# Public Health Reports <br> Vol. 62 • JUNE 20, 1947 - No. 25 

## Printed With the Approval of the Bureau of the Budget as Required by Rule 42 of the Joint Committee on Printing

## INCIDENCE OF POLIOMYELITIS IN 1946

By C. C. Dauer, Epidemiologist, District of Columbia Health Department

Poliomyelitis in the United States.-During the year 1946 there were a greater number of cases of poliomyelitis reported in the United States than for any prior year except 1916. ${ }^{1}$ This was the fourth successive year of relatively high prevalence as slightly more than 25,000 cases were reported in the country as a whole. The total number $(70,288)$ for the past 4 years exceeds the total number of cases $(69,456)$ reported in the 10 -year period immediately preceding 1943 as shown in table 1. However, the total number of deaths has been less, for in 1943, 1944, and 1945 there were 45,000 cases with 3,737 deaths while in the 5 -year period from 1938 to 1942 there were nearly 32,000 cases with 4,165 deaths.

Table 1.-Number of poliomyelitis cases and deaths, case and death rates per 100,000 population, and number of cases reported per death in the United States, 1933-46

| Year | Total cases reported | Total deaths registered | Case rate | Death rate | Cases reported per death |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1933-37. | 37, 463 | 4,930 | 15.9 | 10.8 | 7.8 |
| 1938-42. | 31, 993 | 4, 165 | 14.9 | 1.6 | 7.7 |
| 1943. | 12,449 | 1,115 | 9.3 | . 8 | 11.1 |
| 1944. | 19, 029 | 1,433 | 14.3 | 1.1 | 13.3 |
| 1945 | 13,619 | 1,189 | 10.3 | . 9 | 11.4 |
| 1946. | 25, 191 |  | 19.0 |  | ${ }^{2} 13.3$ |

${ }^{1}$ Average annual rate.
${ }^{2}$ Based on incomplete reports.
In 1946, as indicated in table 2 and figure 1, the disease occurred in epidemic proportions in the west north central region where every State had relatively or excessively high rates of prevalence. Two adjoining States in the east north central group, Illinois and Wiscon-

[^0]$\sin$, also had a relatively high incidence and likewise in adjacent States in the mountain section, particularly Colorado and Wyoming. Other epidemic areas of lesser extent and generally of much less intensity were in New Hampshire and Vermont, Florida, Alabama, Mississippi, Arkansas, Louisiana, Texas, California, and Washington. Con-

Table 2.-Poliomyelitis morbidity rates per 100,000 population, 1943-46, and number of cases reported per death, 1920-46


[^1]
Figure 1.
sequently it may be said that 1946 was noteworthy in that a large number of cases was reported and the areas involved were extensive.

In each of the West North Central States, Illinois, Wisconsin, New Hampshire, Florida, Arkansas, Colorado, Wyoming, and New Mexico, the incidence rate per 100,000 population was higher than for any previous year. The rate in Minnesota (115.0) has never been exceeded by any State except New York and New Jersey which had rates of 129 and 138 respectively in 1916. Even the rates in North Dakota and Colorado were higher than those previously recorded for any States with the exceptions just noted.

The much higher total number of reported cases of poliomyelitis in the United States in recent years may have resulted from an actual increase in incidence in various localities, or it may have been due in part to a more widespread distribution of the infection each year, or the increase may have been the result of more complete reporting and the inclusion of a greater proportion of nonparalytic cases, or to a combination of these factors. Since three of the past 4 years have been characterized by widespread distribution of the disease, and since there has been a rapid increase in the ratio of reported cases to deaths, it is suggested that these two factors are responsible for much of the apparent increase in total number of cases in recent years.

It is noticeable that there has been a mounting increase in the ratio of cases to deaths in all parts of the country, as shown in table 2. Because the downward trend in poliomyelitis death rates has been slight during the past 30 years, it can be assumed that any marked changes in ratio of cases to deaths are due to factors which affect the reporting of the disease or to a decreasing severity of infection which appears improbable. Southern States scarcely reported more cases than deaths in the 5 -year period from 1920 to 1924, while in most other States for which records are available no more than four or five cases were reported for each death. Some sections of the country have shown a consistent rise in the ratio of cases to deaths over a period of years, while in others the change in ratio has taken place recently.

How much of this recent increase in numbers of cases reported is due to the inclusion of a greater proportion of nonparalytic cases is difficult to estimate because only a few States are able to furnish data on paralytic and nonparalytic forms of the disease. In the few States which supplied information for 1946 the percentage of nonparalytic cases included in the total reported varied from 1.8 to 77 percent, and none of the States were in epidemic areas. In 10 cities which reported on types of cases in 1946 the percentage varied from 30 to 67 , the higher ratios being reported in cities located in epidemic areas. For instance, three cities in epidemic areas, Minneapolis, Milwaukee, and Omaha, reported 50, 54, and 67 percent respectively
of the total cases as being nonparalytic. In nonepidemic areas, Detroit and New York City reported 31 and 37 percent respectively as being nonparalytic.

In the few States and the District of Columbia from which data were available there was not a very close correlation between the number of cases reported per death and the proportion of nonparalytic cases. One reasonably might expect that where the proportion of nonparalytic cases is large the number of cases reported per death would be correspondingly high. In Louisiana 1.8 percent of cases were reported to be nonparalytic but 17.3 cases per death were recorded, and in Georgia 7.7 were nonparalytic and 21.3 cases per death were reported. On the other hand, Vermont and Michigan reported 62 and 36 percent respectively as being nonparalytic and the numbers of cases per death were 12.7 and 14.8 respectively. These data suggest that the criteria for classifying cases as paralytic and nonparalytic may vary widely in different States or areas or that comparatively few nonparalytic cases which are reported are designated as such in certain States.

Poliomyelitis in other parts of the western hemisphere.-In 1946 there was a high incidence of poliomyelitis not only in the United States but also in several parts of the western hemisphere. In Canada there was greater prevalence, about 2,500 cases being reported or a morbidity rate of 22 per 100,000 population. About 64 percent of the total reported in Canada occurred in the Province of Quebec where the case rate was 48.3. About 20 percent of the total were reported in the Province of Ontario where the case rate was 13.5. The epidemic began early in July in both Provinces and the peak was reached early in September which coincided with the seasonal curve of incidence in northern United States.

Poliomyelitis was more prevalent than usual in the West Indies, Central and South America. The first cases in Cuba occurred in March, one case in each of three provinces, and the peak of the epidemic on the island was reached in June. The disease was most prevalent in the Provinces of Pinar del Rio, Havana, and Santa Clara. The morbidity rate in Cuba in 1946 was about 7.0 per 100,000 population as compared to 10.5 in 1942 when the last previous epidemic occurred. All cases reported were paralytic in type but the case fatality rate was only about 9 percent which was similar to the rate during the outbreak in 1942.

In Puerto Rico there was no increase in numbers of cases until June and the peak of the epidemic was reached in the month of September. A total of about 300 cases was reported in 1946 with a morbidity rate of 16.0 which was more than twice as high as the rate in the last previous epidemic in 1942 when 117 cases (case rate 6.2)
with 7 deaths were reported. Although the disease was prevalent in three of the principal cities on the island, the incidence rates were reported to be higher in the towns and smaller cities.

Mexico also had a greater prevalence of the disease in 1946 than during the past few years as judged by the numbers of cases reported annually. The outbreak began in May and reached a peak in June. A total of 206 cases with 37 deaths were reported between January 1st and October 1st, many of them in Mexico City. Case fatality was about 18 percent.

In Nicaragua a total of 78 cases with 4 deaths was reported from January to November inclusive. During July and August, 40 of the cases occurred in Managua (population 125,000 ) the capital of the country. The morbidity rate (32.0) was similar to that reported in several cities in the United States.

Venezuela reported an increased incidence during 1946, principally in Maracaibo (population 133,000) where 52 cases were reported during June and July. This city situated not far north of the equator also had as high reported incidence of the disease as certain cities in the United States. In an outbreak of poliomyelitis reported a few years previously in Caracas, Venezuela (estimated population 300,000), there were 122 cases with 15 deaths or a case rate of 41 . In this instance the seasonal occurrence was quite different, most of the cases occurring between November 1, 1941, to March 15, 1942.

Argentina reported an increased incidence, 200 cases being reported in Buenos Aires from February to May 1946, inclusive. There was also an increased prevalence in Southern Brazil from January through April. In Colombia 18 cases were reported in one small town.

The above reports would seem to indicate that poliomyelitis outbreaks in tropical regions are not as uncommon as is frequently stated. Other outbreaks have occurred in the West Indies and in Central and South America during the past few years. The Island of Trinidad (1940 population 473,555) reported 136 cases with 18 deaths from October 1941, to April 1942, inclusive. Later in 1942 outbreaks occurred in Cuba, Puerto Rico, and Colombia. Costa Rica and El Salvador had epidemics in 1944.

