Public Health Reports

Vol. 60 • MARCH 16, 1945 • *No. 11*

FURTHER STUDIES ON THE PHARMACOLOGIC ACTION OF 2,2 BIS (P-CHLOROPHENYL) 1,1,1 TRICHLORETHANE (DDT) [1]

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In a previous article (1) experiments were reported on the acute and chronic toxicity of DDT in several species of laboratory animals. The data indicated (1) that the substance was quite toxic, (2) that its effect was cumulative, (3) that its principal actions were on the central nervous system and the liver, and (4) that the practical usefulness of the compound combined with its toxicity merited a thorough search for means of controlling incipient poisoning. A method was suggested for the estimation of DDT as organic chlorine in the tissues and body fluids which when applied to a rabbit in acute poisoning yielded appreciable amounts of the substance in the blood, liver, kidney, central nervous system, bile, and urine.

The present experiments are an extension of the foregoing observations, designed to determine more accurately the extent of cumulative action of the substance and the value of the chemical test of organic chlorine determination in detecting early poisoning. Experiments were also made on the influence of certain dietary deficiencies on the chronic toxicity of DDT, on the antidotal value of hypnotics in acute poisoning, and on the condition of the vasomotor and respiratory centers and the central nervous system reflexes in the terminal stages of DDT poisoning in cats.

CUMULATIVE ACTION, TISSUE DISTRIBUTION, AND ELIMINATION OF DDT

Experiments in rabbits.—It was shown previously (*1*) that when DDT is given to rabbits orally in olive oil, in daily doses of 50 mg. per kg., the animals usually die in from 15 to 25 days, with characteristic central nervous system symptoms. At necropsy coagulation necrosis and hyaline degeneration of the liver were prominent features.

[1] From the Division of Physiology, National Institute of Health.

Since then we have repeatedly observed similar effects from daily doses of 25 mg. per kg., or about one-twentieth of the acute minimum fatal dose in this species. With these small doses there may be no evident, or only very slight, symptoms referable to the central nervous system. The liver lesions, however, are quite uniform. It was of interest, therefore, to determine the extent of DDT elimination in the urine in this type of chronic poisoning. Table 1 shows the results of two such typical experiments. In one case, the daily elimination of DDT gradually increased from 0.6 mg. to 4.0 mg., when the animal died, and from 1.4 mg. to a maximum of 5.9 mg. in another.[2] This is equivalent to a total estimated output of about

TABLE 1.—*Urinary elimination of DDT in rabbits given 25 mg. per kg. per day. Oral administration in olive oil. Chronic poisoning*

Day of treatment	Rabbit No. 2 (2.0 kg.)		Rabbit No. 5 (2.0 kg.)	
	Amount of urine eliminated (cc.)	Amount of DDT eliminated (mg.)	Amount of urine eliminated (cc.)	Amount of DDT eliminated (mg.)
1	110	0.6	184	1.4
2	112	2.8		
3	193	3.0	258	2.6
4	83	4.2	91	3.8
5–6	51	4.0	242	3.8
7	Died		97	5.4
8–9			192	8.0
10			61	3.6
11–13			252	
14			95	4.6
15–18			367	19.0
19–21			314	13.4
22–25			452	23.8
26–29				
30–33			284	10.6
34–38			589	24.0
Average output of DDT per day (mg.)		2.4		4.2
Percent of intake excreted		4.9		8.0

4.9 percent of the intake in one case and 8 percent in the other. Figure 1 shows the cumulative urinary elimination of DDT in rabbit No. 5 calculated as percent of the amount administered during the experimental period of 38 days. At first there is a gradual increase in the rate of elimination, soon to be followed by a fairly constant level maintained during the greater part of the experiment. Towards the end of the experimental period an estimate was also made of the DDT eliminated in the feces, and it will be noted that with the small daily dose of 25 mg. per kg. relatively less was being eliminated in the feces than in the urine.

The urinary elimination of DDT in rabbits in acute poisoning, following the administration of a single oral dose, is shown in table 2.

[2] The estimation of DDT is based on the quantitative determination of organically bound chlorine reducible by metallic sodium in absolute alcohol as previously described (*1*), and while it is not known with certainty whether it represents DDT or some degradation product thereof, it may be considered provisionally as DDT until more specific information on this subject becomes available.

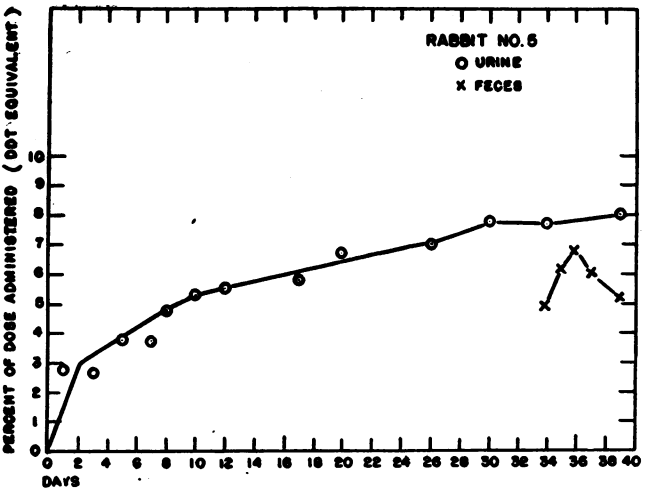

FIGURE 1.—Urinary elimination of DDT, calculated as percent of dose administered, in a rabbit receiving 25 mg. per kg. daily. Lower curve shows fecal elimination of DDT over a 5-day period.

Examination of the data indicates that the elimination may persist for 10 days or longer, though the bulk of the excretable material is eliminated in 5 to 6 days. The peak of elimination is reached on the second or third day. The amount eliminated in the urine varied in the five experiments from 1.8 to 5.1 percent of the dose administered, and the highest concentration of DDT attained in the urine varied from 10 to 65 mg. percent. In the small group of animals recorded, the urinary elimination of DDT seems to be related to the volume of urine output, which suggests that diuresis may favor its elimination from the body. Figure 2 shows the cumulative urinary excretion of DDT in the five experiments, expressed as percent of the dose administered.

TABLE 2.—*Elimination of DDT in rabbits. Oral administration in olive oil. Acute poisoning*

Rabbit number	Weight (kg.)	Dose (mg. per kg.)	Urinary elimination on successive days in mg.													Total elimination (percent of intake)	Highest concentration (mg. percent)	Average daily urine volume (cc.)
			1	2	3	4	5	6	7	8	9	10	11	12	13			
1	2.1	400	3.0	4.2	10.0	2.4	0.3	0.1	0.4	----	0.4	----	----	0.2	----	2.6	10.0	49
1A	2.6	400	3.6	----	12.6	3.5	2.4	1.6	1.2	----	----	----	----	----	----	2.4	17.3	43
2	2.0	400	----	12.0	16.2	7.8	----	3.0	.8	0.6	.5	----	0.2	----	----	5.1	12.3	64
3	3.5	400	.6	15.0	5.6	2.8	1.2	----	----	----	----	----	----	----	----	1.8	65.2	36
4	2.0	300	1.8	13.6	7.0	4.8	----	1.4	.5	----	----	----	----	----	----	4.6	13.6	84
			Fecal elimination, mg.															
1A	2.6	400	319	200	----	----	----	2.6	----	0.8	----	----	----	----	----	50.3	----	----
3	3.5	400	248	168	24	----	----	----	----	----	----	----	----	----	----	31.4	----	----
6	3.7	400	----	144	----	223	7.2	----	11.2	----	2.4	1.0	----	1.4	0.4	26.3	----	----
8	3.9	300	----	3.0	21.8	----	27.4	----	6.8	----	----	4.0	----	2.4	.6	5.6	----	----

Data are also given in table 2 and figure 3 on the elimination of DDT in the feces. This varied from a little over 5 to 50 percent of the dose administered, and obviously represents the unabsorbed DDT as well as that which is excreted in the bile and the alimentary tract. Here again it is interesting to note the elimination may persist

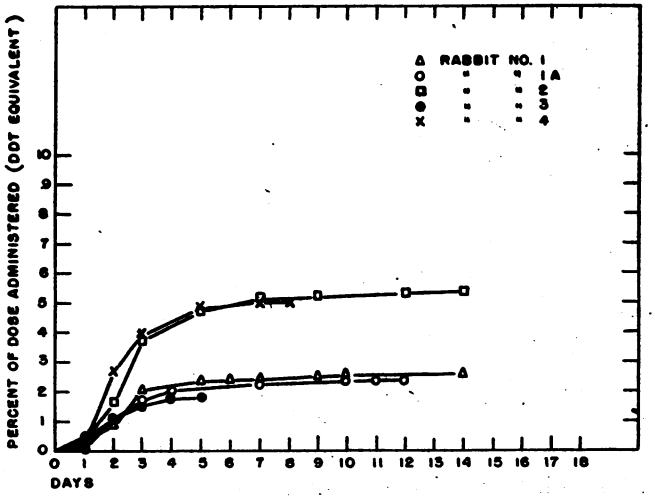

FIGURE 2.—Urinary elimination of DDT, calculated as percent of dose administered, in acute poisoning in the rabbit.

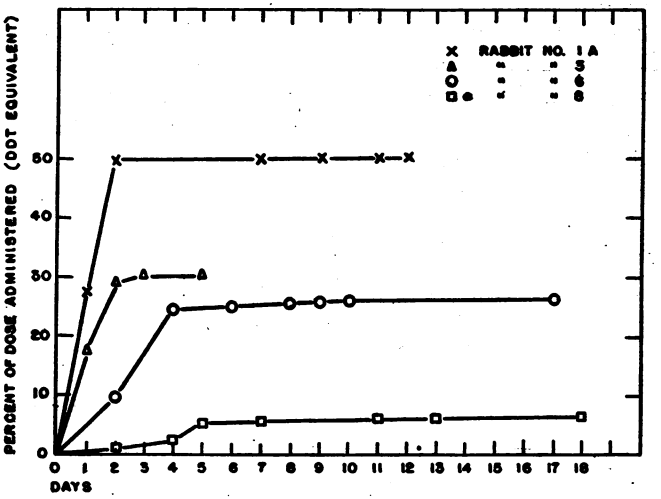

FIGURE 3.—Fecal elimination of DDT, calculated as percent of dose administered, in acute poisoning in the rabbit.

for 2 weeks while the peak of elimination is attained within the first few days. This relative elimination of DDT in the feces as compared with the urinary excretion appears to be much greater with large doses, as illustrated in figure 4, than with small daily doses as shown in figure 1. Obviously, absorption is more complete in the latter

instance. The irregularity of absorption of DDT in rabbits, when given in large doses, apparently explains the great variation in individual susceptibility.

