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Determination of Sodium and Copper Pentachlorophenates in Dilute Aqueous Solutions

By W. T. Haskins, Ph.D.*

Sodium and copper pentachlorophenates have shown considerable promise as molluscacides for the destruction of snail intermediate hosts of the human schistosomes (*1*, *2*, *3*). These snails are found in aquatic environments such as streams, irrigation ditches, swamps, and lakes. In field trials of the compounds in natural waters, the researcher should know the actual concentration prevailing at various locations throughout the body of water in order that he may correlate this data with other pertinent data. To be of optimum value, the analytical method should be usable in the field and hence should involve a minimum of equipment to facilitate portability. Since these compounds are effective at concentrations of 10 ppm. or less, the method should also be sensitive enough to detect 1 ppm. and versatile enough to include a range up to 100 ppm. without requiring extensive serial dilutions of the sample. No published method of analysis for these compounds met these criteria.

Wallin (*4*) has reported that methylene blue combines quantitatively with sodium pentachlorophenate at a pH of 10.9 to form a blue-colored complex which is soluble in chloroform. However, he found that the use of this property as a basis for a colorimetric determination was complicated by a magenta-colored blank obtained when the alkaline methylene blue solution was extracted with chloroform. He describes a method of converting this magenta color to a blue color by filtration of the chloroform layer through cotton. This blank could then be used to correct unknowns treated in the same way by using a spectrophotometer and setting the instrument to zero with the blank.

Preliminary tests indicated that this method was sufficiently sensitive to meet the desired requirements provided it could be simplified by doing away with the spectrophotometer and substituting color standards to read the tests. The chief source of difficulty was the

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magenta-colored blank which completely obscured the blue of the complex in the low concentration range. Further experimentation showed that the interference could be eliminated by mixing equal proportions of an aqueous solution of methylene blue chloride and saturated sodium bicarbonate solution and extracting the mixture with chloroform until the magenta color was removed. The resulting bicarbonate-methylene blue solution could then be used as a reagent for the test for periods up to 1 week without interference from extracted color. The pH of the reagent is approximately 8.5. This was found to be sufficiently alkaline for the quantitative formation of the methylene blue pentachlorophenate complex without further adjustment, thus eliminating the need for any additional buffers in carrying out the test.

Reagents Required

Methylene blue chloride solution. A 0.02 percent solution of methylene blue chloride is prepared from certified dye (CI 922). The weight of material taken for the preparation of the solution is corrected for the dye content of the dye lot as stated on the label. Thus, for the preparation of 250 ml. of this solution from dye labeled as 88 percent actual dye content, 0.0568 gm. of the dye is weighed out, dissolved in approximately 200 ml. of water,[1] and diluted to 250 ml. in a volumetric flask. The solution is stored in a tightly closed brown bottle and protected from direct sunlight. Under these conditions it has shown no apparent deterioration for periods up to 1 month.

Bicarbonate-methylene blue reagent. A 25-ml. volume of the 0.02 percent methylene blue solution is mixed with 25 ml. of saturated sodium bicarbonate solution in a 100-ml. separatory funnel. The mixture is extracted with successive 25-ml. portions of chloroform until the chloroform extract is colorless, or nearly so. Usually four or five extractions are sufficient.[2] The aqueous phase is stored in a tightly closed bottle with a minimum of exposure to strong light. It remains usable for about 1 week, or until 1 ml. of it, diluted to 5 ml. with water and shaken for 15 seconds with 5 ml. of chloroform in a 16 by 150 mm. test tube, develops an appreciable pink color in the chloroform layer within a 15-minute period.

Chloroform. The chloroform should be of USP grade.

Sodium bicarbonate. A saturated solution of CP or ACS grade of sodium bicarbonate is prepared by shaking 15 to 20 gm. of the salt with 100 ml. of water.

Sodium citrate. CP or reagent grade crystals are used.

[1] The water used for the preparation of the reagents should preferably be distilled or deionized. Tap water may be used with more or less loss of stability.

[2] The chloroform used for the extractions may be recovered by shaking it with an equal volume of 0.1 *N* hydrochloric acid, followed by washing twice with an equal volume of water. The recovered chloroform is suitable for further use in the preparation of the reagent but should not be used in the test procedure.