In addition to these epidemics there have been several reported in tropical regions located in other parts of the world. On the Island of Mauritius which lies just south of the equator and 600 miles east of Madagascar, 1,018 cases, 96 percent of which were paralytic, with 58 deaths were reported from January to May 1945 (1). Occasional cases had been seen on the island since 1927 and old cases indicated the presence of the disease as far back as 1891. The 1945 outbreak was a fairly severe one ( 240 cases per 100,000 population) occurring in an isolated population where the infection has been present in sporadic
form for many years. The distribution of cases with respect to age and sex, and rural and urban distribution was not unlike that found in the southern part of the United States.

On the Island of St. Helena (1939 population 4,622) 122 cases of poliomyelitis with 6 deaths were reported in 1945. No information is available with reference to previous occurrence on the island or on the age distribution of cases but the attack rate of about 2.5 percent suggests that this might have been an epidemic in "virgin soil."

It was also reported that an outbreak of the disease occurred in Singapore which presumably originated in British troops in November 1945, when 22 cases occurred among them. Up to March 1946, 161 cases with 15 deaths were reported among civilians, with 24 additional cases later in the year.

These outbreaks reported from tropical areas have varied widely in intensity as judged by the number of reported cases per 100,000 population but case fatality rates when available usually have been about 10 percent or less. Since most reports include only paralytic cases and considering the fact that reports for many countries are known to be incomplete or include data only for the principal cities it would appear that the assertion is borne out that the disease in tropical areas is milder than in temperate zones. When the data are available they indicate a higher incidence in rural areas and small towns than in the large cities, and an age distribution which is similar to that found in the southern part of the United States.

Spread of poliomyelitis infection.-How the virus of poliomyelitis is disseminated through the population in epidemic and interepidemic periods is still a matter of much dispute, but it appears that the theory of transmission by person to person contact or respiratory spread has been strengthened rather than weakened by recent accumulations of epidemiological data on the disease. Epidemiological evidence of a convincing nature is still lacking, which would suggest waterborne transmission, that insects or arthropods commonly are the means of carrying infection, or that food is the medium by which virus frequently is carried from person to person.

Recent investigations by Howe and his associates (2) indicated that in a certain proportion of recognized poliomyelitis cases the virus could be recovered from secretions swabbed from the oropharynx. Recovery of virus was possible only during the period not exceeding 4 days after onset of the disease. These investigators comment on the fact that their methods for recovery of virus were relatively crude, so it is probable that with a more refined technique and the use of more susceptible animals a more frequent harborage of virus in the oropharynx of clinically recognized cases could be demonstrated.

Kessel and Moore (3) have reported the recovery of virus from several pools of tonsils removed from children admitted to Los Angeles hospitals in an interepidemic period. This suggests another fairly substantial reservoir of infection from which dissemination of the virus may occur by means of person to person contact.

Aycock (4) in reporting on 49 cases in which there had been limited exposure to a previous case stated that of 17 cases of poliomyelitis with a history of a single exposure 16 fell between.the fourth day before and the fifth day after onset of the primary case. In an investigation carried out in Alabama, Casey (5) noted that 30 of 36 cases with a single exposure contact took place within the period of 3 days before and 4 days after the onset of the disease in the primary case. He later noted the same higb incidence of person to person contacts in Chicago during a nonepidemic year. Similar instances of the disease occurring following a definite exposure just prior to or just after onset are to be found in epidemiological reports on outbreaks by Frost (Iowa, 1909) (7), by Perkins (Minnesota, 1930) (8), and by Lumsden (Kentucky, 1935) (9).

Brown, Francis, and Pearson (10) reported finding poliomyelitis virus in the stools of a patient 19 days before onset of paralytic disease. In their epidemiological investigation th $\in \underset{y}{ }$ found that seven persons, including the patient just mentioned, were intimately expesed to a recognized case during the period of 4 days before to 2 days after onset of the primary case. This group was made up of lodgemates in a summer camp in Michigan in 1944. Five of six stools collected from boys in the lodge 6 days after last exposure contained poliomyelitis virus. Stools and throat washings from boys in other cabins were negative. It seems to be more than coincidence that the only persons having virus in their stools should have had intimate exposure with the primary case during the period of a few days prior to onset and 2 days thereafter.

These observations made by a number of investigators, namely, that transmission of infection does take place in the interval between a few days before to a few days after onset of a case, in conjunction with the findings of Howe that virus can be recovered from the secretions of the oropharynx in a large proportion of cases not longer than 4 or 5 days following onset, is highly suggestive of spread through secretions of the oropharynx. However, it is quite probable that the majority of infections are transmitted by individuals who exhibit no recognizable symptoms, rather than by recognized cases.

The role which the fecal carrier plays in dissemination of poliomyelitis virus is unknown at the present time. However, it can be
stated that outbreaks have not been observed in which it has been proved that they have played a definite part. Furthermore, it has never been demonstrated that a close correlation exists between incidence of the disease or infection and sanitary conditions of the environment either in the home or the community. The concept of spread of infection by transfer of secretions from the oropharynx through person to person contact continues to be the only one which is consistent with observed facts.

Summary.-There was a high incidence of poliomyelitis in the United States in 1946, principally in the north central part of the country.

There has been a mounting increase in ratio of cases to deaths in recent years, which is probably due to more complete reporting and inclusion of a greater proportion of nonparalytic cases.

Poliomyelitis was also more prevalent in other parts of the western hemisphere in 1946.

Epidemics appear to occur more frequently in tropical areas than is commonly stated.

Accumulations of epidemiological data in recent years appear to have strengthened the hypothesis that poliomyelitis is spread principally by person to person contact.

## REFERENCES

(1) McFarlan, A. M., et al.: The Epidemiology of the 1945 outbreak of poliomyelitis in Mauritius. Quart. J. Med., N. S., 15: 183-208 (July 1946).
(2) Howe, H. A., Bodian, D., and Wenner, H. A.: Further observations on the presence of poliomyelitis virus in the human oro-pharynx. Bull. Johns Hopkins Hosp., 76: 19-24 (January 1945).
(s) Kessel, J. F., and Moore, F. J.: The occurrence of poliomyelitis virus in tonsils and stools of noncontacts during an interepidemic period. . Am. J. Hyg., 41: 25-29 (January 1945).
(4) Aycock, W. L., and Kessel, J. F.: The infectious period of poliomyelitis and virus detection. Am. J. Med. Sc., 205: 454-65 (March 1943).
(5) Casey, A. E.: Place of contact and radial spread of epidemic poliomyelitis. Am. J. Dis. Child., 69: 152-56 (March 1945).
(6) Casey, A. E.: Fishbein, W. I.; and Bundesen, H. N.: Transmission of poliomyelitis by patient to patient contact. J. Ám. Med. Assoc., 129: 1141-45, (December 22, 1945).
(7) Frost, W. H.: Epidemiological studies of acute anterior poliomyelitis. Hygienic Laboratory Bulletin No. 90, 1912.
(8) Perkins, J. E.: Apparent spread of poliomyelitis through families. Minn. Med., 24: 924 (November 1941).
(9) Lumsden, L. L.: Epidemiological studies of poliomyelitis in Kentucky. Public Health Bulletin No. 228, 1936.
(10) Brown, G. C., Francis, T.; and Pearson, H. E.: Rapid development of carrier state and detection of poliomyelitis virus. J. Am. Med. Assoc., 129: 121-23 (September 8, 1945).

## FLY-ABATEMENT STUDIES IN URBAN POLIOMYELITIS EPIDEMICS DURING $1945{ }^{1}$

By Joseph L. Melnick, Ph.D., Yale University School of Medicine, Robert Ward, M. D., New York University College of Medicine, Dale R. Lindsay, Senior Assistant Sanitarian (R), and F. Earle Lyman, Senior Assistant Sanitarian (R), United States Public Health Service.

Poliomyelitis virus has been demonstrated repeatedly in or on flies trapped in epidemic areas in various parts of the country (1), (2), (3), (4), (5). This has been true of urban as well as of rural epidemics. Furthermore, food exposed to flies at homes of poliomyelitis patients has been shown to become contaminated with virus (6). For this reason, it is important to determine whether or not the presence of virus in association with these insects plays a part in the spread of poliomyelitis.

It would be a valuable experiment, for instance, if a sudden, substantial and prolonged reduction in the fly population could be achieved during a poliomyelitis epidemic and within the epidemic area. For this reason, the following experiments were devised. Their object was twofold: First, to determine whether the fly population within cities could be reduced by the methods employed, and second, to determine whether or not such a reduction in flies could be correlated with the course of an epidemic of poliomyelitis.

