIN												
Montana	0	1	1				9	1	3	0	1	0
Idaho	2	0	0	4			25	6	3	0	0	0
Wyoming	0	4	2				2	2	5	0	1	1
Colorado	0	4	4		4	9	0	5	5	0	2	0
New Mexico	3	7	1				0	2	4	0	0	0
Arizona	3	2	1	12	8	18	1	8	9	0	2	1
Utah [2]	0	0	0	4			54	7	12	0	2	0
Nevada	0	1	0				0	9	5	0	0	0
PACIFIC												
Washington	1	0	1		2		40	26	21	2	0	0
Oregon	2	2	2	3	3	3	13	45	25	1	2	3
California	29	20	10	6	6	17	196	291	126	6	11	4
Total	252	195	165	731	380	451	922	1,139	1,539	92	158	47
32 weeks	8,070	6,580	7,241	70,229	338,114	168,789	100,565	590,181	535,598	6,091	12,944	2,354

[1] New York City only.
[2] Period ended earlier than Saturday.

Telegraphic morbidity reports from State health officers for the week ended August 11, 1945, and comparison with corresponding week of 1944, and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever[2]		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	Aug. 11, 1945	Aug. 12, 1944		Aug. 11, 1945	Aug. 12, 1944		Aug. 11, 1945	Aug. 12, 1944		Aug. 11, 1945	Aug. 12, 1944	
NEW ENGLAND												
Maine	12	0	0	10	14	2	0	0	0	1	0	0
New Hampshire	0	0	0	2	0	2	0	0	0	0	0	0
Vermont	2	3	1	2	1	3	0	0	0	0	1	0
Massachusetts	28	23	1	43	47	47	0	0	0	3	8	3
Rhode Island	0	1	0	2	0	0	0	0	0	0	1	0
Connecticut	11	10	2	7	4	4	0	0	0	0	0	1
MIDDLE ATLANTIC												
New York	111	356	30	97	54	54	0	0	0	8	9	16
New Jersey	71	21	13	18	16	18	0	0	0	7	1	4
Pennsylvania	45	72	3	31	36	36	0	0	0	11	3	10
EAST NORTH CENTRAL												
Ohio	14	57	16	54	82	49	0	0	0	3	2	8
Indiana	12	33	12	13	12	10	0	1	1	2	5	5
Illinois	73	27	27	28	46	35	0	0	0	3	3	6
Michigan[1]	8	53	10	51	39	35	0	1	0	0	4	4
Wisconsin	6	8	1	37	52	35	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	2	24	7	25	14	13	0	0	0	0	2	1
Iowa	6	13	5	8	13	9	0	0	0	0	0	5
Missouri	5	2	4	5	4	12	0	0	0	2	4	7
North Dakota	0	2	1	2	0	3	0	2	0	1	0	0
South Dakota	0	0	0	11	3	4	2	6	1	1	2	0
Nebraska	13	4	1	8	3	3	0	0	0	0	0	0
Kansas	3	9	9	23	7	15	0	0	0	1	4	4
SOUTH ATLANTIC												
Delaware	3	9	0	2	1	0	0	0	0	0	0	0
Maryland[1]	4	26	2	8	16	10	0	0	0	1	3	3
District of Columbia	13	10	1	3	4	3	0	0	0	0	0	1
Virginia	27	35	3	18	12	12	0	0	0	8	4	8
West Virginia	0	15	4	22	24	14	0	0	0	3	10	6
North Carolina	7	60	5	14	23	23	0	0	0	2	4	4
South Carolina	13	6	2	7	1	1	0	0	0	4	4	4
Georgia	8	5	1	15	12	7	0	0	0	16	15	15
Florida	3	0	0	3	2	2	0	0	0	5	7	6
EAST SOUTH CENTRAL												
Kentucky	0	47	13	17	13	13	0	0	0	11	17	17
Tennessee	24	9	9	13	9	9	0	0	0	3	6	10
Alabama	8	6	2	17	13	8	0	0	0	3	3	9
Mississippi[1]	3	5	2	7	3	4	0	0	0	4	2	11
WEST SOUTH CENTRAL												
Arkansas	2	2	3	7	3	3	0	0	0	0	4	15
Louisiana	2	11	5	3	2	1	0	0	0	3	5	8
Oklahoma	18	3	3	5	2	5	0	0	0	6	6	6
Texas	56	7	7	30	27	22	1	0	0	20	16	20
MOUNTAIN												
Montana	1	1	1	4	3	5	0	0	0	0	0	1
Idaho	0	1	0	2	4	1	1	0	0	1	0	0
Wyoming	0	0	0	0	0	1	0	0	0	0	0	0
Colorado	7	2	1	10	5	7	0	0	0	2	0	1
New Mexico	2	0	0	0	0	1	0	0	0	0	1	2
Arizona	0	3	2	2	1	1	0	0	0	0	1	1
Utah[1]	18	2	2	2	6	5	0	0	0	1	0	0
Nevada	1	1	0	0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	17	1	3	15	11	8	0	0	0	1	0	0
Oregon	2	20	2	0	7	6	0	1	0	1	1	1
California	10	11	11	111	60	36	0	0	0	2	3	4
Total	671	1,016	420	814	711	593	4	11	7	140	161	218
32 weeks	3,584	5,008	2,272	133,818	146,942	96,866	263	299	609	2,621	3,087	3,813