Color Standards

The color standards used for the determination are prepared by making suitable dilutions of the 0.02 percent methylene blue chloride solution. The values for these dilutions were determined by matching the colors produced by known concentrations of pure sodium pentachlorophenate in the test procedure with the proper dilution of the dye solution. If the diluent is water, the life of the standards is short as judged by fading and the deposition of insoluble material. The life of the standards may be increased to 2 or 3 weeks if 0.1 *N* hydrochloric acid is used as the diluent. The dilution factors for the preparation of the color standards follow:

Ppm. (5-ml. sample)	2	5	10	25	50	100
Dilute 1 ml. of 0.02 percent methylene blue solution to ml	60	30	20	10	5	3

The ppm. figures are based on the use of a 5-ml. sample for the test. Approximately 10 ml. of each standard is placed in a clean screw-capped 16 by 150 mm. culture tube [3] and protected from strong light when not in use. The same standards may be used for the determination of copper pentachlorophenate solutions since the pentachlorophenol content differs from the sodium salt by only approximately 3 percent, which is not detectable by this method.

Reproducibility of the color standards. In order to test the reproducibility of the color standards with varying sources of methylene blue chloride, five different lots of the certified dye were obtained from various suppliers. The stock 0.02-percent solution of each was prepared as described and dilutions were made for the prescribed standards. When inspected in the 16-mm. tubes, agreement among the different lots was excellent. The bicarbonate-methylene blue reagent was also prepared from each dye sample and tests were made at 2 and 10 ppm. on sodium pentachlorophenate. The colors produced in the tests matched very well with the corresponding color standards. Thus, it may be concluded that no great variation in results may be expected with different lots of certified dye.

Procedure

Place 5 ml. of the water to be tested in a 16 by 150 mm. screw-capped culture tube; add 1 ml. of the bicarbonate-methylene blue reagent and 5 ml. of chloroform. Close the tube tightly and shake it vigorously for 15 seconds. Place the tube upright and as soon as separation of the layers is complete inspect the upper layer. If it is

[3] These tubes as supplied by the Kimble Glass Co. have a coated paper liner over a cork backing in the cap. This coating is soluble in chloroform and should be removed and replaced by an aluminum foil disc in the tubes used for the test. The coated paper liners should be retained for the tubes used for the color standards which are prepared with hydrochloric acid.

definitely blue, the sample contains 10 ppm. or less of pentachlorophenate, and the color in the lower layer is compared [4] with the standards to obtain the concentration. For concentrations greater than 10 ppm. the upper layer in the test tube will be colorless, or a very pale blue after it is shaken with 1 ml. of reagent. In this case, add 1 ml. more of the reagent and shake the tube as before. This is repeated until a definite blue color is produced in the upper layer. The color of the lower layer is then compared with the standards to estimate the concentration. In general, it will require an additional 1 ml. of reagent for samples containing 25 ppm., 2 ml. for 50 ppm., and 4 ml. for 100 ppm. before a definite blue color is observed in the upper phase. After the extraction of the color into the chloroform layer, the tests should be read as soon as the chloroform layer is clear (3 to 5 minutes) and in any case within 30 minutes. This limit is necessary since a pink color which develops in time in the chloroform layer makes comparison with the standards especially difficult in the range of 1 to 5 ppm. It is advisable to run a blank determination on 5 ml. of the water from the stream before treatment with the pentachlorophenate in order to eliminate the possibility of interfering substances. A blank is also useful in estimating concentrations approximating 1 ppm. in which the color will be lighter than the 2 ppm. standard but definitely bluer than the blank. The practical accuracy of the method is about 20-percent error in the range of 5 to 100 ppm. and ± 1 ppm. below 5 ppm.