Plans were drawn with the advice and close cooperation of the United States Public Health Service ${ }^{2}$ and others ${ }^{3}$. It was proposed that DDT be used as the fly-abatement measure and that its use be confined to cities. It was further proposed that the work be limited to outdoor application and that it be carried out as a controlled study, in which certain areas of a city would be treated with DDT and others left untreated. An effort was made in this experiment to select such areas early in the epidemic, and to obtain permission from local authorities to start work as quickly as possible.

Preliminary work was carried out during the latter part of June 1945 in Savannah, Ga., ${ }^{4}$ a nonepidemic area. An attempt was made

[^2]to "blanket" with DDT approximately 1 square mile in the most heavily populated area of the city. The population in this area was about 30,000 , the total city population being estimated at 160,000 . A Bean orchard sprayer of 600 -gallon capacity and having a maximum pressure of 800 pounds per square inch, delivering a maximum of 35 gallons per minute, and mounted on a $21 / 2$-ton International truck, comprised the unit used in this experiment. Figure 1 shows the unit in operation in Savannah. One thousand pounds of DDT ${ }^{5}$ were applied in the form of a xylene-Triton-water emulsion, containing from 1.3 to 2.5 percent DDT. Seven men worked for 4 days to disperse this material. In the midst of the treatment, the schedule was interrupted by 2.8 inches of rain. Hand spraying was not done. Not until 9 days after the last day of spraying was fly trapping started. At that time, there was no significant difference in the number of flies trapped within or without the sprayed area.

The fly traps which were employed during these experiments were those described and recommended by the United States Department of Agriculture for use in farming communities (7). The manner in which they were employed to estimate the fly population has been described in previous publications from this laboratory (8), (9). Bait consisted of fish plus ripe fruit. Flies were killed by freezing and aliquots were kept frozen until identified. ${ }^{6}$

Further trials were carried out during the early part of July in New Haven, Conn. ${ }^{7}$ where air-blast equipment was adapted for urban spraying of DDT. A modified Bean "Speed Sprayer" is illustrated in action in figure 2. During this period methods were developed for testing the efficiency of the dispersing equipment. Caged flies and petri dishes were exposed at various stations in city blocks. The location of the sample stations in the block, and of the test block itself when a large area was sprayed, was unknown to the spraying operators. After treatment caged flies were observed as a measure of the immediate effect of the spray, and the petri dishes were biologically assayed with freshly trapped flies for residual insecticidal properties at a later date.

[^3]
## EPIDEMIC STUDIES

During July and August two field experiments were carried out in poliomyelitis areas. Considerable difficulty was encountered in selecting satisfactory locations for these studies. The plan was to select a city in which an epidemic appeared to be developing, then to divide the city into two sections, and to proceed with operations in one section. The untreated part was to serve as a control for determining the normal fly population and the incidence of poliomyelitis in the city. Relatively little difficulty was encountered in obtaining the cooperation of the health officer, but about 2 weeks were required for discussion either by local groups or others, and for assembling equipment, materials, and personnel.

New Jersey test.-During July the incidence of poliomyelitis in Passaic County, N. J., increased with a fairly concentrated epidemic focus in the eastern part of the county at the Clifton-Passaic boundary. It was decided that the city of Paterson, ${ }^{8}$ lying to the north, might-become a suitable area for the experiment, since it was not seeded as extensively with cases. For the geography of the area, see figure 4.

Paterson occupies 8 square miles, of which 4 square miles (wards $1,2,3,4$-indicated in figure 4) were treated with $2 \frac{1}{2}$ tons of DDT ( 2 pounds per acre). This project required the services of 12 men, some working for only 1 week, and others working for 5 weeks. ${ }^{9}$ The actual days in which spraying operations were carried out is indicated in table 1. The 1940 population of the treated area was 67,276 ; that of the remaining 4 square miles of the city which served as the control area was 72,380 .

In addition to dispersing a 5 -percent-DDT emulsion with air-blast equipment from trucks (see figure 2), much effort was expended in treating the garbage dumps in every yard with a 10 -percent-DDT emulsion. (See fig. 3). This proved an arduous and time-consuming task, but was successful in applying DDT at strategic points.

The result of the treatment on the fly population as measured in two of the wards is indicated in figure 5. Definite fly reduction lasting a few days was achieved in all wards. Moreover, when an area (ward 2) was retreated 9 days after the first spraying, it was possible to maintain the fly population at 10 to 25 percent of its normal level

[^4]

Figure 1.-Bean orchard sprayer operating in Savannab, Ga. DDT is being applied from four nozzles, each controlled by an operator. The distance traversed by the spray is dependent upon the output; consequently, it was necessary to work at a maximum delivery of about 35 gallons per minute with a dilute DDT emulsion ( 1 to 2 percent).


Figure 2.-Bean "Speed-Sprayer" operating in Paterson, N. J. This air-blast apparatus is powered by a 100 -horsepower motor, which generates 125,000 cubic feet of air per minute. DDT in varying amounts may be placed in the air current. It was customary to use a 5 -percent emulsion in this machine.
Plate II


 miles. Treated area (wards $1,2,3,4$ ) $=4$ square miles.


Figure 3.-Application of DDT by hand sprayer at a backyard garbage dump in Paterson, N. J.

Table 1.-Average number of fies per trap ${ }^{1}$ in Paterson in relation to spraying operations


[^5]

Figure 5.-Fly abatement produced in wards 2 and 3 of Paterson, N. J., by application of DDT as indicated. Prolonged fly control for 20 days was achieved by retreatment of ward 2 before the fly population overcame the effects of the first spraying.
for a period of 20 days. Particularly successful results on fly abatement were obtained at a housing project, made up of several twoand three-story buildings scattered over 18 acres and inhabited by 299 families with an estimated population of 1,200 . Intensive treat-
ment, not only with DDT, but with a larvicide, orthodichlorobenzene, resulted in good control for the entire month of August. (See fig. 6.)


Figure 6.-Intensive application of DDT and larvicide (orthodichlorobenzene) at housing project resulted in good fly abatement for an entire month. The flies which were trapped soon after the spraying were newly emerged from pupa which had been buried in the ground at the time of spraying.

The case rate of poliomyelitis, by date of onset, in Paterson is shown in figure 7. In evaluating the spray effect, all cases having their onset before August 17 are considered to have been in the incubation period during the spraying period of July 26 to August 19, and there-


FIGdRI 7.-Poliomyelitis in Paterson, N. J. No effect of the DDT spraying can be seen on the course of the epidemic.
fore not subject to the possible effect of DDT. A total of 62 cases was reported in the city of 140,000 , with a case rate of 44 per 100,000 . Before August 17, the case rate in the area later sprayed was 18 per 100,000 ; in the control area it was 15 . After August 17, the rate in the sprayed area was 25 per 100,000 , in the control area, 30 . Only 39 actual cases developed in Paterson after August 17; 17 in the sprayed, and 22 in the control area. (See table 2.) One case of poliomyelitis occurred on August 21 in the housing project referred to above.

Table 2.-Poliomyelitis in Paterson, N. J.1-1945


${ }^{1}$ Total cases for Paterson: 62 per 140,000 or 44 per 100,000.
Illinois test.-A second experiment was carried out in the city of Rockford, Winnebago County, Ill., ${ }^{10}$ in the latter part of August. The city of Rockford is inhabited by 85,000 people; its area is 12 square miles. In contrast to Paterson, which is part of a large metropolitan area, Rockford is surrounded by farmsteads. When spraying operations were started on August 23, the epidemic was uniformly spread throughout the city and had passed its peak. (See fig. 10.) The 4 -square-mile area ( 27,215 population), in the northwestern part of the city, outlined in figure 8, was sprayed with $\mathbf{~}^{2}$ tons of DDT from August 23 to 28 by means of Bean orchard sprayers similar to those used in the Savannah rehearsal. Rain fell intermittently for 5 days after the spraying, as follows: August 28, 0.25 inch; August 29, 0.65 inch; August 31, 1.70 inches; September 1, 0.33 inch. It was not practical to move equipment from New Jersey, even though it was felt the latter equipment was better suited for this

[^6]

Figurs 8.-Rockford, Ill. Cases were reported uniformly throughout the city. Wards 4, 7, and 9 in the northwestern part of the city were treated with DDT. The region surrounding Rockford is rural in character. Area of Rockford equals 12 square miles. Treated area equals 4 square miles.
type of work. No hand spraying was attempted in Rockford. ${ }^{11}$ Eleven men required 6 days to apply the 5 -percent-DDT emulsion at a level of 1.5 pounds per acre. Fly trapping was started at the time of, the spraying operations and was continued for an additional month. This necessitated the employment of two additional men.