[1] Period ended earlier than Saturday.

[2] Including paratyphoid fever reported separately as follows: New Jersey 1; Ohio 1; Illinois 1; South Dakota 1; South Carolina 1; Georgia 10; Tennessee 1; Louisiana 1; Texas 3.

Telegraphic morbidity reports from State health officers for the week ended August 11, 1945, and comparison with corresponding week of 1944, and 5-year median—Con.

Division and State	Whooping cough			Week ended Aug. 11, 1945							
	Week ended—		Median 1940–44	Dysentery			Encephalitis, infections	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
	Aug. 11, 1945	Aug. 12, 1944		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	26	18	20	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0	0	0
Vermont	21	39	39	0	0	0	0	0	0	0	1
Massachusetts	133	57	147	0	2	0	0	0	0	0	0
Rhode Island	11	2	13	0	1	0	0	0	0	0	0
Connecticut	37	54	36	0	110	0	0	0	0	0	1
MIDDLE ATLANTIC											
New York	317	178	272	0	4	0	1	0	0	0	3
New Jersey	197	68	99	0	0	0	0	0	0	0	1
Pennsylvania	240	80	216	0	0	0	0	1	0	0	2
EAST NORTH CENTRAL											
Ohio	196	257	243	1	0	0	0	0	0	0	1
Indiana	34	29	29	0	1	0	1	3	0	0	1
Illinois	131	148	190	4	0	0	1	1	0	0	8
Michigan [2]	111	106	264	2	4	0	0	0	0	0	5
Wisconsin	55	176	220	0	0	0	1	0	0	0	7
WEST NORTH CENTRAL											
Minnesota	21	42	51	1	0	0	0	0	0	0	5
Iowa	9	5	42	0	0	0	0	0	0	0	1
Missouri	34	20	20	0	0	0	0	1	2	0	0
North Dakota	3	70	13	0	0	0	0	0	0	0	0
South Dakota	0	0	4	0	0	0	0	0	0	0	0
Nebraska	1	9	9	0	0	0	0	0	0	0	0
Kansas	20	42	50	0	0	0	2	0	0	0	0
SOUTH ATLANTIC											
Delaware	0	4	3	0	0	0	0	0	0	0	0
Maryland [2]	69	124	118	0	0	3	0	0	0	0	1
District of Columbia	15	1	12	0	0	0	0	0	0	0	0
Virginia	53	53	53	0	0	620	0	4	2	0	2
West Virginia	20	29	43	0	0	0	0	0	0	0	0
North Carolina	133	215	146	0	15	0	0	8	0	6	1
South Carolina	67	77	71	2	71	0	0	0	0	10	0
Georgia	26	12	12	1	7	0	0	0	1	45	3
Florida	11	14	14	1	1	1	0	0	0	16	1
EAST SOUTH CENTRAL											
Kentucky	28	54	54	0	0	0	0	2	0	0	0
Tennessee	31	19	54	0	0	5	2	1	0	2	0
Alabama	37	9	9	0	0	0	0	1	0	18	2
Mississippi [2]	----	----	----	0	0	0	0	0	1	6	5
WEST SOUTH CENTRAL											
Arkansas	26	11	14	1	14	0	0	0	3	1	3
Louisiana	35	0	13	0	2	0	0	0	0	12	0
Oklahoma	16	13	16	0	3	0	0	0	0	0	1
Texas	179	245	191	19	409	48	0	0	2	75	13
MOUNTAIN											
Montana	3	16	17	0	0	0	0	0	1	0	0
Idaho	4	3	3	0	0	0	0	1	1	0	3
Wyoming	12	11	5	0	0	0	0	0	1	0	0
Colorado	68	17	20	0	0	0	0	0	0	0	0
New Mexico	2	2	4	0	1	0	0	0	0	0	0
Arizona	5	20	13	0	0	26	0	0	0	0	1
Utah [2]	36	62	55	0	0	0	0	0	1	0	4
Nevada	0	3	3	0	0	0	0	0	1	0	0
PACIFIC											
Washington	36	14	40	1	0	0	0	0	0	0	1
Oregon	16	2	30	0	0	0	0	0	0	0	1
California	219	53	155	1	7	0	10	0	0	0	4
Total	2,744	2,483	3,302	34	652	703	18	23	16	191	82
Same week, 1944	2,483	----	----	62	724	284	12	25	8	198	73
Average, 1942–44	2,956	----	----	44	515	326	18	[4] 25	16	[4] 131	----
32 weeks: 1945	82,149	----	----	1,158	15,608	5,673	260	329	508	2,501	3,029
1944	61,317	----	----	1,062	13,448	4,869	362	348	375	2,499	2,252
Average, 1942–44	103,166	----	[4] 119,319	1,018	9,483	4,398	353	[4] 348	530	[4] 1,670	----