Reproducibility of the test. The sodium and copper pentachlorophenates used as molluscacides are technical grade chemicals and are subject to variation in pentachlorophenol content and the kind and amount of impurities present. It seemed probable that different lots of the chemicals might give varying results on observed values for the concentration of solutions prepared from them on a purely weight basis. Samples of commercial sodium pentachlorophenate, Dowicide G (Dow Chemical Co.), Santobrite Pellets, and Santobrite Briquettes (Monsanto Chemical Co.), were obtained and solutions of known concentration by weight were prepared from them. Upon analysis of these solutions by the test procedure, it was found that no visible difference in the intensity of the color for comparable concentrations was produced among the various samples and that they also matched the proper color standards. The color standards were originally standardized against known concentrations of sodium pentachlorophenate prepared from purified pentachlorophenol. This result seemed remarkable considering that the technical samples were

[4] Comparison of the color of the chloroform layer in the tubes with the color standards is greatly facilitated by the use of a simple wooden comparator block having three holes into which the tubes can be slipped. Transverse slots are cut through the block near the bottom so that only the chloroform layer is visible when the tubes are in place. A piece of ground glass cemented over one end of the slots will provide more even illumination and freedom from troublesome reflections.

labeled as containing from 74 to 79 percent sodium pentachlorophenate, 11 percent other sodium chlorophenates, and 10 to 15 percent inert matter. It was apparent that some of the other chlorophenates must also be forming a chloroform-soluble complex with the methylene blue; otherwise the tests would be noticeably lighter than the standards. The sodium salts of phenol, 2, 4-chlorophenol, 2,4,5- and 2,4,6-trichlorophenol, and 2,3,4,6-tetrachlorophenol were examined for their ability to form the chloroform-soluble complex under the test conditions; only the tetrachloro compound did so. It may then be concluded that technical sodium pentachlorophenate contains sufficient tetrachlorophenate to give results with this test which are comparable to those given by pure sodium pentachlorophenate within the limits of error of the method. It is also noteworthy that the test seems to be specific for the tetra and pentachloro derivatives to the exclusion of the lower chlorinated members.

Only two samples of technical copper pentachlorophenate (Monsanto Chemical Co.) were available for testing. Both gave good matches with each other and with the standards.

Interfering substances. Hard water, water containing considerable amounts of iron or high concentrations of copper pentachlorophenate will produce a cloudy precipitate with the bicarbonate-methylene blue reagent. The precipitate is carried into the chloroform layer as a suspension and makes comparison with the standards difficult. This interference is eliminated by dissolving a few milligrams (four or five small crystals) of sodium citrate in the 5-ml. sample before adding the reagent. This prevents the formation of a precipitate by the alkaline reagent.

Summary

A rapid method of determining sodium and copper pentachlorophenates in concentrations of 1 to 100 ppm. in water is given. The method is intended for use in the field as an aid in investigating the molluscacidal action of these compounds in natural waters and involves the use of a minimum of equipment and reagents.

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Evaluation of County-Wide DDT Dusting Operations In Murine Typhus Control, 1950

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An evaluation of county-wide DDT dusting operations in murine typhus control was started in southwestern Georgia during the fall of 1945. Methods and some of the extensive data have been reported (*1–4*). The present paper reports on a continuation of the study of residual effectiveness of previous DDT dusting operations in murine typhus control and includes observations made in July and August 1950.

Rat runs and harborages in Thomas County and Brooks County were treated with 10 percent DDT dust. Five county-wide dusting cycles were completed from April 1946 to September 1947. Grady County was not treated. As previously reported (*1–4*), dusting operations resulted in satisfactory control of the oriental rat flea, *Xenopsylla cheopis* (Rothschild), and of the mouse flea, *Leptopsylla segnis* (Schönherr), accompanied by a marked reduction in prevalence of typhus complement-fixing antibodies in rats and a decreased incidence of human murine typhus fever.

A monthly trapping quota was set at 10 rats from each of 16 geographically representative trapping stations in each county and 5 rats from each of the areas peripheral to the stations. Although these quotas were not completely filled, sufficient numbers of rats were obtained to give reliable representative comparisons between counties each month.

Surveillance studies of rats and their ectoparasites were discontinued from December 1949 to June 1950. Data comparable to those previously collected were obtained during July and August 1950. The number of rats examined are shown in table 1.

Control of rat ectoparasites was more effective in Brooks County than in Thomas County. Factors that may account for this difference include: (1) The last dusting cycle was 2 months later in Brooks County than in Thomas County. (2) In the five dusting cycles, an average of 4.7 pounds of 10 percent DDT dust was used per treated establishment in Brooks County and only 3.5 pounds per treated establishment in Thomas County. (3) During all dusting operations, the average number of establishments treated was about 87 percent

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Table 1. *Domestic rats examined during 1950*

County	Number rats examined for ectoparasites		Number of rat sera examined	
	July	August	July	August
Grady	219	204	191	179
Thomas	182	221	161	182
Brooks	223	232	175	184

of the total in Brooks County and only about 79 percent in Thomas County.