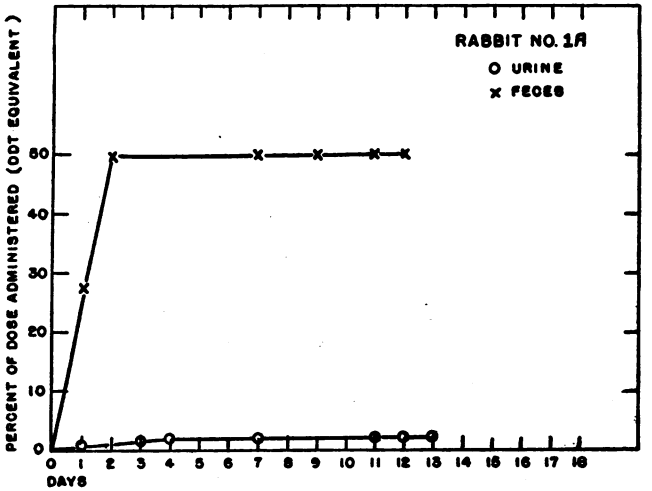

FIGURE 4.—Relative elimination of DDT in the feces and urine in a rabbit receiving a single dose of 400 mg. per kg. Apparently much of the administered DDT failed to be absorbed.

The distribution and storage of DDT in the tissues of the rabbit, in acute and chronic poisoning, is shown in table 3. The concentration of the substance in the blood is usually low. The highest concentration is usually to be found in the bile. The liver, kidney, and central nervous system contained variable and appreciable amounts of DDT, usually more than was found in the blood at the same time. The substance can be demonstrated in some of the tissues as long as 15 days after its administration. The high concentration in the liver and bile suggests that the liver as well as the kidney may be concerned with the elimination of this substance.

TABLE 3.—*Distribution and storage of DDT in the tissues, and its excretion in the bile, in rabbits. Oral administration in olive oil.*

Rabbit number	Weight (kg.)	Dose (mg. per kg.)			Time interval after last dose	DDT (mg. percent)				
		Individual	Number	Total		Blood	Liver	Kidney	Central nervous system	Bile
205	2.7	50	33	1,650	2 hours	10.0	7.8	12.7	3.6	11.5
197	2.6	100	13	1,300	2 hours	3.2	18.0	12.8	13.2	53.4
210	1.4	500	1	500	5 hours	4.0	------	------	------	33.3
212	1.4	300	1	300	26 hours	4.0	------	------	------	------
203	2.7	100	15	1,500	19 hours	------	------	------	8.4	21.4
204	3.3	50	46	2,300	18 hours	------	14.0	15.2	6.2	26.7
198	1.8	100	10	1,000	24 hours	trace	28.0	8.0	15.7	------
9	3.1	400	1	400	4 days	1.3	6.4	5.6	2.5	16.0
5	2.6	400	1	400	10 days	trace	6.9	trace	5.5	8.0
7	3.8	400	1	400	15 days	trace	2.3	4.5	trace	7.9

Summarizing the results of the experiments in rabbits, it may be concluded that DDT is demonstrable in the blood, the tissues, the bile, and the urine in acute and chronic poisoning; that the amount eliminated in the urine increases progressively for a while and then attains a plateau in chronic poisoning, while in acute poisoning it reaches a peak in from 2 to 3 days following its administration, but may persist in small amounts for as long as 2 weeks (curves A and B, fig. 5); and that the amount eliminated in the urine is only a small percentage of the dose administered and bears no constant quantitative relationship thereto. The relatively high fecal elimination of DDT indicates that at best only part of the substance administered orally is absorbed.

Experiments in cats.—We have previously (*1*) called attention to the marked persistence of action of DDT in cats with reference to the effects on the central nervous system. Tremors and twitchings, with progressive spasticity, may be followed by extensor rigidity of several days' duration after a single toxic dose of 300 mg. per kg. It was of interest to ascertain the smallest daily dose of DDT capable of producing the neurological symptoms and to determine the urinary concentration of DDT in relation to the onset of the symptoms. The cats were housed in suitable metabolism cages, they were fed a diet of ground lean beef, and the drug was administered as a 1- to 5-percent solution in olive oil thoroughly incorporated in the meat ration. The animals were observed carefully for manifestations of toxicity and the urines were analyzed for DDT at 5-day intervals. The daily doses of DDT were 5 and 10 mg. per kg. In a few experiments larger doses of 50 mg. per kg. per day were given and the urines analyzed for additional data on the quantitative relationship of urinary excretion to intake. When the central nervous system symptoms were fully established the animals were tested for liver function by the rose bengal technique previously described (*2*), and when the neurological syndrome appeared to have reached a stage of irreversibility the animals were lightly anesthesized with ether or amytal and prepared for recording of blood pressure and respiration, and of the response following the intravenous injection of certain drugs or the stimulation of certain afferent and efferent nerves.

Table 4 shows the results of daily feeding of 5 and 10 mg. per kg. DDT, respectively, in a series of 10 cats weighing from 2.0 to 2.8 kg. Cats Nos. 1 to 6 received 5 mg. per kg. daily and cats Nos. 7 to 12 received 10 mg. per kg. per day. No detectable symptoms were seen in 4 out of 5 animals in the first group though 2 animals died after a total dose of 55 and 60 mg. per kg. had been given. It is not certain that these early deaths were due to the DDT. In one of the cats in this group, No. 6, definite neurological symptoms developed on the nineteenth day of treatment. In the second group of animals receiv-

TABLE 4.—*Urinary DDT elimination in chronic poisoning in cats analyzed at 5-day intervals*

Cat number		Period							Symptoms
		Preliminary	First	Second	Third	Fourth	Fifth	Sixth	
1	cc. per day	66	52	42	47	46	45	46	None.
	mg. DDT per day	[1] trace	0.18	0.18	0.10	0.07	------	------	
	DDT mg. percent	trace	0.30	0.32	0.25	0.21	------	------	
2	cc. per day	62	53	49	63	50	55	58	None.
	mg. DDT per day	trace	0.18	0.15	0.12	0.15	------	0.10	
	DDT mg. percent	trace	0.40	0.27	0.23	0.23	------	0.24	
3	cc. per day	70	41	51	------	------	------	------	None.[3]
	mg. DDT per day	trace	0.10	0.13	------	------	------	------	
	DDT mg. percent	trace	0.25	0.30	------	------	------	------	
4	cc. per day	78	51	58	52	------	------	------	None.[4]
	mg. DDT per day	trace	0.18	0.13	------	------	------	------	
	DDT mg. percent	trace	0.27	0.24	[3] 3.7	------	------	------	
6	cc. per day	94	20	40	64	55	67	57	19th day.
	mg. DDT per day	0	0.15	0.30	0.15	0.14	0.20	0.13	
	DDT mg. percent	0	0.66	0.60	0.25	0.26	0.40	0.23	
7	cc. per day	67	47	50	45	54	50	25	19th day.
	mg. DDT per day	trace	0.14	0.20	0.07	0.20	0.15	0.13	
	DDT mg. percent	trace	0.30	0.40	0.20	0.30	0.33	0.54	
8	cc. per day	57	40	39	47	49	45	48	11th day.
	mg. DDT per day	0	0.12	0.15	0.17	0.18	0.07	0.13	
	DDT mg. percent	0	0.30	0.32	0.36	0.43	0.20	0.28	
10	cc. per day	44	22	23	28	22	31	33	11th day.
	mg. DDT per day	0	0.20	0.15	0.15	0.20	0.30	0.10	
	DDT mg. percent	0	1.05	0.52	0.50	0.80	0.81	0.30	
11	cc. per day	68	26	29	45	50	46	59	26th day.
	mg. DDT per day	trace	0.10	0.13	0.11	------	0.22	0.20	
	DDT mg. percent	trace	0.38	0.50	0.30	------	0.48	0.33	
12	cc. per day	63	38	26	25	54	42	25	None.
	mg. DDT per day	trace	0.17	0.20	0.15	0.20	0.40	0.10	
	DDT mg. percent	trace	0.70	0.46	0.60	0.36	0.64	0.39	

[1] Normal urines extracted by our standard procedure may contain traces, not more than 0.05 mg. chlorine.
[2] Died after a total of 55 mg. per kg.
[3] Bladder specimen obtained at necropsy.
[4] Died after a total of 60 mg. per kg.

ing 10 mg. per kg. daily, neurological symptoms developed in all but one animal within 11 to 26 days, the symptoms becoming progressively worse in most of the animals. Urinary examination for DDT showed an elimination of from 0.1 to 0.4 mg. per day with an estimated concentration of from 0.2 to 1.0 mg. percent. In one instance the urinary DDT reached a concentration of 3.7 mg. percent, and this was a bladder specimen obtained at necropsy. Obviously, the urinary elimination of DDT in cats is low compared to that seen in rabbits, but the significant thing about these experiments is that DDT was present in the urine within 5 days of instituting treatment, and long in advance of any detectable signs or symptoms of poisoning.

In an effort to obtain a higher rate of DDT elimination in the urine of cats, three animals were given 50 mg. per kg. daily and the urines analyzed for several days. The results of this experiment are shown in table 5 and indicate no appreciably greater increase in the rate of elimination at the higher dosage level.

TABLE 5.—*Urinary elimination of DDT in cats receiving 50 mg. per kg. daily*

Cat number	Weight (kg.)	Day of treatment	Symptoms	Urine		
				Amount (cc.)	DDT (mg.)	Mg. percent
17	2.4	1	Slight	105	0.3	0.3
		2	Moderate	88	.2	.23
		3	....do	110	.2	.18
		4	....do	100	.3	.3
		5	Severe	66	.3	.45
		6	Severe, died	120	.3	.25
20	2.4	1	Slight	88	.4	.45
		2	Moderate	24	.2	.83
		3	Moderately severe	54	.4	.74
21	2.5	1	None	107	.2	.2
		2	....do	80	.4	.5
		3	Slight	62	.3	.5
		4	Moderate	80	.6	.75

The sharp contrast in the urinary elimination of DDT in different species is illustrated in figure 5. Curves A and B show the daily excretion of DDT in the urine of rabbits in acute and chronic poisoning, respectively, and curve C shows its elimination in a typical experiment in the cat. Curve D represents the results obtained in a single experiment in the dog which received 100 mg. per kg. daily in the meat for a period of 13 days following an initial dose of 300 mg. per kg. given by stomach tube. Emesis occurred about 3 hours after the first dose, and at irregular intervals during the subsequent course of administration. No other symptoms suggestive of DDT poisoning were seen at

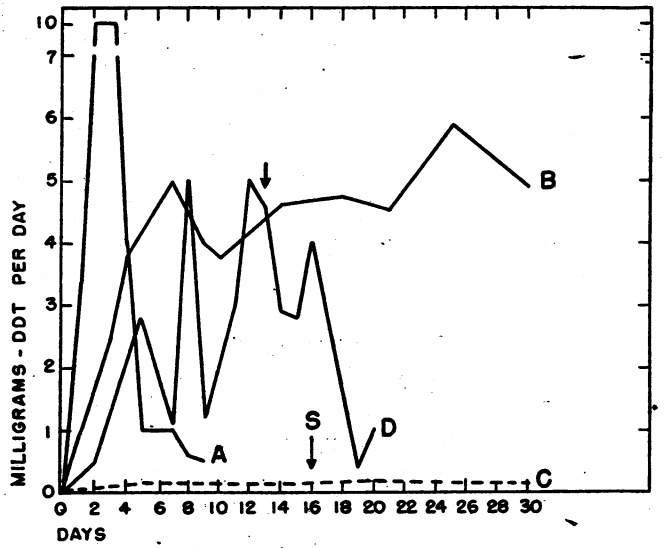

FIGURE 5.—Urinary elimination of DDT in the rabbit, cat, and dog. A. Rabbit, single dose 400 mg. per kg. in olive oil per os. B. Rabbit, 25 mg. per kg. daily. C. Cat, 10 mg. per kg. in olive oil daily. At S neurological symptoms developed. D. Dog, 10 kg. First day 300 mg. per kg. in olive oil by stomach tube (vomited) followed by 100 mg. per kg. daily in the meat to point indicated by arrow when treatment was discontinued. No symptoms were seen at any time except for occasional vomiting.

any time. Though the output of DDT in the urine (estimated as organic chlorine) fluctuated from day to day, there was nevertheless an appreciable amount excreted during the course of administration and for several days thereafter.