The result of the treatment in two of the wards is shown in figure 9. Fly reduction for 5 days was achieved in ward 9 ; no significant abatement was noticed in ward 4. Results in ward 7 were of an intermediate nature. The actual fly catches for the sprayed and control areas of the city are given in table 3.

[^7]

Figure 9.-Results of DDT treatment of fly population in wards 4 and 9, Rockford, 71 . Fly reduction for a few days was present in ward 9, but none was demonstrable in ward 4. No hand spraying was attempted here.

Table 3.-Average volume in cubic centimeters of flies per trap in Rockford in relation to spraying operations ${ }^{1}$


[^8]Table 4.-Poliomyelitis in Rockford, Ill.1-1945

| Week of- | Total cases in Winnebago County | Cases in sprayed wards, 4, 7, 9 |  | Control area in City |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Actual number | $\begin{aligned} & \text { Rate per } \\ & 100,000 \end{aligned}$ | Actual number | $\begin{array}{\|c} \text { Rate per } \\ \mathbf{1 0 0 , 0 0 0} \end{array}$ |
| July 1. | 2 | 0 | 0 | 2 | 4 |
| July 8. | 0 | 0 | 0 | 0 | 0 |
| July 15. | 4 | 0 | 0 | 1 | 2 |
| July 22. | 10 | 0 | 0 | 8 | 14 |
| July 29 | 40 | 5 | 18 | 15 | 26 |
| August 5 | 62 | 6 | 22 | ${ }^{26}$ | 45 |
| August 12 | 64 | 19 | 70 | 21 | 37 |
| August 19 | 40 | 9 | 33 | 17 | 30 |
| - August 26. | 32 | 6 | 22 | 11 | 19 |
| September 2 | 16 | 3 | 11 | 7 | 12 |
| September 9 | 16 | 4 | 15 | 9 | 16 |
| September 16 | 11 | 4 | 15 | 6 | 11 |
| September ${ }^{3} 3$ | 8 | 0 | 0 | 5 | 9 |
| Septamber 30 | 6 | 1 | 4 | 2 |  |
| October 7-..- | 4 | 1 | 4 | 3 | 5 |
| October 14. | 3 | 0 | 0 | 2 | 4 |
| October 21. | 1 | 0 | 0 | 1 | 2 |
| October 28 | 0 | 0 | 0 | 0 | 0 |
| November | 1 | 0 | 0 | 0 | 0 |
| November 11 | 1 | 0 | 0 | 0 | 0 |
| Total | 321 | 58 |  | 136 |  |
| Population $\qquad$ <br>  <br> Rate par 100,000 before Septamber 9 <br> - |  | $\begin{array}{r} 27,215 \\ 4 \\ 177 \\ 37 \end{array}$ |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  | 194 |  |  |
|  |  |  |  | 49 |  |

${ }^{1}$ Total cases for Rockford: 194 per $\mathbf{8 5 , 0 0 0}$ or $\mathbf{2 2 8}$ per $\mathbf{1 0 0 , 0 0 0 .}$


Figure 10.-Poliomyelitis in Rockford, Ill. No effect of the treatment can be seen on the course of the epidemic.

The case rate of poliomyelitis by date of onset is presented in table 4 and in figure 10. In evaluating the results of the spraying, all cases with an onset before September 9 are regarded to have been in the incubation period before or during the spraying period. A total of 194 cases occurred in Rockford, of which only 38 had their onset after September 9. Of these, 10 were in the sprayed area and 28 were in the control area. The case rate per 100,000 before September 9 was 177 in the sprayed and 194 in the control area; after September 9 the case rate dropped to 37 per 100,000 in the sprayed, and 49 in the control area.

The estimated cost of these experiments was $\$ 12,000$ for Paterson and $\$ 7,000$ for Rockford, exclusive of airplane spraying. The number of man-hours required to carry them out was 2,850 for Paterson and 1,550 for Rockford. The figures given are of necessity approximations in view of the fact that much effort was spent in evaluating various types of equipment, some of which was rented by the commission and some of which was loaned to it.

Some damage to property was caused by the spraying operations. This consisted chiefly of the contamination of outdoor goldfish ponds in gardens, with the resultant death of the fish. By and large however, complaints were few and no reports of damages to gardens, bee hives, or other forms of plant or insect life were received.

As shown in tables 5 and 6, there was no recognizable effect of the
Table 5.-Principal fly species found in Patterson, N. J.

| Period | July 25 to Aug. $11{ }^{1}$ |  |  | Aug. 12 to Aug. $25{ }^{2}$ |  |  | Aug. 26 to Sept. 73 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Wards | 1 and 4 | 2 and 3 | Control | 1 and 4 | 2 and 3 | Control | 1 and 4 | 2 and 3 | Control |
| Number of flies identified.-- | 2,625 | 11,468 | 3,675 | 2,730 | 4,615 | 1,758 | 5,191 | 7,193 | 2,796 |
| Specios | Percentage of total fiy population |  |  |  |  |  |  |  |  |
| Phaenicia sericata | 62.5 | 73.0 | 64.0 | 73.6 | 60.0 | 66.6 | 43.3 | 33.4 | 41.8 |
| Muscina assimilis. | 6.5 | 6.7 | 7.3 | 3.1 | 11.2 | 6.1 | 9.6 | 17.7 | 10.3 |
| Muscina stabruan | 12.2 | 5.2 | 11.4 | 2.3 | 6.2 | 5.9 | 6.2 | 8.5 | 17.6 |
| Phormia regina | 3.9 | 3.0 | 4.3 | 10.0 | 4.8 | 5.4 | 19.1 | 10.9 | 8.1 |
| Lucilia illustris | 3.7 | 3.3 | 4.2 | 3.2 | 5.2 | 4.9 | 1.1 | 1.2 | . 4 |
| Phaenicia caeruleiniridis. | 2.1 | 2.0 | 3.2 | 2.1 | 4.7 | 4.9 | 2.4 | 2.4 | . 8 |
| Ophyra leucostoma. | 1.4 | 1.2 | 1.9 | 2.0 | 1.9 | 1.9 | 9.4 | 7.5 | 10.0 |
| Sarcophaga spp- | 1.5 | 1.9 | 2.9 | 1.0 | 3.4 | 1.9 | 2.1 | 3. 6 | 2.3 |
| Musca domestica | 3.1 | 1.2 | 1.4 | 1.0 | 1.8 | . 8 | 1.3 | 3.4 | 2.8 |
| Fannia spp... | . 7 | 1.1 | . 9 | . 4 | 1.0 | . 3 | 2.0 | 3.8 | 2.4 |

[^9]Table 6.-Principal fly species found in Rockford, Ill.

${ }^{1}$ The following additional species were found ranging less than 0.9 percent: Calliphora erythrocephala, Bufolucilia silvarum, Platycoenosia spp., Pollenia rudis, Protophormia terraenovae, Hyemya spp., Euxesta noraia, Chrysomyza iemanaata, Cochiomyia macellaria, Drosophila spp., Camploneura picia, Call phora ${ }^{2}$ The following additional species were found ranging less than 0.8 percent: Bufolucilia silvarum, Muscina assimilis, Platycoenosia spp., Pollenia rudis, unidentified species Hylemya Cailiphora vomitoria, Syrphidae (fam.), Anthomyia pluvialis, Ophyra aenescens, Stomoxys calcitrans, Cynomyopsis cadaverina, Drosophila spp., Myospila meditabunda, Graphiomyia macu${ }^{2}$ The following sdditionsp., and Monelia micans. Pompia rudis, unidentined species, Calliphora vomitoria, Lanchaea polia, Protophormia errae-novae, Calliphora ariaesens, Graphiomyia maculata, Anthomyia pluvialis, Myospila meditabunda, Morellia micans and Chaetopsis, and mosquitoes. ${ }^{\text {The }}$. phora viridescens, Lonchaea polita, Scatophapa spp., Hylemya spp., Protophormia terrae-novae, Euxesta notata, Calliphora vomitoria, Cochliomyia macellaria, Syrphidau (fam.), Anthomyia
plupialis, Pollenia rudis, Camptoneura picta, Stomuxys calcit ans, Chrysomyza demandata, Anisopus marginatus, Morellia micans, Myospila meditabunda, unidentified species.
spraying on the relative incidence of any one species of fly. ${ }^{12}$ The incidence of a given species fluctuated in a similar manner in the sprayed and control wards, in both Paterson and Rockford. These were probably seasonal fluctuations, approximating those noted in previous studies of normal fly populations (8), (9).

It is recognized that, inasmuch as a widespread application of DDT was made, it is quite possible that insects other than flies may also have been reduced in number during the experimental period. However, no extensive study was made of this feature.