References to abundance of ectoparasites in the present report are based on the percentages of examined rats which were infested with one or more individual ectoparasites of any given species. Such figures are considered a better guide to the possible epidemiological significance of the species than any other commonly used index.

The percentages of rats infested with *X. cheopis* are shown by months in figure 1. In the absence of additional dusting operations after September 1947, abundance of *X. cheopis* followed a generally downward trend until February 1948. Less than 2 percent of the Brooks County rats were infested with *X. cheopis* during any one of the 8 months, September 1947 to April 1948. In the same period, less than 10 percent of the Thomas County rats were infested in any one month. An upward trend in *X. cheopis* abundance on rats from dusted areas began during March and April 1948 and continued in 1949 and 1950.

Table 2. *Percentage of rats infested with* Xenopsylla cheopis

Month	County	1947	1948	1949	1950
July	Grady (untreated)	61	50	74	77
	Thomas (dusted 1946–47)	3	20	25	31
	Brooks (dusted 1946–47)	5	3	14	23
August	Grady (untreated)	60	64	57	70
	Thomas (dusted 1946–47)	9	18	27	31
	Brooks (dusted 1946–47)	3	4	20	27

Table 2 shows July and August records of *X. cheopis* infestation for the past 4 years. The progressive increase in *X. cheopis* abundance in dusted counties resulted in higher percentages of infested rats in 1950 than at any time since 1946. Infestation was consistently higher in untreated than dusted counties. The percentages of rats infested with *X. cheopis* in July 1950 were 77, 31, and 23 for Grady (untreated), Thomas (dusted) and Brooks (dusted) Counties, respectively; in August 1950 the percentages were 70, 31, and 27.

After discontinuance of dusting operations, abundance of the mouse flea, *Leptopsylla segnis* (Schönherr), followed a downward trend of a degree similar to *X. cheopis*. The peak of seasonal abundance for *L.*

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segnis occurred in early spring as contrasted with a late summer peak for *X. cheopis*. *L. segnis* was suppressed more in dusted areas during the 1948 seasonal peak than during the similar period of 1949. During February the percentage of Grady County rats infested with *L. segnis* was 67, 56, and 67 for 1946, 1947, and 1948, respectively. Similar figures for the same periods were 12, 8, and 18 in Thomas County and 8, 0, and 3 in Brooks County. In July and August 1950, about 9 percent of the rats from Grady County were infested compared to less than 1 percent of the rats from the dusted counties.

Dusting was less effective in control of the tropical rat mite, *Bdellonyssus bacoti* (Hirst) (=*Liponyssus bacoti*). From May 1947 to November 1949, rats from dusted areas were consistently less heavily infested than those from the untreated county. With few exceptions, *B. bacoti* was more abundant on Thomas County than on Brooks County rats during 1948 and 1949. Observations of infestation in November 1949 and July and August 1950 indicate that the DDT dusting operations have lost their residual effectiveness in control of *B. bacoti*. In November 1949, the percentage of rats infested with *B. bacoti* was 14, 20, and 13 in Grady, Thomas, and Brooks Counties, respectively. Figures for the same counties were 22, 8, and 14 in July 1950; 15, 11, and 15 in August 1950.

During 1947 there was a slight reduction in abundance of the common rat louse, *Polyplax spinulosa* (Burmeister), on rats from dusted areas. Infestation of rats with *P. spinulosa* has been about as heavy in Thomas County as Grady County since February 1948 and as heavy in Brooks County as Grady County since May 1948.

The percentages of rat blood sera that were positive to the murine typhus complement fixation test showed a sharp decline following institution of dusting operations in Thomas and Brooks Counties.[1]

The trend (fig. 2) continued downward until January and February of 1948. Less than 2 percent of the Brooks County rats collected were positive during any one of the 6 months, November 1947 to April 1948. Positive rats did not exceed 9 percent of any month's collection from dusted counties during August 1947 to April 1948. From March 1948 to August 1950 there was a generally upward trend in prevalence of positive rats from dusted counties. July and August records for the past 4 years (table 3) show examples from the general trend and current comparisons between treated and untreated counties. The percentages of positive rats in July 1950 were 46, 7, and 6 for Grady, Thomas, and Brooks Counties, respectively; in August 1950 the percentages were 44, 12, and 13.