[2] Period ended earlier than Saturday.
[4] 5-year median 1940–44.

Anthrax: New Jersey 1. *Leprosy:* Louisiana 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended August 4, 1945

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	------	0	0	0	0	2	0	0	0	5
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	1	0	0	0
Massachusetts:												
Boston	0	0	------	0	18	1	6	6	11	0	0	27
Fall River	0	0	------	0	0	0	1	0	0	0	0	1
Springfield	0	0	------	0	1	0	1	0	3	0	0	3
Worcester	0	0	------	0	16	0	4	0	1	0	0	1
Rhode Island:												
Providence	0	0	------	1	0	0	2	0	0	0	0	4
Connecticut:												
Bridgeport	0	0	------	0	0	0	1	0	0	0	0	0
Hartford	0	0	------	0	0	0	1	0	0	0	0	1
New Haven	0	0	------	1	0	1	0	1	0	0	0	3
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	0	0	0	5	5	3	0	0	6
New York	7	2	------	2	21	10	34	35	23	0	7	147
Rochester	0	0	------	0	1	0	2	14	3	0	0	22
Syracuse	0	0	------	0	0	0	1	0	0	0	0	35
New Jersey:												
Camden	1	0	------	0	0	0	1	0	0	0	0	1
Newark	0	0	------	0	3	0	4	1	0	0	3	25
Trenton	0	0	------	0	0	0	2	21	0	0	0	8
Pennsylvania:												
Philadelphia	1	0	1	0	44	1	13	8	7	0	2	100
Pittsburgh	0	0	1	1	0	0	6	0	8	0	0	20
Reading	0	0	------	0	0	0	1	0	1	0	0	0
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	------	0	2	0	8	0	3	0	0	11
Cleveland	0	0	------	1	1	1	5	1	6	0	1	54
Columbus	0	0	------	0	1	1	0	2	4	0	0	8
Indiana:												
Fort Wayne	0	0	------	0	0	0	0	0	0	0	1	0
Indianapolis	0	0	------	0	2	0	2	0	1	0	0	5
South Bend	1	0	------	0	0	0	0	0	0	0	0	0
Terre Haute	0	0	------	0	0	0	1	0	1	0	0	0
Illinois:												
Chicago	1	0	------	0	70	1	19	5	14	0	0	77
Springfield	0	0	------	0	1	0	0	0	1	0	0	0
Michigan:												
Detroit	3	0	------	0	33	3	6	2	10	0	0	55
Flint	0	0	------	0	3	0	1	0	8	0	0	0
Grand Rapids	0	0	------	0	1	0	0	0	0	0	0	0
Wisconsin:												
Kenosha	0	0	------	0	0	0	0	0	0	0	0	0
Milwaukee	0	0	------	0	6	1	2	0	7	0	0	0
Racine	0	1	------	0	0	0	0	0	0	0	0	6
Superior	0	0	------	0	0	0	0	0	1	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	1	0	0	0	4	0	0	0
Minneapolis	1	0	------	1	0	0	2	1	4	0	0	2
St. Paul	1	0	------	0	1	0	3	0	1	0	0	7
Missouri:												
Kansas City	0	0	------	0	0	0	2	1	5	0	0	1
St. Joseph	0	0	------	0	0	0	0	0	2	0	0	0
St. Louis	0	3	------	0	10	1	6	2	3	0	2	17
North Dakota:												
Fargo	0	0	------	0	0	0	0	0	0	0	0	0