## SUMMARY

DDT was applied in two poliomyelitis epidemic areas, each with an area of about 4 square miles and inhabited by some 67,000 and 27,000 people, respectively. A temporary reduction in flies was achieved in both areas. Under the circumstances, which were not ideal, there was no effect on the poliomyelitis epidemic in either area.

These studies should be regarded as preliminary attempts to answer the question of the role of fly abatement in poliomyelitis control. They serve to indicate some of the difficulties and costs involved in large-scale work of this nature. That they did not answer successfully the major question either in a positive or negative direction was due to the following facts: (1) Poliomyelitis rates in Paterson, N. J., were hardly at the epidemic level, (2) spraying in Rockford, Ill., did not commence until after the outbreak had passed its peak, and (3) striking and prolonged fly control was not achieved. The inconclusive results obtained in this work can not be accepted, therefore, as a final answer to the question.

## REFERENCES

(1) Paul, J. R.; Trask, J. D.; Bishop, M. B.; Melnick, J. L.; and Casey, A. E.: The detection of poliomyelitis virus in flies. Science, 94: 395-396 (1941).
(2) Trask, J. D.; Paul, J. R.; and Melnick, J. L.: The detection of poliomyelitis virus in flies collected during epidemics of poliomyelitis. J. Exp. Med., 77: 531-544 (1943).
(8) Sabin, A. B., and Ward, R.: Flies as carriers of poliomyelitis virus in urban epidemics. Science, 94: 590-591 (1941).
(4) Toomey, J. A.; Takacs, W. S.; and Tischer, L.. A.: Poliomvelitis virus from flies. Proc. Soc. Exp. Biol. and Med., 48: 637-639 (1941).
: Insects and epidemiology of poliomyelitis. Science, 95: 300-301 (1942).
(5) Melnick, J. L., and Ward, R.: Sasceptibility of vervet monkeys to poliomyelitis virus in flies collected at epidemics. J. Infectious Diseases, 77: 249-252 (1945).
(6) Ward, R.; Melnick, J. L.; and Horstmann, D. M.: Poliomyelitis virus in fly contaminated food collected at an epidemic. Science, 101: 491-493 (1945).

[^10](7) Bishop, F. C.: Flytraps and their operation. Farmer's Bulletin, No. 734, U. S. Department of Agriculture, Washington (1937).
(8) Power, M. E.; Melnick, J. L.; and Bishop, M. B.: A study of the 1942 fly population of New Haven. Yale J. Biol. and Med., 15: 693-705 (1943).
(9) Power, M. E., and Melnick, J. L.: A three-year survey of the fly population of New Haven during epidemic and non-epidemic years for poliomyelitis. Yale J. Biol. and Med., 18: 56-69 (1945).

DEATHS DURING WEEK ENDED MAY 24, 1947
[From the Weekly Mortality Index, issued by the National Office of Vital Statistics]

|  | Week ended May 24, 1947 | Corresponding week, 1946 |
| :---: | :---: | :---: |
| Data for 93 large cities of the United States: |  |  |
|  | 8,923 | 8. 878 |
| Median for 3 prior years | 8,878 |  |
| Total deaths, first 21 weeks of year | 207, 368 | 205, 145 |
| Deaths under 1 year of age | 699 | 638 |
| Median for 3 prior years .-.-..................... | +612 |  |
| Deaths under 1 year of age, first 21 weeks of year | 16,540 | 12,856 |
| Data from industrial insurance companies: |  |  |
| Policies in force-..-..... | $67,305,638$ 12,279 | 67, 185, 11,564 |
| Death claims per 1,000 policies in force, annual rate | 12, 9.5 | 9.0 |
| Death claims per 1,000 policies, first 21 weeks of year, annual rate | 10.0 | 10.6 |

## INCIDENCE 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 MAY 31, 1947

## Summary

Of the total of 42 cases of poliomyelitis reported for the week, as compared with 33 last week, 144 for the corresponding week last year, and 52 for the 5 -year (1942-46) median, only 3 States reported more than 2 cases each-California 18 (last week 10), Texas 5 (last week 5), and Kentucky 4 (last week 0 ). The total since the approximate average date of low seasonal incidence (week ended March 15, 1947) is 342 , as compared with 565 for the corresponding period last year and a 5 -year median of 297. During the period since March 15, the 5 States reporting more than 10 cases each are as follows (figures for the same period last year in parentheses): California 111 (63), New York 31 (39), Texas 28 (94), Florida 19 (120), Illinois 14 (18).

Of the diseases listed in the following tables, current and cumulative figures are above the 5 -year medians for amebic and unspecified dysentery, tularemia, and whooping cough. The figure to date for undulant fever is 2,292 , as compared with 1,860 and 1,967 respectively, for the years 1946 and 1945. Both current and cumulative figures are below the 5 -year medians for diphtheria, measles, meningococcus meningitis, scarlet fever, smallpox, typhoid and paratyphoid fever, infectious encephalitis, Rocky Mountain spotted fever, and endemic typhus fever.

Cases of smallpox were reported in only one State (Alabama, 3 cases), 2 cases of anthrax were reported, 1 each in New York and Pennsylvania, 4 cases of infectious encephalitis (3 in Illinois and 1 in Nebraska), and 1 case of leprosy, in Texas.

For the current week 19 cases of Rocky Mountain spotted fever were reported (as compared with 23 for the corresponding week last year and a 5 -year median of 23) of which 6 occurred in Maryland and 3 each in Illinois and Oklahoma. The total to date is 82 , as compared with 88 for the same period last year.
A total of 8,130 deaths was recorded for the week in 93 large cities of the United States, as compared with 8,923 last week, 8,272 and 8,680 , respectively, for the corresponding weeks of 1946 and 1945 , and a 3 -year (1944-46) median of 8,436 . The cumulative figure is 215,498 , as compared with 213,417 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended May 31, 1947, and comparison with corresponding week of 1946 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.


Telegraphic morbidity reports from State health officers for the week ended May 31, 1947, and comparison with corresponding week of 1946 and 5 -year median-Con.


[^11]Telegraphic morbidity reports from State health officers for the week ended May \$1, 1947, and comparison with corresponding week of 1946 and 5-year median-Con.