Determination of the human incidence of murine typhus fever has been a major objective of this study. Case-finding techniques have been employed continuously since the institution of operations.

[1] Both rat and human blood sera were examined by the Communicable Disease Center Serological Laboratory under direction of Dr. Joseph H. Schubert.

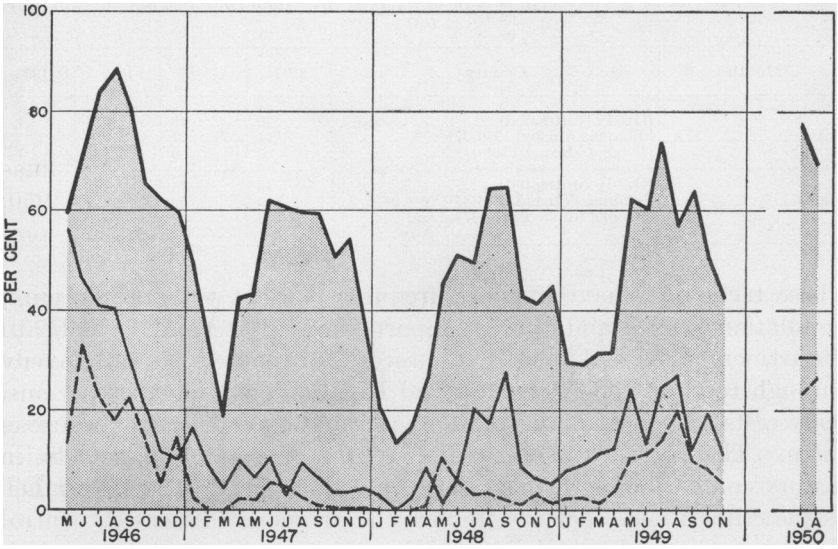

Figure 1. Percentage of domestic rats infested with *Xenopsylla cheopis*.

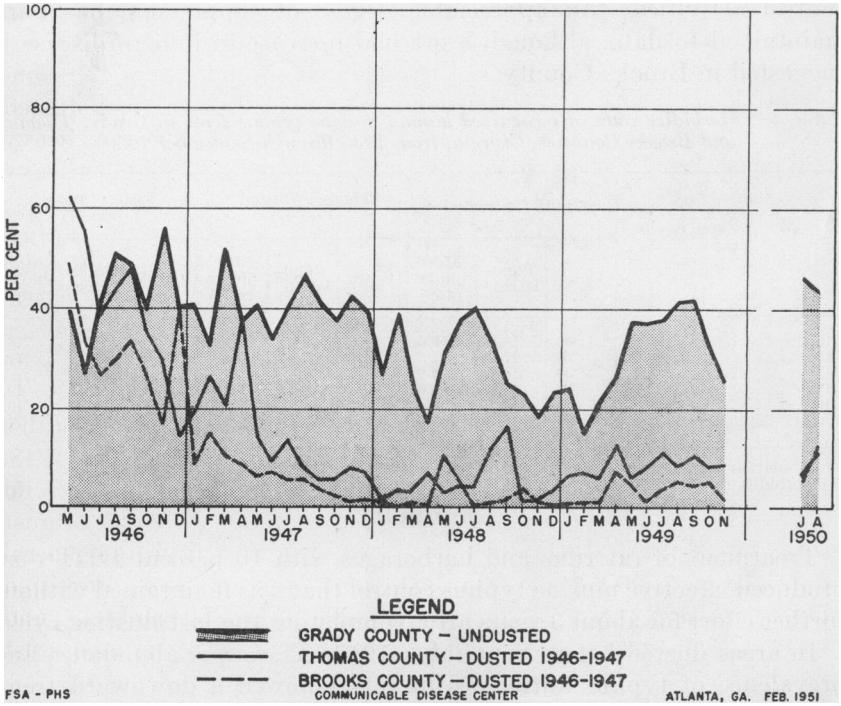

Figure 2. Percentage of domestic rats positive to the murine typhus complement fixation test.