Analyses for DDT in the blood and tissues of chronically poisoned cats were carried out in three of the cats listed in table 4. The results of this study are summarized in table 6 and indicate a relatively higher concentration in the liver and kidneys as compared with similar tissues in rabbits. The concentration of DDT in the brain and cord of the cat is of the same order as that found in the central nervous system of the rabbit. The concentration of DDT in the blood and bile of the cat appears lower than that found in rabbits.

TABLE 6.—*DDT in the tissues of cats. Chronic poisoning*

Cat number	Dose (mg. per kg.)	Hours after last dose	DDT (mg. percent)				Bile
			Blood	Liver	Kidney	Central nervous system	
1	31×5 2×50	18	0	25.0	37.9	5.0	25.0
2	31×5 7×50	24	0.8	47.0	38.0	10.8	0
8	33×10	24	0	133.0	45.0	8.3	6.7

Liver function tests by the rose bengal technique (*2*) carried out upon a series of chronically poisoned cats at a time when the neurological syndrome had been well established showed no marked deviation from the normal. Only one animal, cat No. 1 in table 7, showed an abnormal retention of the dye. Microscopic examination of the livers obtained at necropsy showed fatty degeneration but no evidence of hyaline degeneration or liver necrosis so frequently seen in rabbits under similar experimental conditions (*3*).

TABLE 7.—*Liver function and chronic toxicity of DDT in cats*

Cat number	Weight (kg.)		Dose (mg. per kg.)	Central nervous system symptoms		Plasma rose bengal at 60 min.[1] (mg. percent)
	Initial	Final		Duration (days)	Degree	
6	3.2	2.6	42×5	30	Severe	0.23
7	2.1	2.2	45×10	30	Moderately severe	.2
10	2.4	2.2	45×10	42	---- do	.3
11	2.3	2.0	45×10	26	---- do	.23
12	2.4	1.9	31×10 11×50	10	---- do	.27
20	2.4	1.9	13×50	12	Severe	.35
21	2.5	2.0	14×50	13	Slight[2]	.35
1	2.2	2.3	31×5 2×50	2	Severe	.62
8	3.4	2.8	32×10	26	---- do	.23

[1] Plasma rose bengal in normal cats at 60' averages 0.3 mg. percent, with variations of from 0.2 to 0.4 mg. percent (*2*).
[2] Persistent vomiting and inanition.

It is evident that the cat differs from the rabbit in its response to DDT in several essentials. The neurological syndrome in the cat is more pronounced, more persistent, and is elicited by much smaller doses than in the rabbit. Liver damage, which is uniform and usually severe in the chronically poisoned rabbit, is scarcely in evidence beyond some fatty degeneration in the cat. The substance (or degradation products) is eliminated in the urine at a much higher level in the rabbit than in the cat, while the tissues of the cat appear to store more of it than do the tissues of the rabbit. Possibly the substance is not metabolized in the same manner in the two species, which may account for the differences observed.

The circulatory and respiratory responses to some typical drugs and to nerve stimulation were studied in a group of five cats in extreme poisoning, under amytal or ether anesthesia, in an effort to obtain additional information on the mode of action of the substance. Surgical anesthesia induced by ether or amytal produced complete muscular relaxation and abolished all tremors and twitchings. Afferent stimulation of the central sciatic readily restored the tremors and often elicited violent convulsive seizures which could be checked by deep anesthesia. The carotid blood pressure was within normal range, and the respiration, though accelerated and often irregular in rate and depth, was uniform under the anesthetic. The circulatory and respiratory responses to epinephrine, nicotine, pituitary, choline and histamine were typical and characteristic (see figs. 6–11). Faradic stimulation of the central sciatic invariably elicited a typical rise in blood pressure and stimulation of respiration with increase in rate and depth, as shown in figure 11. No abnormal responses were noted from stimulation of the central vagus, but stimulation of the peripheral vagus often gave subnormal responses. It was usually possible to restore the irritability of the peripheral vagus by an intravenous injection of choline as shown in figure 12. This effect, however, was evanescent, the irritability of the vagi falling off within a few minutes to be restored only by another injection of choline. It therefore appears from the available evidence that the vasomotor and respiratory centers are not deeply affected even in extremely severe poisoning and that the only abnormality found was a diminution or loss of irritability of the peripheral vagus, which seems to be a terminal manifestation, and functional in character, since it can be resensitized by choline.

Experiments on rats.—In the previous study (*1*) it was shown that the LD^{50} of DDT in rats given orally in olive oil is between 150 and 200 mg. per kg. When fed in a semisynthetic adequate diet with 18 percent protein as casein, 0.1 percent DDT was fatal in from 18 to 80 days, while 0.05 percent was survived for a period of 3 months. Since DDT produces hyaline degeneration and liver necrosis in rabbits

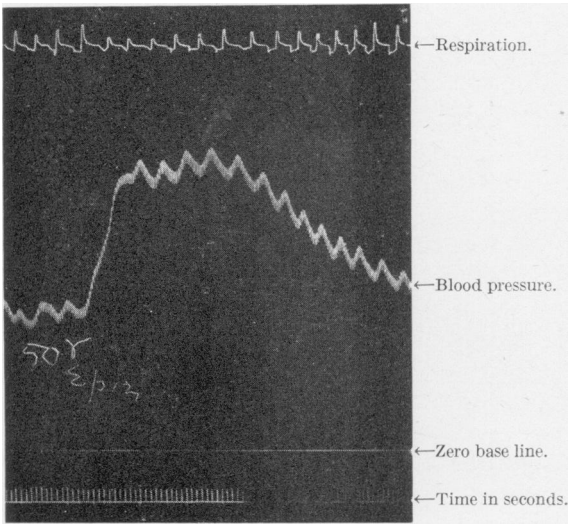

FIGURE 6.—Cat No. 6. Weight 2.4 kg. Forty-nine doses of 5 mg. per kg. given daily. Severe generalized tremors with spastic and flaccid paresis and intermittent tonic and clonic convulsions, opisthotonos, and dyspnea. Ether. Carotid blood pressure 100 mmHg. Response to intravenous injection of 0.05 mg. epinephrine.

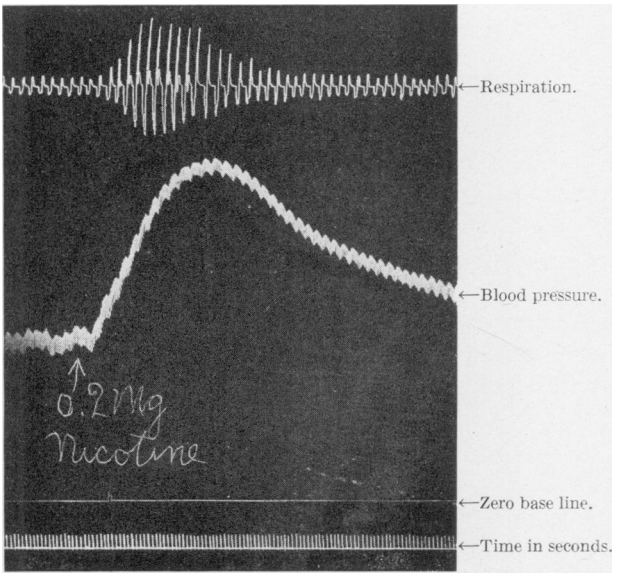

FIGURE 7.—Cat No. 11. Weight 2.0 kg. Forty-five doses of 10 mg. per kg. given daily. Neurological syndrome similar to that of cat No. 6. Ether. Blood pressure 110 mmHg. Response to intravenous injection 0.2 mg. nicotine.

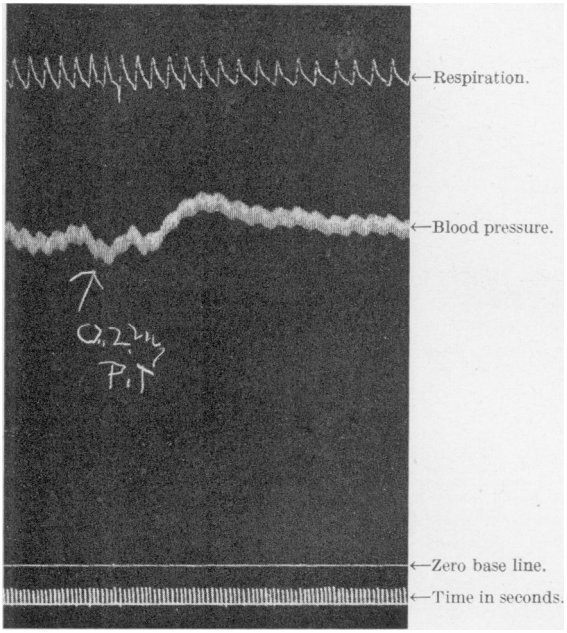

FIGURE 8.—Cat No. 20. Weight 1.9 kg. Thirteen doses of 50 mg. per kg. given daily. Severe poisoning. Amytal anesthesia. Blood pressure 160 mmHg. Response to intravenous injection of 0.2 mg. standard posterior pituitary.

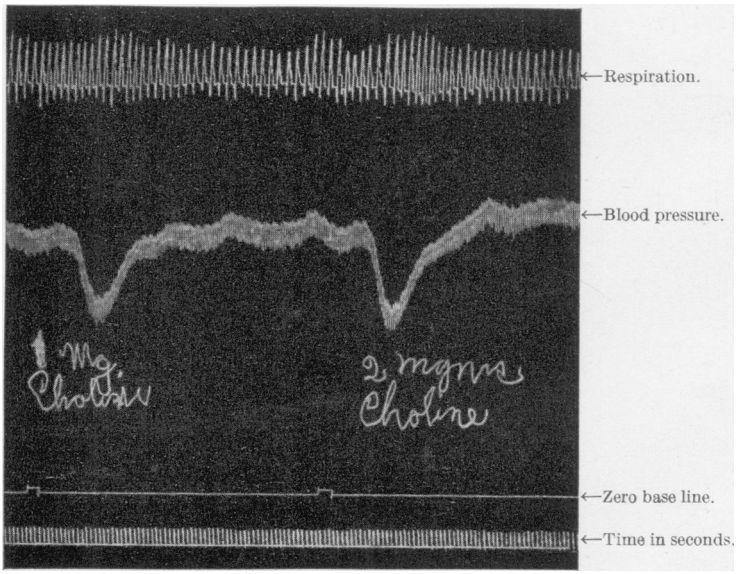

FIGURE 9.—Cat No. 11. Ether. Response to intravenous injection of choline.