| Division and State | Whooping cough |  |  | Week ended May 31, 1947 |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Week ended- |  | $\begin{aligned} & \mathrm{Me} \\ & \text { dian, } \\ & \text { 1942- } \\ & 46 \end{aligned}$ | Dysentery |  |  | En-cephalitis, infectious | Rocky Mt. spotted fever | Tula remis |  | $\begin{aligned} & \text { Un- } \\ & \text { du- } \\ & \text { lant } \\ & \text { faver } \end{aligned}$ |
|  | $\begin{aligned} & \text { May } \\ & 31 \\ & 1947 \end{aligned}$ | $\begin{gathered} \text { June } \\ 194 \\ 1946 \end{gathered}$ |  | $\underset{\text { bic }}{\text { Ame- }}$ | $\begin{array}{\|c} \text { Bacil- } \\ \text { lary } \end{array}$ | $\begin{gathered} \text { Un- } \\ \text { speci- } \\ \text { fied } \end{gathered}$ |  |  |  |  |  |
| NEW ENGLAND |  |  |  |  |  |  |  |  |  |  |  |
| Maine | 19 | 13 | 19 |  |  |  |  |  |  |  | 1 |
| New Hampshire... | 4 | 4 | 3 |  |  |  |  |  |  |  |  |
| Vermont......- | 1 | 1 | 15 |  |  |  |  |  |  |  | 2 |
| Massachusetts. | 100 19 | 124 9 | 114 |  | 2 |  |  |  |  |  |  |
| Connecticut.-- | 44 | 49 | 35 |  |  |  |  |  |  |  | 3 |
| middle atlantic |  |  |  |  |  |  |  |  |  |  |  |
| New York | 131 | 131 | 192 | 5 | 1 |  |  |  |  |  | 2 |
| New Jersey | 149 | 88 | 88 |  |  |  |  |  |  |  |  |
| Pennsylvania rast north central | 146 | 180 | 180 | 1 |  |  |  | 1 |  |  |  |
| Ohio.- | 192 | 87 | 110 |  |  |  |  |  |  |  |  |
| Indians | 24 | 30 | 30 |  | 1 |  |  | 1 |  |  |  |
| Illinois..- | 70 | 103 | 103 | 3 | 1 | ---- | 3 | 3 | 1 |  | 13 |
| Michigan ${ }^{\text {2 }}$ | 217 | 125 | 125 |  | 1 |  |  |  |  |  | 3 |
| Wisconsin $\qquad$ wEST NORTH Cerntral | 149 | 127 | 127 |  |  |  |  |  | 1 | ----- | 8 |
| Minnesota | 36 | 22 | 22 |  |  | 1 |  |  |  |  | 3 |
| Iowa. | 17 | 27 | 16 |  |  |  |  |  |  |  | 12 |
| Missouri-:- | 39 | 19 | 19 |  |  |  |  | 1 |  |  |  |
| North Dakota | 101 |  | 2 |  |  |  |  |  |  |  |  |
| South Dakots.. | 1 |  | 3 |  |  |  |  |  |  |  |  |
| Nebraska.....- | 31 | 11 | 13 |  |  |  | 1 |  |  |  | 2 |
| SOUTH ATLANTIC |  |  |  |  |  |  |  |  |  |  |  |
| Delaware. | 5 |  |  |  |  |  |  |  |  |  |  |
| Maryland ${ }^{\text {3 }}$--...-.... | 92 | 7 | 50 |  |  | 1 | ---- | 6 |  |  |  |
| District of Columbia. | 22 | 10 | 11 | 1 |  |  |  |  | 1 |  |  |
| Virginia ---- | 85 | 133 | 64 |  |  | 108 |  |  |  |  | 1 |
| West Virginia. | 17 | 30 | 30. |  |  |  |  |  |  |  |  |
| North Carolina | 77 | 109 | 116 | 1 |  |  |  |  |  | 1 | 1 |
| South Carolina | 204 | 31 | 71 | 1 | 14 |  |  |  |  | , | 1 |
| Georgia | 29 | 4 | 37 |  | 1 |  |  |  |  | 2 | 3 |
| Florida.-..-.... | 74 | 45 | 21 |  |  |  | -...- |  |  | 2 | .-.-- |
| hast south central |  |  |  |  |  |  |  |  |  |  |  |
| Kentucky. | 35 | 25 | 34 |  |  |  |  |  |  |  |  |
| Tennessee. | 42 | 45 | 45 |  |  |  |  |  |  |  |  |
| Alabama-- | 148 | 31 | 37 | 1 |  |  |  |  |  | 6 | 1 |
| Mississippi ${ }^{\text {2 }}$-.-.-.--- | 16 |  |  | 1 |  |  | --- |  | 8 |  | 1 |
| WEST SOUTH CENTRAL |  |  |  |  |  |  |  |  |  |  |  |
| Arkansas.. | 63 | 2 | 13 |  |  |  |  |  | 15 |  |  |
| Louisiana. | 10 | 5 | 2 | 2 |  |  |  |  |  | 2 | 1 |
| Oklahoma. | 41 | 7 | 11 | 2 |  |  |  | 3 |  |  | 2 |
| Texas.-- | 782 | 172 | 297 | 22 | 287 | 22 |  |  |  | 14 | 11 |
| MOUNTAD |  |  |  |  |  |  |  |  |  |  |  |
| Montana | 7 | 5 | 5 |  |  |  |  |  |  |  |  |
| Idaho-. | 3 | 21. | 0 | 1 |  |  |  |  |  |  |  |
| W yoming | 1 | 20 | 3 |  |  |  |  |  |  |  |  |
| Colorado | 4 | 12 | 26 |  |  |  |  | 1 |  |  |  |
| New Mexico. | 24 | 13 | 5 |  |  |  |  |  |  |  |  |
| Arizona. | 53 | 24 | 22 |  |  | 12 |  |  |  |  | 1 |
| Utah ${ }^{3}$ | 6 | 7 | 33 |  |  |  |  |  |  |  | 1 |
| Nevada....-............- |  |  |  |  |  |  |  |  |  |  |  |
| PaCIFIC |  |  |  |  |  |  |  |  |  |  |  |
| Washington.. | 14 | 43 | 23 |  |  |  |  |  |  |  | 1 |
| Oregon. | 11 | 25 | 22 |  |  |  |  | 1 |  |  | 1 |
| California. | 240 | 96 | 313 | 3 | --... |  |  |  |  | 2 | 9 |
| Total. | 3,601 | 2,079 | 2,366 | 50 | 316 | 147 | 4 | 19 | 37 | 30 | 90 |
| Same week, 1946 | 2,079 ${ }^{1}$ |  |  | 37 | 498 | 248 | 16 | 23 | 16 | 52 | 91 |
| Median, 1942-46 | 2,366 |  |  | 37 | 483 | 97 | 14 | 23 | 17 | 52 | 798 |
| 2 weeks: 1947... | 3,311 |  |  | 1,066 | 6,528 | 4,242 | 144 | 82 | 681 | 804 | 2, 293 |
| 1946 | 1,019 |  |  | 858 | 7,212 | 2,503 | 193 | 88 | 392 | 1,015 | 1,860 |
| Median, 1942-46............- | 4, 758 | - | --1 | 677 | 6,002 | 1,643 | 193 | 84 | 387 | 1,0157 | 1,914 |

${ }^{2}$ Period ended earlier than Saturday.

[^12]Anthrax: New York 1 case; Pennsylvania 1 case.
Leprosy: Texas 1 case.

## WEEKLY REPORTS FROM CITIES ${ }^{1}$

City reports for week ended May 24, 1947
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.


[^13]City reports for week ended May 24，1947－Continued

|  | \#\# | $\dot{\Xi}_{\Phi}$ | Infl | nza |  | 曹皆 | $\stackrel{\infty}{a}$ | $\pm$ |  |  | 泪 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Division，State，and City | 品 总 吕 |  | $\begin{aligned} & \mathbf{8} \\ & \text { థ } \\ & \text { む } \end{aligned}$ | $\begin{aligned} & \stackrel{\circ}{\stackrel{a}{\widetilde{\omega}}} \\ & \stackrel{\oplus}{\circ} \end{aligned}$ |  |  |  |  |  |  |  |  |
| WEST NORTH CENTRAL－ continued |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Kansas： |  |  |  |  |  |  |  |  |  |  |  |  |
| Topeka | 0 | 0 |  | 0 | 8 | 0 | 0 | 0 | 5 | 0 | 0 0 | 3 |
| Wichita | 1 | 0 |  | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 2 |
| south atlantic |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Baltimore | 4 0 | 0 | 1 | 0 | 14 | 1 | 5 0 | 1 0 | 18 | 0 | 1 | 78 |
| Frederick | 1 | 0 |  | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | －．．．－－ |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lynchburg－．． | 1 | 0 | 1 | 0 | $\stackrel{1}{57}$ | 0 0 | 0 | 0 | 0 3 | 0 | 0 | $\cdots$ |
| Roanoke． | 0 | 0 |  | 0 | 38 | 0 | 0 | 0 | 3 | 0 | 0 | ．．．．． |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| North Carolina： |  |  |  |  |  |  |  |  |  |  |  |  |
| Waleigh ${ }_{\text {Witmington }}$ | 0 | 0 |  | 0 | 2 | 0 0 | 1 | 0 | 0 | 0 | 0 | 10 |
| Winston－Salem | 0 | 0 |  | 0 | 13 | 0 | 0 | 0 | 1 | 0 | 0 | 5 |
| South Carolina： |  |  |  |  | 11 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| Georgia： |  |  |  |  |  |  |  |  |  |  |  |  |
| Atlanta | 0 | 0 |  | 0 |  | 0 | 6 | 0 | 0 | 0 | 0 | 2 |
| Brunswick． | 0 | 0 |  | 0 | 2 | 0 | 0 | 0 0 | 0 | 0 | 0 | 3 |
| Savannah Florida： | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |  |  |
| Tampa ．－．．－．．．．．．－．－ | 0 | 0 |  | 0 | 9 | 0 | 0 | 1 | 2 | 0 | 0 | 2 |
| fast gouth central |  |  |  |  |  |  |  |  |  |  |  |  |
| Tennessee： |  |  |  |  |  |  |  |  |  |  |  |  |
| Menphis－．．．－．．．－－－－ | 0 | 0 |  | 0 | 4 | 0 | 1 | 0 | 2 3 | 0 | $\stackrel{2}{2}$ | 22 4 |
| Alabama： |  |  |  |  |  |  |  |  |  |  |  |  |
| Birmingham ．．．．．．．．．－ | 0 | 0 |  | 0 | 11 | 0 | 3 | 0 | 0 | 0 | 0 | 2 |
| Mobile．．－－．－．．．．．．．－－ | 1 | 0 |  | 0 | 3 | 1 | 1 | 0 | 2 | 0 | 0 | 4 |
| west soutil central |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| New Orleans | 5 | 0 | 2 | 0 | 11 | 0 | 5 | 0 | 0 | 0 | 1 | 12 |
| Shreveport．．．．－．．．．．．－ | 0 | 0 |  | 0 |  | 0 | 2 | 0 | 0 | 0 | 0 | －－．．．－ |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Galveston－．．．．．．－．－．－－－ | 0 | 0 |  | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |  |
| Mouston．－ | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 1 | 6 |
| San Antonio．．．．．．．．－－ | 2 | 0 | 2 | 1 |  | 0 | 1 | 0 | 1 | 0 | 1 |  |
| mOUNTAIN |  |  |  |  |  |  |  |  |  |  |  |  |
| Montana： |  |  |  |  |  |  |  |  |  |  |  |  |
| Billings．－－－．－．．．－．－．－ | 0 | 0 |  | 0 |  | 0 | 0 | 0 | 2 | 0 | 0 |  |
| Great Falls．．．．．．．．．－－ | 0 | 0 |  | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Helena ．． | 0 | 0 |  | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| Missoula | 0 | 0 |  | 0 | 25 | 0 | 2 | 0 | 0 | 0 | 0 |  |
| Idaho： |  |  |  |  |  |  |  |  | 0 | 0 | 0 | 1 |
| Colorado： |  |  |  |  |  |  |  |  |  |  |  |  |
| Denver－．．．－．－．．．．．．．．－－ | 2 | 0 | 1 | 0 |  |  |  |  |  | 0 | 0 | 9 |
| Utah：Pueblo．－．－．－．．．．－－－－－－－ | 0 |  |  | 0 | 1 | 0 | 2 | 0 | 1 | 0 |  |  |
| Salt Lake City ．－．．．．．． | 0 | 0 | －－－－－ | 0 | 4 | 0 | 0 | 0 | 3 | 0 | 0 | 2 |