Table 3. *Percentage of rat blood sera positive to the murine typhus complement fixation test*

Month	County	1947	1948	1949	1950
July	Grady (untreated)	40	40	38	46
	Thomas (dusted 1946–47)	14	4	11	7
	Brooks (dusted 1946–47)	6	0	4	6
August	Grady (untreated)	46	34	42	44
	Thomas (dusted 1946–47)	9	12	9	12
	Brooks (dusted 1946–47)	6	1	5	13

These techniques have included frequent contact with physicians, a population census and survey, reports from State and local health departments, hospital records, and records of reputed cases discovered through rumor. The Bengston and Kolmer complement-fixing antibody tests have been employed for confirmation or negation of human cases. The presence of a titer of 1 to 4 or greater and a clinical history compatible with this disease have been arbitrarily determined as the criteria necessary to establish the diagnosis of a case.[2]

As seen in table 4, the morbidity rates of human typhus fever decreased markedly in both dusted counties within the first year of control activities. An appreciable degree of suppression has been maintained to date, although a gradual increase in human disease is suggested in Brooks County.

Table 4. *Morbidity rates of recognized human murine typhus fever in Grady, Thomas, and Brooks Counties, Georgia, from 1945 through September 1950*

Year	Grady (untreated)			Thomas (dusted 1946–47)			Brooks (dusted 1946–47)		
	Cases	Population [1]	Morbidity rate [2]	Cases	Population [1]	Morbidity rate [2]	Cases	Population [1]	Morbidity rate [2]
1945	46	16.8	274.0	69	34.1	202.3	35	16.0	218.8
1946	50	17.3	289.0	36	35.1	102.6	12	16.5	72.7
1947	30	18.5	162.2	7	36.4	19.2	0	18.9	------
1948	26	18.5	141.0	3	35.5	8.5	2	19.0	10.5
1949	28	18.5	151.4	2	35.2	5.7	2	19.1	10.5
January–September 1950	19	18.9	100.5	0	33.9	------	2	18.1	11.0

[1] Population in thousands.
[2] Morbidity rate per 100,000.

Summary

Treatment of rat runs and harborages with 10 percent DDT dust produced effective murine typhus control that was maintained without further effort for about 3 years after completing the last dusting cycle.

In areas dusted before September 1947, *X. cheopis* abundance and prevalence of typhus antibodies in rats followed a downward trend until February 1948. From March 1948 to August 1950, the trend was gradually upward.

[2] During 1950, medical consultation was contributed by Dr. Ralph S. Paffenbarger, Jr., S. A. Surgeon, Communicable Disease Center Epidemiologic Services.

Percentages of rats infested with *X. cheopis*, and positive to the typhus complement fixation test during 1950 were:

County	Percent infested— July	Percent infested— August	Percent positive— July	Percent positive— August
Grady (untreated)	77	70	46	44
Thomas (dusted)	31	31	7	12
Brooks (dusted)	23	27	6	13

In both treated counties, morbidity rates of human typhus fever were decreased within the first year of dusting operations, and a significant degree of suppression was maintained.

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Five New *Salmonella* Types

Salmonella quiniela [1]

By CALVIN L. STUCKER,* MILDRED M. GALTON,* P. R. EDWARDS,† and MARY A. FIFE†

The new type, *Salmonella quiniela*, is represented by only one culture, isolated from a rectal swab taken from an apparently normal greyhound. Upon biochemical examination the organism was found to possess the usual characteristics of the genus *Salmonella*. Hydrogen sulfide was produced and d-tartrate and citrate were utilized, but indol was not formed nor was gelatin liquefied. Glucose, arabinose, xylose, rhamnose, maltose, dulcitol, mannitol, sorbitol, and inositol were fermented within 24 hours with the production of acid and gas. Lactose, sucrose, trehalose, raffinose, adonitol, and salicin were not fermented.

The organism was a member of group C_2 of the genus *Salmonella* and was agglutinated to titer by O serum prepared from *Salmonella newport* (VI, VIII). In absorption tests *S. quiniela* removed all agglutinins from that serum. The O antigens of *S. quiniela* are VI, VIII.