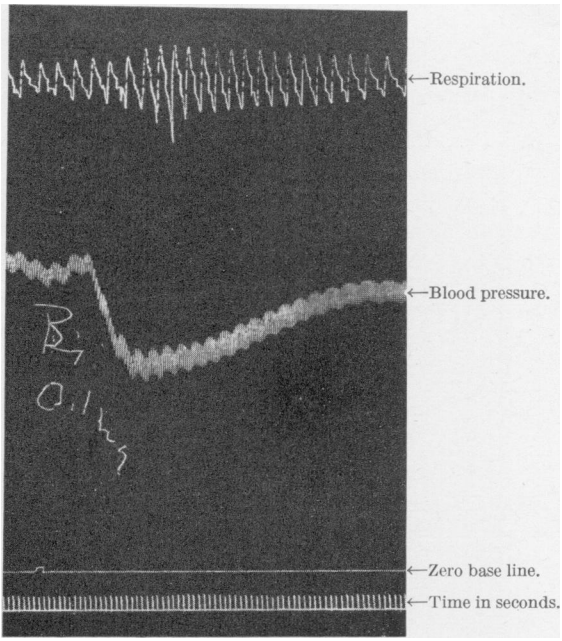

FIGURE 10.—Cat No. 20. Amytal. Response to intravenous injection of 0.1 mg. histamine.

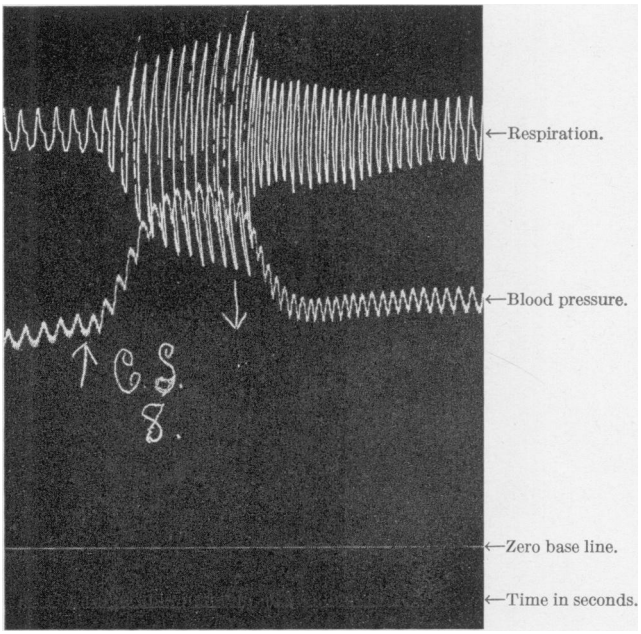

FIGURE 11.—Cat No. 7. Weight 2.0 kg. Fifty doses of 10 mg. per kg. given daily. Severe generalized tremors with flaccid and spastic paresis. Ether. Blood pressure 120 mmHg. Response to faradic stimulation of central sciatic nerve.

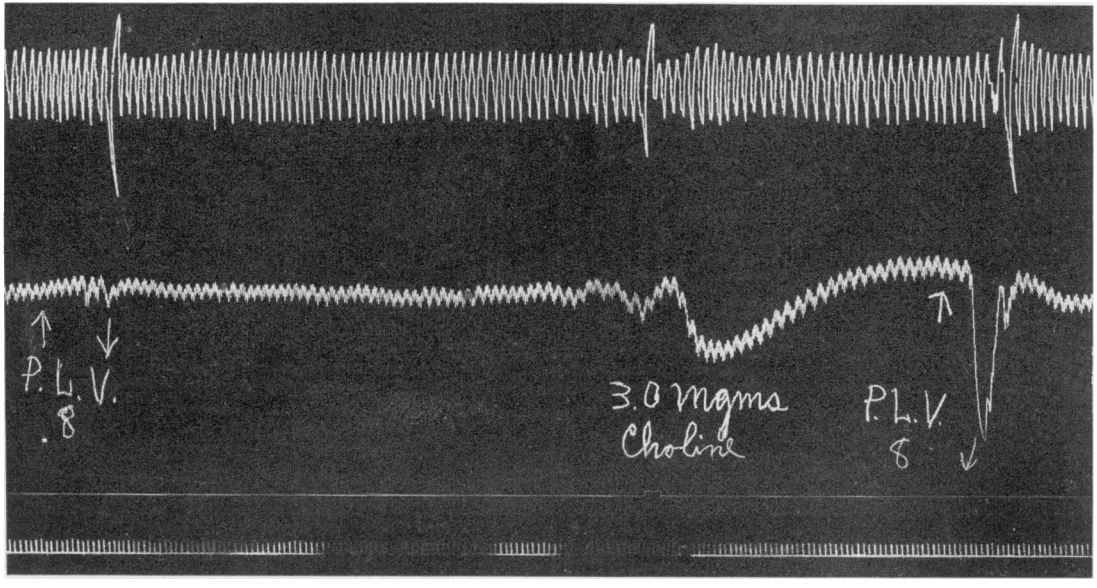

FIGURE 12.—Cat No. 7. Shows loss of irritability of peripheral left vagus on faradic stimulation (PLV) with temporary recovery following the intravenous injection of 3.0 mg. choline. Top line, respiration; second line, blood pressure; third line, zero base line; fourth line, time in seconds.

and since it was previously shown that hepatoxic substances like selenium (*4*) and p-dimethylamino azobenzene (*5*) produced severer effects on the liver of animals fed a low-protein diet, it seemed desirable to ascertain the effect of low protein on the extent of liver injury produced by DDT in rats. Accordingly three groups of rats were set up, each receiving 0.05 percent DDT, as follows:

Group 1. 12 rats, 5 percent casein.
Group 2. 12 rats, 5 percent casein+0.5 percent cystine.
Group 3. 10 rats, 25 percent casein.
All the animals received a 5 percent yeast supplement, which provided an additional 3 percent protein.

At the end of the experimental period of 80 days, 9 animals survived in group 1, 10 in group 2, and 10 in group 3. Hemoglobin determinations at this time gave an average of 15 gm. per 100 cc. for group 1, 14.5 gm. for group 2, and 17.4 gm. for group 3. Liver function tests by the rose bengal technique (*5*) gave an average retention of the dye at the end of one hour of 1.2 mg. percent for group 1, 0.9 mg. percent for group 2, and 0.8 mg. percent for group 3, all within the normal range. Gross examination of the livers showed no lesions in group 3, 7 in group 2 presented a mottled appearance, and 1 in group 1 showed slight fatty changes. It would appear that the low-protein diet may have contributed slightly to the general toxicity of DDT, but it has not materially altered the susceptibility of the liver to the toxic action of the compound.

The antidotal action of hypnotics.—The previous study on the mutual effects of cyclohexanone, a substance with narcotic properties, and DDT suggested a possible antagonistic action between the two substances (*1*). Accordingly, further studies have been made with a view to finding a suitable narcotic with antidotal potentialities. The well-established antidotal action of the analeptics against the barbiturates and the resemblance of action of DDT to some of the analeptics indicated the desirability of exploring the possibility of some of the barbiturates as antidotes. In addition other hypnotics were tried for comparison. Rats 125 to 250 gm. in weight, in sets of 20, were used in this work. Prior to experimentation they were deprived of food for 18 hours. The animals were then divided into 2 groups equally matched as to number, sex, and weight. All the animals were given a uniform dose of 5 percent DDT in olive oil by stomach tube. One group of 10 served as controls and the other was used for treatment. Upon the appearance of tremors and twitchings, which, under the experimental conditions, occurred within 3 to 5 hours of the administration of the compound, treatment was instituted in one group while the controls were left alone. The treatment consisted of the administration of the drug to be tested, in doses adequate to control the tremors. The treatment was re-

TABLE 8.—*Effect of hypnotics on the acute toxicity of DDT in rats*

Series	DDT (mg. per kg.)	Mortality (percent)		Hypnotic used	Treatment (per kg.)		
		Controls	Treated		First day	Second day	Third day
1	250	70	50	Amytal sodium	2×50 mg		
2	300	90	80	Phenobarbital sodium	2×100 mg	100 mg	
3	300	80	90	Paraldehyde	2×2 cc		
4	300	90	50	Dilantin sodium	2×100 mg	100–200 mg	
5	300	100	50	do	250 mg	200 mg	200 mg.
6	300	100	40	do	200–250 mg	0–200 mg	
7	300	90	40	Urethane	0.8+0.6 gm		
8	300	60	0	do	2×0.4 gm	2×0.4 gm	0–0.4 gm.
9	300	80	0	do	2 to 3×0.4 gm	0.4–0.6 gm	0–0.6 gm.
10	300	90	10	do	0.8 to 1.4 gm	0.6–0.8 gm	

peated as often as necessary until the animals remained free or nearly free from the neurological symptoms. On account of the persistence of action of DDT, treatment had to be continued for a period of from 1 to 3 days. The survivors were observed for an additional period of 7 days before a given experiment was terminated. Experiments have thus far been made with amytal, phenobarbital, paraldehyde, dilantin, and urethane. Paraldehyde was given by stomach tube and all the others were given intraperitoneally. The results summarized in table 8 indicate a very slight effect from amytal, a doubtful effect from phenobarbital, no effect from paraldehyde, and a very substantial antidotal action from dilantin and urethane.[3] Of the two, urethane appears to be the more effective drug. In the first experiment with urethane the results were not so satisfactory, evidently because not enough of the drug was given. A single dose of 0.4 gm. per kg., which is somewhat less than 25 percent of the MLD of urethane, has been effective in allaying the tremors. The smallest dose that will induce narcosis in normal rats is 0.6 gm. per kg. The antidotal effect from the small dose of 0.4 gm. per kg. does not last more than 2 to 4 hours and must be repeated frequently. At no time did any single dose exceed 0.8 gm. per kg., which is a little less than half of the MLD. It would seem that a total dose of from 1.2 to 2.5 gm. per kg., spread over a period of from 1 to 3 days according to the symptomatology, is required for effective treatment. In the 4 sets of experiments on urethane, in which a total of 80 rats was used, the average mortality for the controls was 80 percent, while in the treated groups the mortality was 12.5 percent.

The results with dilantin appear promising too, though not as satisfactory as with urethane. In 3 sets of experiments with a total of 60 rats, the average mortality for the controls was 96.7 and for the treated rats 46.7 percent. It was much more difficult to control the tremors with dilantin than with urethane. The smallest effective dose for dilantin was 200 to 250 mg. per kg. The LD^{50} of dilantin given

[3] It was impossible to control the tremors with paraldehyde, even with doses approaching the toxic level.

intraperitoneally in normal rats we have found to be 300 mg. per kg. Merritt and Putnam (*6*) studying the anticonvulsant effects of a series of drugs in cats reported better results for dilantin than phenobarbital. Our results are in agreement with this. They induced convulsions by electrical stimulation. They reported no experiments with urethane. The highly specific action of urethane in antagonizing the neurological syndrome of DDT may be useful in elucidating the mechanism of action of this convulsant.