City reports for week ended May 24, 1947—Continued

| Division, State, and City |  |  | Influenza |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | $\begin{aligned} & \text { 毋. } \\ & \text { む } \end{aligned}$ |  |  |  |  |  |  |  |  |  |
| PACIFIC |  |  |  |  |  |  |  |  |  |  |  |  |
| Washington: |  |  |  |  |  |  |  |  |  |  |  |  |
| Seattle. | 0 | 0 |  | 0 | 4 | 0 | 2 | , | 2 | 0 | 0 | 6 |
| Spokane | 0 | 0 |  | 0 | 1 | 0 | 1 | 0 0 | 0 | 0 | 0 | 5 |
| California: | 0 | 0 |  | 0 | 9 | 0 | 0 | 0 | 1 | 0 | 0 |  |
| Los Angeles | 2 | 0 | 3 | 1 | 14 | 4 | 2 | 1 | 24 | 0 | 0 | 38 |
| Sacramento.. | 0 | 0 |  | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 3 |
| San Francisco.........- | 0 | 0 | - | 0 | 6 | 1 | 5 | 1 | 7 | 0 | 1 | 6 |
| Total. | 42 | 2 | 38 | 8 | 2, 576 | 23 | 245 | 9 | 596 | 0 | 14 | 901 |
| Corresponding week, 1946* | 81 |  | 24 | 12 | 7,844 |  | 261 |  | 906 | 0 | 14 | 501 |
| Average 1942-46* | 58 |  | 39 | ${ }^{2} 13$ | 34,979 |  | ${ }^{2} 274$ |  | 1,134 | 0 | 13 | 720 |

23-year average, 1944-46.
: 5-year median, 1942-46.

* Exclusive of Oklahoma City.

Dysentery, amebic.-Cases: New York 6; Memphis 1; New Orleans 5; Los Angeles 1.
Dysentery, bacillary.-Cases: New York 2; Detroit 1; Charleston, S. C., 4; Los Angeles 1.
Dysentery, unspecified.-Cases: Cincinnati 11; Raleigh 1; San Antonio 4.
Rocky Mt. spotted fever.-Cases: Indianapolis 1; Washington, D. C., 1.
Tularemia.-Cases: St. Lonis 1 ; Litile Reck 1.
Typhus fever; endemic.-Cases: Mobile 1; Little Rock 1; Houston 1.
Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (latest available estimated population, $32,495,600$ )


## PLAGUE INFECTION IN TEXAS AND WASHINGTON

## TEXAS

Plague infection was reported proved on May 28 in a pool of 50 fleas from 6 prairie dogs (Cynomys sp.) taken May 15 in Dawson County, Texas, 12 miles southwest of Lamesa. This location is about 75 miles southeast of Cochran County, where plague infection was first reported found in ectoparasites from wild rodents in the State in 1946.

## WASHINGTON

Pools of fleas from wild rodents in Washington have been reported infected as follows:

Kittitas County.-132 fleas from 70 meadow mice (Microtus sp.), 22 fleas from 13 pocket mice (Perognathus sp.), 200 fleas from 85 whitefooted deer mice (Peromyscus sp.), collected May 13; and 16 fleas from 56 meadow mice (Microtus sp.), 8 fleas from 26 white-footed deer mice (Peromyscus sp.), and 6 fleas from 16 pocket mice (Perognathus sp.) collected May 15. All specimens taken at the head of Squaw Creek and proved positive on May 28.

Yakima County. 94 fleas from 87 field mice (Microtus sp.), 50 fleas from 2 ground squirrels (Citellus townsendii), and 34 fleas from 11 chipmunks (Eutamias sp.), all specimens collected on May 9, at a location 2 miles north of area 47-WB-17 Firing Range, 6 miles east of Firing Range Headquarters.

## TERRITORIES AND POSSESSIONS

## Panama Canal Zone

Notifiable diseases-April 1947.-During the month of April 1947, certain notifiable diseases were reported in the Panama Canal Zone and terminal cities as follows:


[^14]
## FOREIGN REPORTS

## CANADA

Provinces-Communicable diseases-Week ended May 10, 1947.During the week ended May 10, 1947, 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 | $\begin{aligned} & \text { Que- } \\ & \text { bec } \end{aligned}$ | Ontario | Manitoba | Sas-katchewan | Alberta | British Columbia | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Chickenpox |  | 35 |  | 218 | 285 | 13 | 29 | 27 | 79 | 686 |
| Diphtheria |  | 2 | 2 | 22 | 2 | 3 |  |  |  | 31 |
| Dysentery: |  |  |  |  | 4 |  |  |  |  | 4 |
| Bacillary |  |  |  | 1 |  |  |  |  |  | 1 |
| German measles |  |  |  | 80 | 61 | 2 | 13 | 5 | 6 | 167 |
| Influenza. |  | 1 |  |  | 5 |  |  |  | 75 | 81 |
| Measles.- |  | 21 | 4 | 42 | 168 | 213 | 38 | 36 | 175 | 697 |
| Meningitis, meningococcus |  |  |  |  |  |  |  |  | 1 | 1 |
| Mumps.- |  | 33 | 1 | 31 | 419 | 34 | 79 | 18 | 161 | 776 |
| Poliomyelitis |  |  |  |  |  |  |  |  | 1 | 1 |
| Scarlet fever-1. ${ }_{\text {Tuberculosis (all forms) }}$ | 1 | 1 | 2 19 | 50 106 | 101 37 | 116 | 2 4 | 26 | 113 | 180 |
| Typhoid and paratyphoid fever |  |  |  | 10 | 3 3 |  |  | 2 | 113 | 9 |
| Undulant fever.-- |  |  |  | 5 | - 1 | 2 |  | 2 | 4 | 14 |
| Venereal diseases: |  |  |  |  |  |  |  |  |  |  |
| Gonorrhea. |  | 10 | 9 | 140 | 74 | 180 | 20 | 42 | 82 | 457 |
| Syphilis. |  | 11 | 7 | 60 | 60 | ${ }^{1} 23$ | 14 | 12 | 43 | 235 |
| Whooping cough. |  |  |  | 46 | 90 | 44 |  | 14 | $\begin{array}{r}\mathbf{3} \\ \hline 8\end{array}$ | 276 |

${ }^{1}$ Manitoba: Figures for week ended May 3 are included.

## reports of cholera, plague, smallpox, typhus fever, and YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

Notr.-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 recent months. 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 Healti Reports for the last Friday in each month.

## Plague

China-Fukien Province-Hweian.-During the months of January and February 1947, 255 cases of plague with 71 deaths were reported in Hweian, Fukien Province, China.

Peru.-For the month of April 1947, plague was reported in Peru as follows: Lambayeque Department-Province of Chiclayo, Monsefu, 2 cases, 2 deaths, Puerto de Eten, 2 cases; Piura DepartmentProvince of Huancabamba, Chalaco, 10 cases, Pacaipampa, 8 cases, 2 deaths, Tuluce, 1 case.

## Smallpox

China-Shanghai.-For the week ended May 17, 1947, 150 cases of smallpox were reported in Shanghai, China.

G'reat Britain-England and Wales.-Smallpox has been reported in England as follows: Week ended May 17, 1947, Barnsley (Yorks), 3 cases; Bermondsey, 1 case; Bilston, 3 cases; Birmingham, 1 case. Week ended May 24, 1947, Barnsley, 2 cases; Bilston, 2 cases; Coseley, 1 case; Sheffield, 1 case.