City reports for week ended August 4, 1945—Continued

	Diphtheria cases	Encephalitis, infections, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	2	0	------	0	0	1	0	0	1	0	0	0
Kansas:												
Topeka	0	0	------	0	0	0	2	1	0	0	0	4
Wichita	0	0	------	0	0	0	4	0	1	0	0	0
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	1	0	0	1	0	0	0	1
Maryland:												
Baltimore	6	0	------	0	0	0	7	1	5	0	0	45
Cumberland	0	0	------	0	0	0	0	0	0	0	0	3
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	------	0	0	1	3	3	7	0	0	16
Virginia:												
Lynchburg	0	0	------	0	0	0	1	0	0	0	1	1
Richmond	0	0	------	0	0	0	1	16	0	0	0	1
Roanoke	1	0	------	0	0	0	0	0	0	0	0	0
West Virginia:												
Wheeling	0	0	------	0	0	0	0	0	0	0	0	2
North Carolina:												
Raleigh	0	0	------	0	0	0	0	0	0	0	0	2
Wilmington	1	0	------	0	0	0	1	0	1	0	0	3
Winston-Salem	1	0	------	0	0	0	0	0	1	0	0	10
South Carolina:												
Charleston	0	0	------	0	0	0	1	0	0	0	0	0
Georgia:												
Atlanta	0	0	------	0	0	0	5	1	2	0	0	0
Brunswick	0	0	------	0	1	0	0	0	0	0	0	0
Savannah	0	0	------	0	0	0	0	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	3	1	3	2	8	3	1	0	0	13
Nashville	0	0	------	0	0	0	1	3	0	0	0	9
Alabama:												
Birmingham	0	0	1	0	0	1	1	3	0	0	0	2
Mobile	0	0	------	0	0	0	0	0	3	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	0	0	1	0	1	0	0	0
Louisiana:												
New Orleans	3	0	------	0	4	1	4	1	0	0	0	1
Shreveport	2	0	------	0	0	0	2	3	0	0	1	0
Texas:												
Dallas	4	0	------	0	1	0	1	0	3	0	0	10
Galveston	0	0	------	0	0	0	0	2	0	0	0	0
Houston	4	0	------	0	0	2	5	6	3	0	1	5
San Antonio	0	0	------	0	0	1	0	2	0	0	0	1
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	------	0	0	0	0	0	1	0	0	0
Helena	0	0	------	0	0	0	0	0	0	0	0	0
Missoula	0	0	------	0	1	0	0	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	1	0	2	0	3	0	3	3	4	0	0	34
Pueblo	2	0	------	0	1	0	2	0	0	0	0	2
Utah:												
Salt Lake City	0	0	------	0	16	0	4	2	1	0	0	11

City reports for week ended August 4, 1945—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	1	0	------	0	32	1	2	0	1	0	0	9
Spokane	0	0	------	0	2	0	0	1	0	0	0	18
Tacoma	0	0	------	0	8	0	3	0	0	0	0	2
California:												
Los Angeles	3	0	1	1	32	0	2	3	20	0	0	43
Sacramento	0	0	------	0	3	0	1	1	2	0	0	3
San Francisco	1	0	------	0	47	3	7	4	8	0	0	9
Total	48	6	9	9	391	34	214	167	202	0	19	912
Corresponding week, 1944	37	------	14	8	299	------	244	------	207	0	25	600
Average, 1940–44	39	------	24	[1] 6	[2] 516	------	[1] 238	------	205	0	36	1,115

[1] 3-year average, 1942–44.
[2] 5-year median, 1940–44.