SUMMARY

Experiments on the elimination of DDT in the urine in acute and chronic poisoning in rabbits, cats, and in one dog are described. Data are presented on the distribution and storage of DDT in some of the tissues of rabbits and cats. It has been shown that organic chlorine can be demonstrated in the urine of rabbits, cats, and dogs receiving DDT long in advance of any recognizable symptoms of poisoning. Experiments on the circulatory and respiratory responses to some typical drugs and to nerve stimulation in advanced DDT poisoning in cats indicate little deviation from the normal except for a lowered irritability of the peripheral vagi. Studies on the action of a series of hypnotics and related compounds in acute DDT poisoning in rats indicate good antidotal effects from urethane and to a lesser degree from dilantin.

REFERENCES

(*1*) Smith, M. I., and Stohlman, E. F.: The pharmacologic action of 2,2 bis (p-chlorophenyl) 1,1,1 trichlorethane and its estimation in the tissues and body fluids. Pub. Health Rep., **59**: 984 (1944).

(*2*) Smith, M. I., Westfall, B. B., and Stohlman, E. F.: Studies in Chronic Selenosis. III. Liver Function and Bile Pigments in Experimental Chronic Selenium Poisoning. Nat. Inst. Health Bull. No. 174, 21–44, 1940.

(*3*) Lillie R. D., and Smith, M. I.: Pathology of experimental poisoning in cats, rabbits, and rats with 2,2 bis-parachlorphenyl–1,1,1 trichlorethane. Pub. Health Rep., **59**; 979 (1944).

(*4*) Smith, M. I.: The influence of diet on the chronic toxicity of selenium. Pub. Health Rep., **54**: 1441 (1939).

(*5*) Smith, M. I., Lillie, R. D., and Stohlman, E. F.: The toxicity and histopathology of some azo compounds as influenced by dietary protein. Pub. Health Rep., **58**: 304 (1943).

(*6*) Merritt, H. H., and Putnam, T. J.: A new series of anticonvulsant drugs tested by experiments on animals. Arch. Neurol. and Psychiat., **39**: 1003 (1938).

PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period July–December 1944

The following is a list of publications of the United States Public Health Service issued during the period July–December 1944.

The purpose of the publication of this list is to provide a complete and continuing record of Public Health Service publications for reference use by librarians, scientific workers, and others interested

in particular fields of public health work, and not to offer the publications for indiscriminate free public distribution.

Those publications marked with an asterisk (*) may be obtained only by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at the prices noted.

Periodicals

*Public Health Reports (weekly), July–December, vol. 59, Nos. 27 to 52, pages 857 to 1692. 5 cents a number.

*Venereal Disease Information (monthly), July–December, vol. 25, Nos. 7 to 12, pages 197 to 386. 5 cents a number.

*Journal of the National Cancer Institute (bimonthly), August–December, vol. 5, Nos. 1 to 3, pages 1 to 232. 40 cents a number.

Public Health Engineering Abstracts (monthly), July–November, vol. XXIV. Nos. 7 to 11, 32 pages each. Index to vol. XXIV, 15 pages. (This index takes the place of issue No. 12 of the Abstracts).

National Negro Health News (quarterly), July–December, vol. 12, Nos. 3 and 4, 24 pages each.

Reprints from the Public Health Reports

2566. National inventory of needs for sanitation facilities. III. Sewerage and water pollution abatement. July 7, 1944. 26 pages.

2567. Tuberculosis mortality among residents of the 92 cities of 100,000 or more population: United States, 1939–41. By Dorothy J. Liveright. July 21, 1944. 13 pages.

2568. National inventory of needs for sanitation facilities. IV. Rural sanitation. By C. H. Atkins. July 28, 1944. 10 pages.

*2569. Pathology of experimental poisoning in cats, rabbits, and rats with 2,2 bis-parachlorphenyl-1,1,1 trichlorethane. By R. D. Lillie and M. I. Smith. The pharmacologic action of 2,2 bis(p-chlorophenyl)1,1,1 trichlorethane and its estimation in the tissues and body fluids. By M. I. Smith and E. F. Stohlman. Histopathological changes following administration of DDT to several species of animals. By Arthur A. Nelson, John H. Draize, Geoffrey Woodard, O. Garth Fitzhugh, R. Blackwell Smith, Jr., and Herbert O. Calvery. July 28 and August 4, 1944. 28 pages. Out of print.

2570. Diamond points and the discard rate of steel dental burs. By Henry Klein. August 4, 1944. 4 pages.

2571. A simplified procedure for detecting cross reactions in diagnostic antipneumococcic serum. By Bernice E. Eddy. August 11, 1944. 4 pages.

2572. Studies on the duration of disabling sickness. V. Frequency of short-term absences and its relation to total frequency. By W. M. Gafafer and Rosedith Sitgreaves. August 18, 1944. 9 pages.

2573. Pathologic changes in animals exposed to a commercial chlorinated diphenyl. By J. W. Miller. August 18, 1944. 10 pages; 1 plate.

2574. Methods of sanitizing eating and drinking utensils. By John Andrews. August 25, 1944. 16 pages.

2575. The influenza epidemic of the winter of 1943–44 in the United States: A preliminary summary. By Dorothy F. Holland and Selwyn D. Collins. September 1, 1944. 12 pages.

2576. Physical impairments of members of low-income farm families—11,490 persons in 2,477 Farm Security Administration borrower families, 1940.

I. Characteristics of the examined population. II. Defective vision as determined by the Snellen test and other chronic eye conditions. By Mary Gover and Jesse B. Yaukey. September 8, 1944. 22 pages.

2577. Anti-plague measures in Tacoma, Wash. By James M. Hundley and Kaarlo W. Nasi. September 22, 1944. 18 pages.

2578. Sickness absenteeism among male and female industrial workers during 1943 and among males during the first and second quarters of 1944, with a note on the respiratory epidemic of 1943–44. By W. M. Gafafer. September 29, 1944. 8 pages.

2579. Studies on the duration of disabling sickness. VI. Time lost from short-term absences and its relation to total time lost. By W. M. Gafafer and Rosedith Sitgreaves. October 6, 1944. 9 pages.

2580. An epidemic of a severe pneumonitis in the bayou region of Louisiana. I. Epidemiological study. By B. J. Olson and W. L. Treuting. II. Clinical features of the disease. By W. L. Treuting and B. J. Olson. III. Pathological observations. Report of autopsy on two cases with a brief comparative note on psittacosis and Q fever. By Chapman H. Binford and George H. Hauser. IV. A preliminary note on etiology. By B. J. Olson and C. L. Larson. October 6, 13, and 20, 1944. 58 pages; 13 plates.

2581. Mouse protective antibodies in human serums following injections with cholera vaccine. By James J. Griffitts. October 20, 1944. 12 pages.

2582. Pathologic reaction to the virus of lymphocytic choriomeningitis in guinea pigs. By R. D. Lillie and Charles Armstrong. October 27, 1944. 16 pages.

2583. Medical care: A private enterprise or a social service? By Joseph W. Mountin. October 27, 1944. 8 pages.

2584. The infectivity of mycobacteria for chorioallantoic membranes of chick embryos. By George L. Fite and Byron J. Olson. November 3, 1944. 14 pages.

2585. The prophylactic effect of sulfadiazine and sulfaguanidine against mosquito-borne *Plasmodium gallinaceum* infection in the domestic fowl (preliminary report). By G. Robert Coatney and W. Clark Cooper. November 10, 1944. 4 pages.

2586. Age and sex incidence of influenza in the epidemic of 1943–44, with comparative data for preceding outbreaks. By Selwyn D. Collins. November 17, 1944. 21 pages.

2587. Laboratory method of determining the potency of typhoid vaccine. By James J. Griffitts. November 24, 1944. 14 pages.

2588. Fluoride domestic waters and systemic effects. I. Relation to bone-fracture experience, height, and weight of high school boys and young selectees of the armed forces of the United States. By F. J. McClure. December 1, 1944. II. Fluorine content of urine in relation to fluorine in drinking water. By F. J. McClure and C. A. Kinser. December 8, 1944. 32 pages.

2589. Pathologic reaction in guinea pigs to the Humphreys' virus strain. By T. L. Perrin and E. A. Steinhaus. December 15, 1944. 8 pages.

2590. Notes on State legislative provisions for the temporary licensing of physicians. By Adela Stucke. December 15, 1944. 6 pages.

2591. Infectious hepatitis: Experimental study of immunity. By J. W. Oliphant. December 15, 1944. 4 pages.

2592. Studies on neuromuscular dysfunction. I. Neostigmine therapy of neuromuscular dysfunction resulting from trauma. II. Neostigmine therapy of hemiplegia, facial paralysis and cerebral palsy. III.

Neostigmine therapy of chronic rheumatoid arthritis and subacromial bursitis. By Herman Kabat. December 22, 1944. 16 pages.

2593. Relative resistance of *Escherichia coli* and *Eberthella typhosa* to chlorine and chloramines. By Elsie Wattie and C. T. Butterfield. December 29, 1944. 12 pages.

2594. Studies of antigens in infected yolk sacs. By Norman H. Topping and M. J. Shear. December 29, 1944. 5 pages.

Supplements to the Public Health Reports

177. Toxicity and potential dangers of aerosols, mists, and dusting powders containing DDT. By P. A. Neal, W. F. von Oettingen, W. W. Smith, R. B. Malmo, R. C. Dunn, H. E. Moran, T. R. Sweeney, D. W. Armstrong, and W. C. White. 1944. 32 pages.

178. The deterioration of Romanovsky stain solutions in various organic solvents. Purification of the thiazins and spectra of purified dyes. Spectroscopic data on paired mixtures of purified thiazins and on commercial thiazins. By R. D. Lillie. 1944. 24 pages.

Public Health Bulletins

284. Occupational and related dermatoses. Abstracts from the literature January 1940 to June 1943, inclusive. By Louis Schwartz and Norman R. Goldsmith. 1944. 179 pages.

285. Experimental studies on the toxicity and potential dangers of trinitrotoluene (TNT). By W. F. von Oettingen, D. D. Donahue, R. K. Snyder, B. L. Horecker, A. R. Monaco, A. H. Lawton, T. R. Sweeney, and P. A. Neal. 1944. 78 pages.

286. A guide and key to the aquatic plants of the Southeastern United States. By Don E. Eyles and J. Lynn Robertson, Jr., with original drawings by Garnet W. Jex. 1944. 151 pages; 331 illustrations.

287. A critical review of the literature relating to the flight and dispersion habits of anopheline mosquitoes. By Don E. Eyles. 1944. 39 pages.

288. The triatominae of North and Central America and the West Indies and their public health significance. By Robert L. Usinger. 1944. 81 pages; 12 plates.

Worker's Health Series

14. That tired feeling. 1944. 12 pages.

Posters

Restaurant Sanitation—set of six posters, each 14 x 10 in. in four colors (distributed only in sets):

1. For our patrons' health wash your hands often.
2. For our patrons' health use a fork, don't be a butterfinger.
3. For our patrons' health keep these cold.
4. For our patrons' health keep these under cover.
5. For our patrons' health don't touch rims, use handles, handle with care.
6. For our patrons' health wash every piece carefully.

Workers' Health Poster:

30. That tired feeling. Two colors, 10 x 14 in.

Unnumbered Publications

Index to Public Health Reports, vol. 59, part 1, January–June 1944. 14 pages.