Indochina (French).-For the period May 1-10, 1947, smallpox was reported in French Indochina as follows: Annam, 14 cases, 6 deaths; Cambodia, 122 cases, 34 deaths.

Venezuela.-For the week ended May 17, 1947, 185 cases of smallpox (alastrim) with 1 death were reported in Venezuela, by States, as follows: Bolivar, 59 cases; Guarico, 32 cases, 1 death: Sucre, 94 cases.

## Typhus Fever

Peru.-For the month of March 1947, 131 cases of typhus fever were reported in Peru.

Rumania.-For the week ended April 26, 1947, 1,269 cases of typhus fever were reported in Rumania.


[^0]:    ${ }^{1}$ All morbidity data for 1946 used in this report are provisional. Data for the United States for prior years are from final reports submitted by States to the U. S. Public Health Service. Data for other countries are those reported or tabulated in Public Health Reports, in the Monthly Epidemiological Report of the Pan American Sanitary Bureau, or in the Epidemiological Information Bulletin, Health Division, UNRRA.

[^1]:    (..) = data not available.
    n. d. $=$ no deaths.
    $*=$ based on cases and deaths January 1 to November 30.

[^2]:    ${ }^{1}$ From the Section of Preventive Medicine, Yale University School of Medicine, New Haven, Conn. This work was carried out as a project of the Commission on Neurotropic Virus Diseases, Army Epidemiological Board, Preventive Medicine Service, Office of The Surgeon General, U. S. Army. It was aided by a special grant from the National Foundation for Infantile Paralysis, Inc. Substantial aid was also received from the Communicable Disease Center (Atlanta, Ga.), States Relations Division, United States Public Health Service.
    ${ }^{2}$ It was understood that the Neurotropic Virus Commission should direct the course of this work and evaluate its findings. The U. S. Public Health Service acted in an advisory capacity and also furnished a large part of the material and personnel.
    ${ }^{3}$ Other agencies which were consulted included the U. B. Army Committee for Insect and Rodent Control, the Office of Scientific Research and Development Committee on Insect Control, the Orlando Station of the U. S. Department of Agriculture, and the Connecticut Agricultural Experiment Station.

    4 Dr. C. Henderson, health officer of Savannah, and George H. Bradley, Senior Entomologist (R), Mark D. Hollis, Sanitary Engineer Director and S. W. Simmons, Sanitarian (R), Communicable Disease Center (Atlanta, Ga.), U. S. Public Health Service, were instrumental in making it possible to carry out this project.

[^3]:    ${ }^{5}$ This dosage of 1,000 pounds of DDT per square mile was also used in subsequent work carried out in the summer of 1945.

    6 Fly identifications were carried out under the direction of Dr. Maxwell E. Power, Osborn Zoological Laboratory, Yale University. Participating in this and in other parts of the study were Messrs. George Bock, Howard Kriebel, Jan Long, Keith Salmonson, and Ira Wine.
    ${ }^{7}$ Dr. Joseph I. Linde, health officer of New Haven; Dr. Roger B. Friend, Connecticut Agricultural Experiment Station; Mr. Charles Brown and Mr. S. Frederick Potts, New Haven Station of the U. S. Department of Agriculture; and Mr. Walter Norton of the John Bean Manufacturing Co., Lansing, Mich.. assisted in these trial applications. We are indebted to the New Haven Park Department and to the Connecticut Agricultural Experiment Station for the loan of trucks and apparatus.

[^4]:    ${ }^{8}$ Dr. Frederick P. Lee, health officer of Paterson, cooperated generously in this project.
    Besides the local city and State health departments, the following people and agencies were interested in these experiments, and it was found important to consult with all of them:
    (1) Commanding officer and chief surgeon, Regional Service Command, U. S. Army.
    (2) Medical Director, U. S. Public Health Service District Office.
    (3) Local and State mosquito-control agencies.
    (4) Local and State fish and game commission.

    - Guy M. Boatright and Bernard D. Smith, Engineering Aides, of the U. S. Public Health Service Laboratory, Savannah, Ga., participated in all phases of the work in Paterson.

[^5]:    ${ }^{1}$ Approximately 10 traps were set out per square mile. An attempt was made to pick similar sites about homes in both the sprayed and control areas. When trapping and DDT treatment were carried out on the same day in one ward, these operations were done in different sections of the ward.
    ${ }^{2}$ DDT $:=$ DDT applied by power sprayers. (See figs. 1 and 2.)
    ${ }^{3}$ DDT b = DDT applied at garbage areas by hand. (See fig. 3.)
    4 DDT $e=$ DDT applied by thermal aerosol generator (venturi). The generator was kindly made available by Dr. R. I. Rice and Dr. H. F. Johnstone, University of Illinois, Urbana, Ill.

[^6]:    ${ }^{10}$ Dr. N. O. Gunderson, health officer of Rockford, cooperated generously in this project. Medical Director F. V. Meriwether, Director, District No. 3, U. S. Public Health Service, was also instrumental in making this project possible.

[^7]:    ${ }^{11}$ A preliminary experimental spraying by airplane of an area (ward 9) in the northern part of the city on August 19, indicated that this was a difficult technique to carry out under the conditions of the experiment. The amount of DDT applied by plane was 0.3 pound per acre and was one-fifth the dose applied by the ground crews. Col. R. Lee, Medical Corps, A. A. F., was instrumental in making the use of the plane available.

[^8]:    ${ }^{1}$ Approximately 10 traps were set out per square mile. An attempt was made to pick similar sites about homes in both the sprayed and control areas. When trapping and DDT treatment were carried out on the same day in one ward, these operations were done in different sections of the ward.
    DDT was applied by 2 Bean high-pressure sprayers similar to the one in fig. 1.

[^9]:    ${ }^{1}$ The following additional species were found, ranging less than 1.1 percent.
    Anthomyia pluvialis, Bufolucilia silvarum, Calliphora erythrocephala, Camptoneure picta, Chaetopsis, sp., Chrysomyza demandata, Cochliomyia macellaria, Euresta notata, Graphiomyia maculata, Hylemya spp.z mosquitoes, Ophyra aenescens, Platycoenosia spp., Pollenia rudis, Rivellia sp., Syrphidae, Tipulidae, and unidentified species.
    ${ }^{2}$ The following additional species were found, ranging less than 0.6 percent:
    Anisophus alternatus, Bufolucilia siloarum, Calliphora erythrocephala, Camptoneura picta, Chaetopsis sp., Chrysomyza demandata, Cochliomyia macellaria, Drysophila sp., Euresta notata, Hylemya spp., Lonchaca polita, mosquitoes, Ophyra aenescens, Platycoenosia spp., Pollenia rudis, Syrphidae, and unidentified species.
    ${ }^{3}$ The following additional species were found, rangfing less than 3.0 percent:
    Anthomyia pluvialis, Bufolucilia silvarum, Calliphora erythrocephala, Calliphora vomitoria, Camptoneura picta, Chaelopsis sp., Chrysomyza demandata, Cochliomyia macellaria, Drysopitila sp., Euresta natata, Cynomyopsis cadaverina, Graphiomyia maculata, Hylemya spp., Lonchaea polita, mosquitoes, Ophyra aenescens, Platycoenosia spp., Pollenia rudis, Stomarys calcitrans, Syrphidae, Trpulidae, and unidentified species.

[^10]:    12 Separate species of flies trapped in Rockford are being tested for poliomyelitis virus by monkey inocula tion. The four most prevalent species, Phaenicia sericata, Phormia regina, Ophyra leucostoma, and Musca domestica, trapped from Aug. 20 through Sept. 1, 1945 when the epijemic was still in force, have been tested, and of these Phormia regina alone has yielded positive tests for virus.

[^11]:    ${ }^{3}$ Period ended earlier than Saturday.
    4 Dates between which the approximate low week ends. The specific date will vary from year to year.

    - Including paratyphoid fever reported separately, as follows: Massachusetts 1 (salmonella infection); New York 1; Michigan 1; Iowa 1; North Carolina 1; Georgia 1; Kentucky 1; Oklahoma 1; Texas 2.
    - The figures for poliomyelitis, and other diseases, are those reported during the specific weeks. The figures for the early weeks of the year, therefore. probably include cases which should be charged to the preceding year. For example, the 51 cases of poliomyelitis reported in Michigan to date this year include delayed reports of 17 cases with onsets in 1946.

[^12]:    ${ }^{7}$ 2-year average, 1945-48.

[^13]:    In some instances the figures include nonresident cases.

[^14]:    ${ }^{1}$ If place of infection is known, cases are so listed instead of by residence.
    17 recurrent cases.
    3 Reported in the Canal Zone only.