Anthrax.—Cases: Camden, 1.
Dysentery, amebic.—Cases: New York, 3; Los Angeles, 1.
Dysentery, bacillary.—Cases: Detroit, 1; Charleston, S. C., 9: Nashville, 1.
Dysentery, unspecified.—Cases: St. Paul, 4: Richmond, 1; San Antonio, 22.
Rocky Mountain spotted fever.—Cases: Richmond, 3.
Tularemia.—Cases: San Antonio, 1.
Typhus fever, endemic.—Cases: Wilmington, N. C., 1; Atlanta, 1; Savannah, 8; Birmingham, 1; Mobile, 5, New Orleans, 2; Shreveport, 1; Houston, 11; San Antonio, 3.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1943, 34,190,900)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	0.0	0.0	0.0	5.3	92	5.3	42.0	23.6	42	0.0	0.0	118
Middle Atlantic	4.2	0.9	0.9	1.4	32	5.1	31.9	38.9	21	0.0	5.6	168
East North Central	3.0	0.6	0.0	0.6	73	4.3	26.8	6.1	34	0.0	1.2	131
West North Central	8.0	6.0	0.0	2.0	24	4.0	37.8	9.9	42	0.0	4.0	62
South Atlantic	15.7	0.0	0.0	0.0	3	1.7	33.1	38.3	28	0.0	1.7	146
East South Central	0.0	0.0	23.6	5.9	18	17.7	59.0	53.1	24	0.0	0.0	142
West South Central	37.3	0.0	0.0	0.0	14	11.5	37.3	40.2	20	0.0	5.7	49
Mountain	23.8	0.0	15.9	0.0	167	0.0	71.5	39.7	48	0.0	0.0	373
Pacific	7.9	0.0	1.6	1.6	196	6.3	23.7	14.2	49	0.0	0.0	133
Total	7.3	0.9	1.4	1.4	60	5.2	32.7	25.5	31	0.0	2.9	139

PLAGUE INFECTION IN KERN AND SANTA CLARA COUNTIES, CALIF.

Under date of August 2, plague infection was reported proved on July 31 in a pool of 200 fleas and 87 lice from 35 ground squirrels, *C. beecheyi*, shot on the east side of Castair Lake, 1½ miles east and ½ mile north of Lebec, Kern County, Calif., and, under date of August 7, to have been proved on August 3 in a pool of 150 fleas from 35 ground squirrels, same species, shot 5 miles east and 1½ miles north of Gilroy, Santa Clara County, and submitted to the laboratory on July 16.

TERRITORIES AND POSSESSIONS

Virgin Islands of the United States

Notifiable diseases—April–June 1945.—For the months of April, May, and June 1945, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	April	May	June	Disease	April	May	June
Chickenpox	2	2	1	Schistosomiasis		1	
Gonorrhea	13	10	15	Syphilis	11	54	10
Granuloma inguinale		1	2	Tuberculosis		6	2
Hookworm disease	6	3	2	Typhoid fever			1
Measles	40	97	2	Typhus fever	2	2	
Pellagra	1			Vincent's infection			1

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended July 21, 1945.—During the week ended July 21, 1945, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		17	2	71	104	41	18	72	41	366
Diphtheria		5	4	45	12	1	2			69
Dysentery:										
Bacillary				4					9	13
Unspecified					4					4
German measles		2		2	8		1	24	5	42
Influenza		2			14	1			10	27
Measles		1		41	125	6	9	22	59	263
Meningitis, meningococcus				3				1		4
Mumps		4		42	58	14	3	20	23	164
Poliomyelitis		1			3	1		1	4	10
Scarlet fever		2	1	95	53	11	1	8	13	184
Tuberculosis (all forms)		5	7	124	71	8	1	2	15	233
Typhoid and paratyphoid fever				10	2	1				13
Undulant fever				1						1
Venereal diseases:										
Gonorrhea		28	37		155	45	31	53	95	444
Syphilis		13	7		78	13	6	15	36	168
Whooping cough		3	33	108	29	3		7	3	186

CHINA

Notifiable diseases—April 1945.—During the month of April 1945, certain notifiable diseases have been reported by the Army Medical Administration, Health Department of the Board of Supplies and Transport, the Chinese Red Cross Medical Corps and the National Health Administration of China, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	485	33	Scarlet fever	11	
Cholera	2		Smallpox	220	17
Diphtheria	20		Typhoid fever	388	12
Dysentery, unspecified	856	8	Typhus fever	394	13
Relapsing fever	983	15			

NEW ZEALAND

Notifiable diseases—4 weeks ended July 14, 1945.—During the 4 weeks ended July 14, 1945, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	16	1	Ophthalmia neonatorum	1	
Diphtheria	112	3	Puerperal fever	3	
Dysentery, bacillary	30	4	Scarlet fever	522	
Erysipelas	20		Tetanus	1	
Food poisoning	2		Tuberculosis (all forms)	167	50
Influenza	1	1	Typhoid fever	4	
Lethargic encephalitis	1	1	Undulant fever	4	
Malaria	30				

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; P, present]