Reprints from Venereal Disease Information

225. Some general considerations affecting present-day sex and sex education problems. By John H. Stokes. July 1944. 8 pages.
226. Methods of transporting gonococci to laboratories for cultural studies. By Oscar F. Cox, Marjorie A. Kinney, and J. Howard Mueller. July 1944. 4 pages.
227. Outpatient penicillin treatment of gonococcic infections in males. By C. J. Van Slyke and S. Steinberg. August 1944. 4 pages.
228. A sociologic analysis of 304 female patients admitted to the Midwestern Medical Center, St. Louis, Mo. By H. L. Rachlin. September 1944. 8 pages.
229. Venereal disease epidemiology in the Army Third Service Command: Progress report for period July through December 1943. By E. W. Norris, A. F. Doyle, Fred W. Kratz, and Albert P. Iskrant. October 1944. 4 pages.
230. United States Public Health Service evaluation of massive arsenotherapy for syphilis: Cooperating clinics of New York and Midwestern groups. November 1944. 9 pages.
231. A preliminary report of blood testing, as required by Alabama law, in the first three counties surveyed. By W. H. Y. Smith, D. G. Gill, and S. R. Damon. November 1944. 4 pages.
232. Cardiolipin antigens in the Kolmer complement fixation test for syphilis. By Ad Harris and J. Portnoy. December 1944. 9 pages.
233. Trend in age of acquiring venereal disease in New York City 1940–1943. By Theodore Rosenthal and George Kerchner. December 1944. 5 pages.

Supplement to Venereal Disease Information

4. Directory of clinics for the diagnosis and treatment of venereal diseases. Revised 1944. 59 pages.

FELLOWSHIPS IN HEALTH EDUCATION

Fellowships for graduate work in health education are being offered to qualified applicants by the United States Public Health Service, in cooperation with the National Foundation for Infantile Paralysis, Surgeon General Thomas Parran has announced. These fellowships for the fall term of college, 1945, are being awarded to meet present and future needs for trained health educators in schools, communities, and local, State, and Federal health departments.

Men and women between the ages of 22 and 40 who are citizens of the United States and who hold a bachelor's degree from a recognized college or university may apply.

Fellowships will lead to a master's degree in public health. The 12 months' training period will consist of 9 months in the School of Public Health at the University of North Carolina, Yale University, or the University of Michigan, and 3 months' field experience in community health education under supervision. Applicants must meet the requirements for admission to the Schools of Public Health. Training

in science, sociology, education, and psychology, plus experience working with people are desirable prerequisites.

The fellowships provide a stipend of $100 a month for 12 months, full tuition, and travel for field experience. Candidates must pay their travel to and from the university at the beginning and end of training.

"The existing shortage of trained health educators and the demand for expansion of health education activities indicated both in this country and abroad highlight the need for qualified personnel with a thorough understanding of both public health and education," the Surgeon General said.

Basil O'Connor, President of the National Foundation for Infantile Paralysis, pointed out that coordination of official and voluntary agencies on a community basis will make available the services of competent health educators whose aid will be invaluable in solving community health problems. He stressed the assistance to be given by such a group during an infantile paralysis outbreak in informing residents about the disease and the necessity for long-continued after-care of patients.

Fellowship application forms may be obtained from the Surgeon General, United States Public Health Service, Washington 14, D. C. Applications must be accompanied by a transcript of college credits and a small photograph, and must be in the office of the Surgeon General not later than June 1, 1945.

INCIDENCE OF HOSPITALIZATION, JANUARY 1945

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover hospital service plans scattered throughout the country, mostly in large cities.

Item	January	
	1944	1945
1. Number of plans supplying data	77	75
2. Number of persons eligible for hospital care	15,454,382	15,956,400
3. Number of persons admitted for hospital care	111,530	137,055
4. Incidence per 1,000 persons, annual rate, during current month (daily rate × 365)	84.7	101.1
5. Incidence per 1,000 persons, annual rate for the 12 months ending January 31	103.5	104.0

DEATHS DURING WEEK ENDED FEBRUARY 17, 1945

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

	Week ended Feb. 17, 1945	Corresponding week, 1944
Data for 92 large cities of the United States:		
Total deaths	9,823	9,742
Average for 3 prior years	9,873	
Total deaths, first 7 weeks of year	68,407	73,898
Deaths under 1 year of age	658	635
Average for 3 prior years	639	
Deaths under 1 year of age, first 7 weeks of year	4,414	4,457
Data from industrial insurance companies:		
Policies in force	66,996,664	66,306,324
Number of death claims	11,880	14,178
Death claims per 1,000 policies in force, annual rate	9.2	11.2
Death claims per 1,000 policies, first 7 weeks of year, annual rate	10.6	12.1

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 FEBRUARY 24, 1945 [1]

Summary

Continuing the seasonal upward trend, the incidence of meningococcus meningitis increased slightly during the current week. A total of 288 cases was reported, as compared with 281 last week and a 5-year (1940–44) median of 87. The current week's total, while only slightly more than half the average for the corresponding weeks of the epidemic years of 1943 and 1944, is more than reported for the corresponding week of any other year since 1936. Of the current total 130 cases, or 45 percent, occurred in the 5 States reporting more than 13 cases each, as follows (last week's figures in parentheses): New York 27 (32), Pennsylvania 25 (24), Illinois 28 (18), Texas 25 (19), and California 25 (17). The total to date this year is 1,985, as compared with 2,959 and 4,487 for the corresponding periods of 1943 and 1944, respectively, and a 5-year median of 503.

A total of 26 cases of poliomyelitis was reported, as compared with 43 last week and a 5-year median of 25. The cumulative total is 315 cases, as compared with a 5-year median of 228, and is the largest number recorded for the corresponding period of any year since 1928.

The total of 5,938 cases of scarlet fever, while less than for the same week last year (6,424), is more than for the corresponding week of any other year since 1938, and the total to date this year, 41,896 is more than for the corresponding period of any year since 1940.

Cumulative figures for certain diseases for the first 8 weeks of the year (corresponding figures for last year in parentheses) are as follows: Diphtheria 2,627 (2,030), amebic dysentery 219 (182), bacillary dysentery 4,692 (1,733), unspecified dysentery 1,003 (488), infectious encephalitis 50 (72), measles 13,492 (141,835), Rocky Mountain spotted fever 4 (2), smallpox 77 (113), tularemia 189 (80), typhoid fever 475 (651), typhus fever 479 (354), undulant fever 675 (354), whooping cough 18,333 (14,465).

Deaths recorded for the week in 93 large cities of the United States totaled 9,351, as compared with 9,913 last week, 9,699 for the corresponding week last year, and a 3-year (1942–44) average of 9,811. The cumulative total is 78,392, as compared with 84,272 for the corresponding period last year.

[1] Reports from States for the current week are exclusive of New Mexico.

Telegraphic morbidity reports from State health officers for the week ended February 24, 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	Week ended—		Median	Week ended—		Median	Week ended—		Median
	Feb. 24, 1945	Feb. 26, 1944	1940–44	Feb. 24, 1945	Feb. 26, 1944	1940–44	Feb. 24, 1945	Feb. 26, 1944	1940–44	Feb. 24, 1945	Feb. 26, 1944	1940–44
NEW ENGLAND												
Maine	0	1	0	------	3	3	15	182	177	1	1	1
New Hampshire	0	0	0	------	------	------	0	22	22	0	1	0
Vermont	0	0	0	------	8	------	14	195	13	0	2	0
Massachusetts	2	10	2	------	------	------	52	453	411	5	9	5
Rhode Island	0	0	0	40	------	------	12	333	111	1	3	1
Connecticut	0	0	0	4	------	2	69	360	238	1	6	4
MIDDLE ATLANTIC												
New York	12	13	23	[1] 5	[1] 5	[1] 13	78	2,338	1,596	27	58	11
New Jersey	2	2	3	1	19	19	48	1,436	1,109	6	17	2
Pennsylvania	13	10	13	6	16	------	108	2,410	2,410	25	37	11
EAST NORTH CENTRAL												
Ohio	11	5	10	7	24	24	46	2,103	217	13	30	3
Indiana	7	6	6	4	10	29	16	298	226	4	6	1
Illinois	4	20	19	------	36	36	90	1,213	553	28	26	3
Michigan [2]	7	5	4	5	14	------	24	1,581	285	12	24	1
Wisconsin	3	2	1	12	134	134	38	1,690	662	2	11	0
WEST NORTH CENTRAL												
Minnesota	4	5	5	1	2	3	12	1,381	291	1	10	1
Iowa	0	4	4	------	48	42	14	342	276	3	4	1
Missouri	3	8	8	5	------	4	5	382	382	7	25	1
North Dakota	3	1	1	57	4	20	2	241	42	1	1	0
South Dakota	2	4	2	1	------	1	16	85	7	1	1	0
Nebraska	3	4	3	10	22	15	15	48	48	1	2	1
Kansas	5	2	3	6	8	17	18	513	343	2	5	3
SOUTH ATLANTIC												
Delaware	2	1	1	------	------	------	9	17	17	1	3	0
Maryland [3]	6	3	2	1	18	21	48	870	77	8	11	6
District of Columbia	1	0	0	1	2	2	9	121	59	4	4	2
Virginia	5	6	13	718	746	987	62	872	436	12	29	6
West Virginia	6	7	6	39	68	68	58	295	189	8	4	3
North Carolina	6	3	10	------	67	64	32	1,339	343	7	19	0
South Carolina	3	4	4	665	800	986	30	366	237	[3] 2	10	4
Georgia	6	4	4	41	122	147	39	381	349	2	7	2
Florida	2	2	3	2	13	13	41	209	145	11	9	0
EAST SOUTH CENTRAL												
Kentucky	6	6	6	4	214	115	3	142	142	8	13	2
Tennessee	2	2	4	68	151	151	71	624	226	8	30	5
Alabama	9	9	11	212	205	620	8	512	172	2	14	3
Mississippi [2]	4	0	9	------	------	------	------	------	------	5	10	1
WEST SOUTH CENTRAL												
Arkansas	3	6	6	217	223	286	32	139	122	4	6	2
Louisiana	6	3	5	3	163	96	19	258	83	2	9	1
Oklahoma	6	4	6	129	209	209	12	105	57	1	10	1
Texas	52	33	36	1,951	2,142	2,142	339	1,192	697	25	27	7
MOUNTAIN												
Montana	1	0	1	31	25	11	12	208	125	1	2	1
Idaho	1	0	1	------	------	------	1	30	34	0	0	0
Wyoming	0	0	0	------	9	52	4	65	65	0	1	0
Colorado	9	3	7	20	112	61	17	403	228	4	3	1
New Mexico	------	4	1	------	11	11	------	51	51	------	1	1
Arizona	2	4	3	115	189	189	7	224	175	2	2	1
Utah [2]	0	0	0	30	316	43	46	48	111	0	0	0
Nevada	0	0	0	------	------	------	1	0	0	0	0	0
PACIFIC												
Washington	4	3	3	1	4	4	79	150	150	4	7	1
Oregon	2	2	2	9	64	41	53	94	235	1	6	1
California	34	15	15	21	199	199	677	752	481	25	36	3
Total	259	226	275	4,442	6,425	6,425	2,401	27,073	17,754	288	552	87
8 weeks	2,627	2,030	2,480	35,023	301,265	112,641	13,492	141,835	97,528	[3] 1,985	4,487	503

*Exclusive of report from New Mexico.
[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Corrected report: South Carolina, for week ended Feb. 3, meningococcus meningitis, 5 cases.