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

Place		January–May 1945	June 1945	July 1945—week ended—			
				7	14	21	28
ASIA							
China:							
Kweichow Province—Kweijang	C				12		
Szechwan Province—							
Chengtu	C		P		3		3
Chungking	C		8,000				
Hsin Chiaco	C		1				
Hsin Kai Shih	C		1				
Kiang Pei	C		1				
Kweyang	C		26				
Nei Kiang	C		200				
Pi Shan	C		40				
Yunnan Province	C		P				
India	C	75,859					
Bombay	C	37	9	6			
Calcutta	C	3,540	663				
Cawnpore	C	50	70				
Chittagong	C	15	2				
Delhi	C	11	46				
Madras	C	49					
Vizagapatam	C	13					
Indochina: Cochinchina	C	P					

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		January-May 1945	June 1945	July 1945—week ended— 7	14	21	28
AFRICA							
Algeria	C	[1] 12					
Basutoland	C	4					
Bechuanaland	C	7					
Belgian Congo	C	6	2	1		1	
British East Africa:							
Kenya	C	5	[2] 6			13	
Uganda	C	4	2				
Egypt	C	113	59				
Ismailiya	C	72				5	2
Port Said	C	20	33	3		3	6
Suez	C	10	6	1	2		
French West Africa	C	5					
Dakar	C	1					
Madagascar	C	110	2				
Morocco (French)	C	231	270			[3] 101	
Senegal	C	54					
Tunisia	C	3					
Union of South Africa	C	7					
ASIA							
China:							
Foochow	C		P				
Yunnan Province [4]	C			P			
India	C	17,662					
Iraq	C	34					
Palestine	C	12					1
Plague-infected rats		17					
EUROPE							
France: Corsica—Ajaccio	C	2	4		2		
Great Britain: Malta	C		4		[5] 8	[5] 4	2
Portugal: Azores	C	3	2	1	2		
Spain: Canary Islands	C	1					
NORTH AMERICA							
Canada: Alberta Province: [6]							
Plague-infected squirrels			1	1			
SOUTH AMERICA							
Argentina:							
Buenos Aires Province—Plague-infected rats		2					
Santiago del Estero Province	C	1					
Bolivia: Santa Cruz Department	C	[7] 75					
Ecuador:							
Chimborazo Province	C	6					
Loja Province	C	2					
Peru:							
Ancash Department	C	1					
Ica Department	C	[8] 3					
Lambayeque Department	C	12					
Libertad Department	C	10					
Lima Department	C	10					
Otuzco Department	C	3					
Piura Department	C	4					
OCEANIA							
Hawaii Territory	D		[9] 1				
Plague-infected rats [7]		9					

[1] Includes 4 cases of pneumonic plague.
[2] Includes 5 suspected cases.
[3] For the period July 1–20, 1945.
[4] Information dated July 5, 1945, stated that from April 1944 to May 1945, 85 deaths from plague had occurred in the mountainous region south of Kunming, China.
[5] Includes 2 suspected cases.
[6] During the month of June 1945, plague infection in fleas was reported in Alberta Province. For the week ended July 28, 1945, plague infection was also reported in 6 pools of fleas in Alberta Province, Canada.
[7] Includes 6 suspected cases.
[8] Includes 1 suspected case.
[9] Previously reported as a case, death occurring on June 2, 1945.

SMALLPOX

[C indicates cases; P, present]

Place		January–May 1945	June 1945	July 1945—week ended— 7	14	21	28
AFRICA							
Algeria	C	135	18				
Angola	C	54					
Basutoland	C	306					
Belgian Congo	C	3,905	882				
British East Africa:							
Kenya	C	134	20			10	
Nyasaland	C	9					
Tanganyika	C	2,724	129	71			
Uganda	C	560	109	11			
Cameron (French)	C	318	16			[1] 40	
Dahomey	C	100	3			[1] 2	
Egypt	C	929	79				
French Equatorial Africa	C	1,515	11			5	
French Guinea	C	1,339	84			[1] 52	
French West Africa: Dakar District	C	365	19			[1] 6	
Gambia	C	69	12	1			
Gold Coast	C	26	3				
Ivory Coast	C	345	77			[1] 36	
Mauritania	C	74	6				
Morocco (French)	C	305	165			[1] 434	
Nigeria	C	3,116					
Niger Territory	C	401	45			[1] 11	
Rhodesia, Northern	C	609	147	4			
Senegal	C	421	26			[1] 36	
Sierra Leone	C	12					
Sudan (Anglo-Egyptian)	C	[2] 3					
Sudan (French)	C	1,371	251			[1] 195	
Togo (British)	C	25					
Togo (French)	C	418	39			[1] 25	
Tunisia	C		2				
Union of South Africa [3]	C	959	81	P		P	
ASIA							
Arabia	C	19	3				
Ceylon	C	[4] 348	31	9		19	9
China: [5] Kunming (Yunnan Fu)	C	7					
India	C	169,915					
Iran	C	351					
Iraq	C	21	15				
Syria and Lebanon	C	6					
Turkey (see Turkey in Europe).							
EUROPE							
Belgium	C	1					
France	C	2	2	22			
Great Britain: Scotland	C	[2] 2					
Italy	C	1,540					
Sicily	C	4	1				
Portugal	C	16	3				
Spain	C	27					
Canary Islands	C	1					
Turkey	C	281	8				2
NORTH AMERICA							
Canada	C	6					
Guatemala	C	4					
Honduras	C	8					
Mexico	C	710					
Nicaragua	C	123					
SOUTH AMERICA							
Bolivia	C	293			200		
Brazil	C	[6] 59	[6] 25				
Columbia	C	161	50				
Ecuador	C	21					
Paraguay	C	1					
Peru	C	27					
Uruguay	C		19				
Venezuela	C	[6] 464	[6] 25			[6] 12	

[1] For the period July 1–20, 1945.
[2] Imported.
[3] For the week ended June 30, 1945, cases of virulent smallpox were reported in the Union of South Africa.
[4] Includes some cases of chickenpox.
[5] For the months of March and April 1945, 688 cases of smallpox were reported in all of China.
[6] Includes cases of alastrim.

TYPHUS FEVER *

[C indicates cases; P, present]

Place		January–May 1945	June 1945	July 1945—week ended— 7	14	21	28
AFRICA							
Algeria	C	841	93				
Basutoland	C	50					
Belgian Congo [1]	C	109	22				
British East Africa: Kenya	C	24	3				
Egypt	C	13,004	1,535				
French West Africa: Dakar [1]	C	6	5				
Libya: Tripolitania	C	17					
Morocco (French)	C	4,154	935			[2] 829	
Nigeria	C		P				
Rhodesia, Northern	C	11					
Sierra Leone	C	1					
Tunisia	C	365	10			[2] 4	
Union of South Africa	C	459	P	P		P	
ASIA							
China: [3] Kunming (Yunnan Fu)	C	36	1				
India	C	21	1				
Iran	C	585					
Iraq	C	156	50	3	2	9	6
Palestine [1]	C	35	2				
Syria and Lebanon	C	12					
Trans-Jordan	C	42					
Turkey (see Turkey in Europe).							
EUROPE							
Albania	C	100					
Austria	C		30	16			
Belgium	C	106	37	2			
Bulgaria	C	928					
Denmark	C	114	30				
France	C	15	142		27		
Germany	C		7,579	185			
Gibraltar	C	4					
Great Britain	C	[4] 14	7				
Malta and Gozo [1]	C	9					
Greece	C	46	14				
Italy	C	98	20				
Netherlands	C	15	1				
Portugal	C	41	2				
Rumania	C	[5] 7,831					
Slovakia	C	230	25				
Spain	C	13					
Sweden	C	192					
Turkey	C	1,978	225	16	42	20	24
Yugoslavia	C	1,194					
NORTH AMERICA							
Canada [1]	C	1					
Costa Rica	C	3	2		1		
Cuba [1]	C	2	1				
Guatemala	C	802					
Jamaica	C	16	5				
Mexico	C	703					
Panama (Republic)	C	1	2				
Puerto Rico [1]	C	49	21	13	15	5	9
Virgin Islands [1]	C	8					
SOUTH AMERICA							
Bolivia	C	293					
Brazil	C	1					
Chile [1]	C	257	47				
Colombia	C	20					
Curacao	C	1					
Ecuador	C	195	34				
Peru	C	232					
Venezuela [1]	C	58	17				
OCEANIA							
Australia [1]	C	[6] 53	18				
Hawaii Territory [1]	C	39	13	1	1	1	3

*Reports from some areas are probably murine type, while others probably include both murine and louse-borne types.

[1] Reports cases as murine type.

[2] For the period July 1–20, 1945.

[3] For the months of March and April, 1945, 861 cases of typhus fever were reported in all of China.