Telegraphic morbidity reports from State health officers for the week ended February 24, 1945, and comparison with corresponding week of 1944 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and para typhoid fever [3]		
	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44	Week ended—		Median 1940–44
	Feb. 24, 1945	Feb. 26, 1944		Feb. 24, 1945	Feb. 26, 1944		Feb. 24, 1945	Feb. 26, 1944		Feb. 24, 1945	Feb. 26, 1944	
NEW ENGLAND												
Maine	1	0	0	57	27	13	0	0	0	0	0	0
New Hampshire	0	0	0	10	28	13	0	0	0	0	1	0
Vermont	0	0	0	14	27	13	0	0	0	0	1	0
Massachusetts	0	0	0	271	415	318	0	0	0	1	0	1
Rhode Island	0	0	0	17	13	18	0	0	0	0	0	0
Connecticut	0	0	0	114	79	79	0	0	0	2	1	1
MIDDLE ATLANTIC												
New York	2	1	1	496	589	589	0	0	0	3	4	5
New Jersey	3	1	1	130	193	193	0	0	0	2	0	0
Pennsylvania	1	0	1	602	610	535	0	0	0	4	3	3
EAST NORTH CENTRAL												
Ohio	0	0	1	456	396	275	0	0	0	4	8	4
Indiana	0	0	1	208	164	167	3	8	1	0	12	4
Illinois	2	0	1	443	360	360	1	1	1	0	1	3
Michigan [3]	0	1	1	316	262	241	1	1	0	0	3	1
Wisconsin	0	0	1	229	371	174	4	0	1	0	0	0
WEST NORTH CENTRAL												
Minnesota	0	0	0	101	181	106	0	0	0	0	0	0
Iowa	0	0	0	72	128	102	0	0	3	[4] 2	0	0
Missouri	1	0	0	87	201	146	0	0	1	2	1	0
North Dakota	0	0	0	30	48	30	0	0	0	0	0	0
South Dakota	0	0	0	11	37	29	0	0	1	0	0	0
Nebraska	0	0	0	111	82	47	0	0	0	0	0	0
Kansas	0	0	0	165	124	82	0	0	0	1	0	1
SOUTH ATLANTIC												
Delaware	0	0	0	5	6	13	0	0	0	0	0	0
Maryland [3]	0	0	0	296	180	65	0	0	0	1	0	0
District of Columbia	0	0	0	77	227	25	0	0	0	0	0	0
Virginia	1	0	2	162	102	44	0	0	0	4	2	1
West Virginia	0	0	1	41	70	47	0	0	0	1	3	2
North Carolina	0	0	1	108	39	39	0	0	0	1	0	0
South Carolina	0	0	0	7	6	6	0	1	0	1	3	3
Georgia	0	0	0	37	11	20	0	0	0	0	1	2
Florida	0	2	1	15	19	5	0	0	0	0	0	1
EAST SOUTH CENTRAL												
Kentucky	2	0	0	79	82	82	0	0	0	0	0	1
Tennessee	0	0	0	102	179	86	0	0	0	3	2	3
Alabama	2	1	0	15	18	23	0	0	0	0	1	1
Mississippi [3]	1	0	1	45	11	10	1	0	0	1	4	1
WEST SOUTH CENTRAL												
Arkansas	0	0	0	13	9	6	1	4	2	0	0	1
Louisiana	0	1	1	21	7	8	0	1	0	1	1	3
Oklahoma	3	3	0	35	32	28	0	0	0	0	0	2
Texas	1	2	2	121	87	58	0	3	1	5	7	2
MOUNTAIN												
Montana	0	0	0	40	34	33	0	0	0	0	0	0
Idaho	0	0	0	56	30	10	0	0	0	0	2	0
Wyoming	0	0	0	7	11	11	0	0	0	0	0	0
Colorado	0	0	0	101	63	63	0	0	0	2	0	0
New Mexico	----	0	0	----	10	7	----	0	0	----	0	0
Arizona	0	0	0	28	17	9	0	0	0	0	0	0
Utah [3]	0	1	1	51	139	43	0	0	0	0	0	0
Nevada	0	0	0	2	0	0	1	0	0	0	0	0
PACIFIC												
Washington	0	5	0	119	247	62	0	3	0	0	0	0
Oregon	0	1	0	47	120	18	0	0	0	0	1	1
California	6	5	3	378	333	153	0	3	0	3	3	3
Total	26	24	25	5,938	6,424	4,367	12	25	25	44	65	65
8 weeks	315	209	228	41,896	40,428	30,415	77	113	229	[4] 475	651	617

[2] Period ended earlier than Saturday.
[4] Delayed report, included in cumulative total only: Iowa, typhoid fever, 12 cases.
[3] Including paratyphoid fever reported separately, as follows: New York, 1; West Virginia, 1; Colorado, 1

Telegraphic morbidity reports from State health officers for the week ended February 24, 1945, and comparison with corresponding week of 1944 and 5-year median—Con.

Division and State	Whooping cough			Week ended Feb. 24, 1945								
	Week ended—		Median 1940–44	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever	Undulant fever
	Feb. 24, 1945	Feb. 26, 1944		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	32	12	37	0	0	0	0	0	0	0	0
New Hampshire	1	5	5	0	0	0	0	0	0	0	0
Vermont	30	23	23	0	0	0	0	0	0	0	2
Massachusetts	168	49	125	0	5	0	0	0	0	0	1
Rhode Island	18	4	18	0	0	0	0	0	0	0	0
Connecticut	48	7	60	0	0	0	0	0	0	0	3
MIDDLE ATLANTIC											
New York	171	116	310	2	1	0	1	0	1	0	1
New Jersey	115	50	90	0	0	0	0	0	0	0	0
Pennsylvania	171	204	267	0	1	0	1	0	0	0	0
EAST NORTH CENTRAL											
Ohio	187	93	177	1	0	0	1	0	0	0	0
Indiana	26	25	25	1	0	1	0	0	0	0	0
Illinois	60	54	105	3	0	0	0	1	0	0	5
Michigan [2]	89	112	137	0	3	0	0	0	0	0	0
Wisconsin	57	103	146	0	0	0	0	0	1	0	3
WEST NORTH CENTRAL											
Minnesota	19	34	38	4	0	0	0	0	0	0	12
Iowa	2	14	14	0	0	0	0	0	0	0	[6] 0
Missouri	1	28	26	0	0	1	0	0	0	0	0
North Dakota	0	4	13	0	0	0	0	0	0	0	0
South Dakota	2	3	3	0	0	0	0	0	0	0	1
Nebraska	3	35	14	0	0	0	0	0	0	0	0
Kansas	46	21	39	0	1	0	1	0	0	0	5
SOUTH ATLANTIC											
Delaware	1	0	4	0	0	0	0	0	0	0	0
Maryland [2]	40	23	82	0	0	0	0	0	0	0	0
District of Columbia	6	2	24	0	0	0	0	0	0	0	1
Virginia	54	55	55	1	0	36	0	0	3	0	0
West Virginia	45	45	39	0	0	0	0	0	0	0	1
North Carolina	83	123	126	0	0	0	0	0	2	9	0
South Carolina	67	47	47	1	7	0	0	0	0	1	0
Georgia	11	26	23	0	0	0	1	0	2	7	2
Florida	15	24	14	4	0	1	1	0	0	4	0
EAST SOUTH CENTRAL											
Kentucky	41	57	53	0	0	0	0	0	1	0	1
Tennessee	23	40	55	0	0	0	0	0	3	3	0
Alabama	22	33	33	2	0	0	1	0	0	5	1
Mississippi [2]				0	0	0	0	0	0	2	2
WEST SOUTH CENTRAL											
Arkansas	18	3	10	0	0	0	0	0	0	0	0
Louisiana	1	0	2	0	1	0	0	0	0	1	1
Oklahoma	25	6	13	0	0	0	0	0	0	0	0
Texas	279	124	124	8	342	1	0	0	0	21	6
MOUNTAIN											
Montana	11	17	17	0	0	0	0	0	0	0	0
Idaho	0	0	5	0	0	0	0	0	0	0	1
Wyoming	7	2	3	0	0	4	0	0	0	0	0
Colorado	27	30	30	0	1	0	1	0	0	0	0
New Mexico		5	17								
Arizona	53	29	29	0	0	9	0	0	0	0	0
Utah [2]	55	9	25	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	0	0	0	0	0
PACIFIC											
Washington	16	22	26	1	0	5	0	0	0	0	5
Oregon	18	36	31	0	0	0	0	0	0	0	8
California	233	62	247	2	5	0	0	0	0	1	9
Total	2,397	1,816	2,988	30	367	58	8	1	13	54	71
Same week, 1944	1,816			39	195	107	9	1	0	30	72
Average, 1942–44	2,901			24	209	62	10	[7] 1	11	[7] 30	40
8 weeks, 1945	18,333			219	4,692	1,003	50	4	189	479	[6] 675
8 weeks, 1944	14,465			182	1,733	488	72	2	80	354	313
Average, 1942–44	25,888		[7] 30,944	154	1,267	358	67	[7] 4	141	[7] 354	243

[2] Period ended earlier than Saturday.
[6] Delayed report, included in the cumulative total only: Iowa, undulant fever, 94 cases.
[7] 5-year median, 1940–44.

WEEKLY REPORTS FROM CITIES

City reports for week ended February 17, 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	1	0	1	0	0	0	3	0	9	0	0	0
New Hampshire:												
Concord	0	0	------	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	2	0	------	0	40	3	10	1	74	0	1	24
Fall River	0	0	------	0	1	0	2	0	4	0	0	1
Springfield	0	0	------	0	1	0	1	0	12	0	1	3
Worcester	0	0	------	0	3	1	6	0	20	0	0	7
Rhode Island:												
Providence	0	0	------	0	1	0	2	0	10	0	0	23
Connecticut:												
Bridgeport	0	0	------	0	0	0	0	0	7	0	0	0
Hartford	0	0	------	0	45	0	1	0	16	0	0	0
New Haven	0	0	------	0	0	1	3	0	5	0	0	21
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	------	1	2	1	7	0	11	0	2	2
New York	12	0	2	3	16	21	79	2	252	0	1	76
Rochester	0	0	------	0	12	0	2	0	2	0	0	16
Syracuse	0	0	------	0	0	0	4	0	8	0	0	33
New Jersey:												
Camden	0	0	------	0	1	0	3	0	4	0	1	2
Newark	0	0	1	0	11	1	9	0	19	0	0	6
Trenton	0	0	------	0	1	1	3	0	5	0	0	0
Pennsylvania:												
Philadelphia	3	0	3	0	20	5	30	1	128	0	3	55
Pittsburgh	0	0	2	3	1	7	15	0	26	0	0	9
Reading	0	0	------	0	2	0	3	0	3	0	0	1
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	1	0	------	1	0	5	15	0	23	0	1	1
Cleveland	0	0	1	1	13	3	8	0	62	0	0	53
Columbus	0	0	2	2	4	0	2	0	7	0	1	5
Indiana:												
Fort Wayne	0	0	------	0	0	0	2	0	17	0	0	0
Indianapolis	6	0	------	2	1	3	6	1	33	0	0	2
South Bend	0	0	------	0	0	0	0	0	3	0	0	0
Terre Haute	0	0	------	0	0	0	0	0	11	0	0	0
Illinois:												
Chicago	0	0	1	1	28	10	41	0	122	0	0	35
Michigan:												
Detroit	2	2	2	0	3	8	21	0	94	0	0	20
Flint	0	0	------	0	1	0	4	0	11	0	0	1
Grand Rapids	0	0	------	1	5	0	1	0	11	0	0	1
Wisconsin:												
Kenosha	0	0	------	0	1	0	0	0	1	0	0	10
Milwaukee	0	0	2	2	5	2	4	0	76	0	0	6
Racine	1	0	------	0	0	0	0	0	5	0	0	0
Superior	0	0	------	0	0	0	0	0	1	0	0	1
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	------	0	0	0	2	0	2	0	0	0
Minneapolis	2	0	------	0	4	2	7	0	15	0	1	3
St. Paul	0	0	------	0	4	1	3	0	6	0	0	16
Missouri:												
Kansas City	0	0	------	1	0	1	15	0	29	0	0	3
St. Joseph	1	0	------	0	0	1	0	0	22	0	0	0
St. Louis	0	1	4	1	1	3	21	0	39	0	0	2