[4] Includes imported cases.

[5] For the period Jan. 1–20, 1945.

[6] Revised figures.

YELLOW FEVER

[C indicates cases; D, deaths]

Place	January–May 1945	June 1945	July 1945—week ended—			
			7	14	21	28
AFRICA						
Gold Coast:						
Nsawam—C		[1] 2		[2] 1		
Takoradi—C		1				
Winneba—C		1				
Ivory coast:						
Gaoua—C		1				
Guiglo—C	1					
Sierra Leone: Moyamba—C		2				
SOUTH AMERICA						
Brazil:						
Goias State—D	76					
Minas Geraes State—D	25					
Colombia: Santander del Norte Department—D	7					
Peru:						
Cuzco Department—C	2					
Loreto Department—C	1					
Venezuela:						
Bolivar State—C	1					
Merida State—C					2	
Tachira State—D	2	12		6		
Zulia State—C				3	1	2

[1] Includes 1 suspected case.
[2] Suspected.

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THE TOXICOLOGY OF BERYLLIUM[1]

A Review

This investigation was undertaken because of the conflicting opinions relating to the toxicity of beryllium and because of the rapidly growing importance of this metal in industry. A study was made of the effects produced by the administration of beryllium compounds by mouth, by intraperitoneal injection and by inhalation. Beryllium oxide, carbonate, phosphate, chloride, sulfate, nitrate, oxyfluoride, hydroxide, potassium beryllium sulfate, and the mineral beryl (beryllium aluminum silicate) were chosen for experimental investigation. Guinea pigs, white rats, white mice, rabbits, and dogs were used as experimental animals. Symptoms of poisoning were sought; morbidity and mortality figures were collected; blood changes were studied; distribution of beryllium in the tissues following the various modes of exposure were determined; the irritant effect of certain beryllium salts on the skin was observed and the pathological changes resulting from exposure of animals to the various beryllium compounds were investigated. Comparison was made of the toxicities of beryllium, magnesium and zinc sulfates on intraperitoneal injection into mice.

[1] The toxicology of beryllium. By Frances Hyslop, Edward D. Palmes, William C. Alford, A. Ralph Monaco, and Lawrence T. Fairhall. National Institute of Health Bulletin No. 181. Government Printing Office, 1943. For sale by the Superintendent of Documents, Washington 25, D. C. Price 15 cents.

In addition to the exposure of animals to the dust of various beryllium compounds, animals were exposed to the fumes produced during the electrolytic deposition of beryllium at high temperatures.

No particular toxicity for beryllium was established as a result of this study. Animals tolerated large concentrations of various beryllium compounds over long periods of time with no indication of toxicity. No evidence of blood dyscrasia was apparent nor any consistent pathological change that could be attributed to beryllium. On the other hand certain beryllium salts which hydrolyse extensively, such as the sulfate and fluoride, were found to be irritant both to the skin and on inhalation.

THE TRIATOMINAE OF NORTH AND CENTRAL AMERICA AND THE WEST INDIES AND THEIR PUBLIC HEALTH SIGNIFICANCE [1]

A Review

A detailed account of the biology, systematics, and disease relationships of members of the Reduviid subfamily Triatominae from the area indicated. Life histories are given of seven North American species and a complete summary is given of host records.

The higher classification of the subfamily is revised with a new arrangement into 4 tribes. The tribe Triatomini is further subdivided into 12 species groups. These groups comprise closely allied species or subspecies. The principal subspecies complexes are *sanguisuga, lecticularius, rubida, protracta,* and *phyllosoma.* The various elements in each of these polytypic species show geographical replacement and are differentiated by relatively minor characters.

Keys are given to some eggs and nymphs and to adults of all of the known species. Each species is described, illustrated, and a summary is given of its distribution. Complete synonymy is included for each species. Four new tribes, one new genus, one new species, and five new subspecies are proposed.

A brief summary of the latest information on Chagas' disease is included, together with a discussion of the relation of triatomine bugs to the disease. Information on the infection rates in vectors and in animal reservoirs is summarized in two tables. Considering the relatively high rate of infection in vectors and in animal reservoirs in the southwestern United States it is considered likely that human cases actually have occurred but that the Mexican border population failed to recognize or report them.

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[1] The Triatominae of North and Central America and the West Indies and their public health significance. By Robert L. Usinger. Pub. Health Bull. No. 288. Government Printing Office, 1944. For sale by the Superintendent of Documents, Washington 25, D. C. Price 25 cents.

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