City reports for week ended February 17, 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								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	0	0	------	0	6	0	5	0	21	0	0	0
Kansas:												
Topeka	3	0	------	0	1	0	3	0	10	0	0	3
Wichita	0	0	------	0	0	0	4	0	6	0	0	8
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	0	0	4	0	0	0	0	0
Maryland:												
Baltimore	8	0	------	0	3	1	14	0	122	0	0	34
Cumberland	0	0	------	0	0	0	0	0	14	0	0	0
Frederick	0	0	------	0	0	0	1	0	0	0	0	0
District of Columbia:												
Washington	3	0	1	1	7	3	14	0	67	0	0	10
Virginia:												
Lynchburg	0	0	------	0	0	0	0	0	7	0	0	0
Richmond	0	0	2	0	0	0	2	0	10	0	0	0
Roanoke	0	0	------	0	0	0	1	0	1	0	0	0
West Virginia:												
Charleston	0	0	------	0	0	0	0	0	0	0	0	0
Wheeling	0	0	------	0	6	2	0	0	5	0	0	0
North Carolina:												
Raleigh	0	0	------	0	7	0	1	0	0	0	0	12
Wilmington	1	0	------	0	0	0	4	0	2	0	0	7
Winston-Salem	0	0	------	0	1	0	4	0	11	0	0	4
South Carolina:												
Charleston	0	0	42	0	4	4	2	0	1	0	1	0
Georgia:												
Atlanta	1	0	9	2	0	0	4	0	16	0	0	1
Brunswick	0	0	------	0	0	0	1	0	1	0	0	0
Savannah	0	0	1	1	0	0	2	0	0	0	0	0
Florida:												
Tampa	0	0	------	0	0	2	2	0	0	0	0	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	0	45	4	4	0	14	0	0	6
Nashville	0	0	------	0	0	0	3	0	3	0	0	0
Alabama:												
Birmingham	1	0	5	2	0	0	5	0	4	0	0	0
Mobile	0	0	------	2	0	0	4	0	2	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	8	0	1	3	3	0	1	0	1	1
Louisiana:												
New Orleans	1	0	------	0	7	1	9	0	9	0	0	3
Shreveport	0	0	------	1	0	1	8	0	3	0	0	0
Texas:												
Dallas	2	0	------	0	4	0	0	0	16	0	0	2
Galveston	0	0	------	0	0	0	2	0	2	0	0	0
Houston	0	0	------	0	1	1	5	0	7	0	1	1
San Antonio	1	0	1	0	1	0	7	0	4	0	0	0
MOUNTAIN												
Montana:												
Billings	0	0	------	0	0	0	0	0	0	0	0	0
Great Falls	0	0	------	0	2	0	0	0	1	0	0	0
Helena	0	0	------	0	0	0	0	0	1	0	0	4
Missoula	0	0	------	0	0	0	2	0	1	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	2	0	1	0	0	0
Colorado:												
Denver	1	0	5	1	6	2	8	0	25	0	0	18
Pueblo	0	0	------	0	1	0	0	0	3	0	0	0
Utah:												
Salt Lake City	0	0	------	1	28	0	3	0	17	0	0	1

City reports for week ended February 17, 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	0	0	------	1	22	4	7	0	18	0	0	2
Spokane	0	0	------	0	2	1	3	0	10	0	0	0
Tacoma	0	0	------	0	2	0	0	0	7	0	0	0
California:												
Los Angeles	3	0	4	4	37	1	7	0	60	0	1	12
Sacramento	0	0	------	0	1	0	1	0	13	0	0	5
San Francisco	2	0	------	0	93	1	9	0	43	0	0	15
Total	58	3	99	35	515	111	495	5	1,764	0	16	587
Corresponding week, 1944	65	------	335	60	6,674	------	508	------	2,033	1	10	302
Average, 1939–44	75	------	849	[1] 63	[2] 4,208	------	[1] 524	------	1,515	2	12	869

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

Anthrax.—Cases: Philadelphia, 1.
Dysentery, amebic.—Cases: New York, 5; Columbus, 1; St. Louis, 1; Los Angeles, 1.
Dysentery, bacillary.—Cases: Worcester, 1; Detroit, 3; Minneapolis, 1; St. Louis, 1; Charleston, S. C., 9; Memphis 1; Los Angeles, 4.
Dysentery, unspecified.—Cases: Cincinnati, 1; Baltimore, 1; San Antonio, 4.
Leprosy.—Cases: New York, 1.
Typhus fever, endemic.—Cases: New Orleans, 2; San Antonio, 2.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1943, 34,285,000)

	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	7.9	0.0	2.6	0.0	239	13.1	73.5	2.6	412	0.0	5.3	207
Middle Atlantic	6.9	0.0	3.7	3.2	31	16.7	71.7	1.4	212	0.0	3.2	93
East North Central	6.1	1.2	4.9	6.1	37	19.0	63.8	0.6	293	0.0	1.2	83
West North Central	12.1	2.0	8.0	4.0	32	16.1	120.7	0.0	302	0.0	2.0	70
South Atlantic	21.2	0.0	90.0	6.5	46	19.6	91.5	0.0	420	0.0	1.6	111
East South Central	5.9	0.0	29.5	23.6	266	23.6	94.4	0.0	136	0.0	0.0	35
West South Central	11.5	0.0	25.8	2.9	40	17.2	97.6	0.0	121	0.0	5.7	20
Mountain	7.9	0.0	39.7	15.9	294	15.9	119.1	0.0	389	0.0	0.0	183
Pacific	7.9	0.0	6.3	7.9	248	11.1	42.7	0.0	239	0.0	1.6	54
Total	8.8	0.5	15.1	5.3	79	16.9	75.5	0.8	269	0.0	2.4	90

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended February 3, 1945.—During the week ended February 3, 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		11		193	372	45	52	102	173	948
Diphtheria		1		28	2	8	2			41
German measles		2		4	20	1	4	7	33	71
Influenza		3			52	1			47	103
Measles				112	134	27	14	6	289	582
Meningitis, meningococcus					1	1	1	1		4
Mumps				302	245	31	21	88	35	722
Scarlet fever		16	6	67	99	19	9	49	49	314
Tuberculosis (all forms)		5	10	114	40	17		22	16	224
Typhoid and paratyphoid fever				6		8		1	1	16
Undulant fever				2	2				1	5
Venereal diseases:										
Gonorrhea	2	21	22	102	129	35	46	38	29	424
Syphilis		7	14	103	107	15	6	14	26	292
Whooping cough		37		227	93	11	9	12	43	432

CUBA

Habana—Communicable diseases—4 weeks ended February 3, 1945.—During the 4 weeks ended February 3, 1945, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chickenpox	11		Tuberculosis	3	1
Diphtheria	20		Typhoid fever	19	1
Measles	2				

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Plague

Algeria—Oran.—For the period January 21–31, 1945, 4 cases of plague were reported in Oran, Algeria.

Madagascar.—Plague has been reported in Madagascar as follows: December 21–31, 1944, 18 cases; January 11–20, 1945, 13 cases.

Morocco (French).—Plague has been reported in French Morocco as follows: January 21–31, 1945, 2 cases in Casablanca region; February 1–10, 1945, 11 cases for the entire country, on February 7, 1945, plague was reported present in Port Lyautey, French Morocco.

Smallpox

French Equatorial Africa.—Smallpox has been reported in French Equatorial Africa as follows: December 11–20, 1944, 23 cases; December 21–31, 1944, 61 cases; January 1–10, 1945, 716 cases; January 11–20, 1945, 82 cases; January 21–31, 1945, 158 cases.

India—Calcutta.—Smallpox has been reported in Calcutta, India, as follows: Weeks ended January 6, 1945, 233 cases, 176 deaths; January 13, 411 cases, 327 deaths; January 20, 391 cases, 320 deaths; January 27, 339 cases, 254 deaths.

Union of South Africa.—For the month of November 1944, 390 cases of smallpox with 26 deaths were reported in the Union of South Africa.

Venezuela.—For the month of January 1945, 93 cases of smallpox (alastrim) with 2 deaths were reported in Venezuela, including 68 cases and 2 deaths reported in the Federal District.

Typhus Fever

Algeria.—For the period January 21–31, 1945, 67 cases of typhus fever were reported in Algeria, including 4 cases in Algiers, 18 cases in Bone, 2 cases in Lacalle, and 2 cases in Oran.

Egypt.—For the week ended January 20, 1945, 347 cases of typhus fever with 33 deaths were reported in Egypt.

Morocco (French).—Typhus fever has been reported in French Morocco as follows: January 21–31, 1945, 101 cases; February 1–10, 1945, 196 cases.

Peru.—For the month of December 1944, 108 cases of typhus fever were reported in Peru, by Departments as follows: Huanuco, 25; Puno, 23; Cuzco 22; Huancavelica, 15; Junin, 8; Apurimac, 8; Cajamarca, 5; Arequipa, 1; Ayacucho, 1.

Tunisia.—For the period January 1–10, 1945, 25 cases of typhus fever were reported in Tunisia.

Turkey.—For the week ended February 17, 1945, 86 cases of typhus fever were reported in Turkey.

Yellow Fever

Brazil—Goiaz State.—Deaths from yellow fever (jungle type) have been reported in Goiaz State, Brazil, as follows: Goiaz, December 7–26, 1944, 3; Pirenopolis, December 7, 1944, to January 26, 1945, 8; Luziana, December 21, 1944, to January 16, 1945, 10; Anapolis, January 9–30, 1945, 5; Jaragua, January 11–25, 1945, 3; Ipameri, December 11, 1944, 1; Silvania, January 1, 1945, 1; Corumba, January 5, 1945, 1; Jatai, January 10, 1945, 1; Itaberai, January 5, 1945, 1; Chagas, January 8, 1945, 1; Cristalina, January 22, 1945, 1; Caldas Novas, January 26, 1945, 1; Pires do Rio, January 29, 1945, 1.