The H antigens of *S. quiniela* were diphasic. Phase 1 was agglutinated by serum derived from phase 1 of *Salmonella cholerae-suis* (c), and, in absorption tests, removed all agglutinins from that serum. Phase 1 of *S. quiniela* may be expressed by the symbol c. Phase 2 of *S. quiniela* was agglutinated by serums prepared from *Salmonella abortus-equi* (e, n, x) and from phase 2 of *Salmonella glostrup* (e, n, z_{15}). It was agglutinated by single factor z_{15} serum but not by single factor x serum. In absorption tests the organism removed all agglutinins from serum derived from phase 2 of *S. glostrup*. Phase 2 of *S. quiniela* is e, n, z_{15}. The antigenic formula of the new type is therefore VI, VIII: c–e, n, z_{15}.

Summary

A new *Salmonella* type, *Salmonella quiniela*, was isolated from the rectal swab taken from an apparently normal greyhound. The antigenic formula of the organism was VI, VIII: c–e, n, z_{15}.

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[1] This work was supported in part through a grant from the Armed Services Epidemiological Board and in part by the Veterinary Public Health Services, Communicable Disease Center.

Salmonella milwaukee

By P. R. Edwards and Mary A. Fife

Salmonella milwaukee was isolated by Mary Nimlos in the laboratory of the Milwaukee Health Department. Four cultures of the organism were isolated from the stools of as many members of a family which was affected with acute gastroenteritis. The cultures were forwarded to the writers for identification.

The four cultures possessed the usual biochemical characteristics of the genus *Salmonella*. Hydrogen sulfide was produced, d-tartrate and citrate were utilized, but indol was not formed. Gelatin was liquefied very slowly, a slight crater of liquefaction at the surface of the medium becoming visible after 45 days incubation at 25° C. Glucose, arabinose, xylose, rhamnose, maltose, trehalose, mannitol, sorbitol, and dulcitol were fermented promptly with the production of acid and gas. Lactose, sucrose, raffinose, inositol, adonitol, and salicin were not fermented.

The O antigens of *S. milwaukee* were related to those of group G (XIII . . .) of the genus. This relationship is shown in the table. When tested with serums for single factors XXII, XXIII, XXXV, and XXXVI which occur in group G, reactions were obtained in none of them. In addition to their relationship to group G, the organisms were much more closely related to O antigen 21 of the Arizona group.[1] As shown in the table, the O antigens of *S. milwaukee* were not identical with Arizona O 21. Inasmuch as *S. milwaukee* lacks major relationships to the O antigens previously described in the *Salmonella* group, it becomes necessary to assign a new symbol, XLIII, to this type.

O antigens of S. milwaukee

Serums	Antigens				
	S. poona	*S. grumpensis*	*S. worthington*	Arizona O 21	*S. milwaukee*
S. poona: Unabsorbed	1,280	320	320	80	40
S. worthington:					
Unabsorbed	1,280	1,280	2,560	160	160
Absorbed by Arizona O 21	320	640	1,280	<40	40
Arizona O 21:					
Unabsorbed	80	640	640	5,120	2,560
Absorbed by:					
S. worthington	<40	<40	<40	1,280	1,280
S. milwaukee	<40	<40	<40	1,280	<40
S. milwaukee:					
Unabsorbed	40	160	160	2,560	5,120
Absorbed by:					
S. worthington	<40	<40	<40	1,280	2,560
Arizona O 21	<40	80	80	<40	1,280

[1] Edwards, P. R., West, M. G., and Bruner, D. W.: The serologic classification of the Arizona group of paracolon bacteria. J. Infect. Dis. 81: 19-23 (1947).

The H antigens of *S. milwaukee* were monophasic and were agglutinated to the titer of *Salmonella derby* (f, g) serum. They were agglutinated by single factor f serum and in absorption tests completely exhausted the H agglutinins of *S. derby* serum. The H antigens of *S. milwaukee* may be expressed as f, g. The antigenic formula of the organism is XLIII: f, g.

Summary

A new *Salmonella* type, *Salmonella milwaukee*, was represented by four cultures which were isolated from a familial outbreak of gastroenteritis. The cultures possessed a somatic antigen not hitherto found in *Salmonella* cultures. The new type was assigned the antigenic formula XLIII: f, g.

Salmonella homosassa

By P. R. Edwards, and Mary A. Fife

Salmonella homosassa first was isolated in the laboratories of the Florida State Department of Health during a survey of salmonellosis incidence in dogs in Florida. The first culture was isolated from a rectal swab taken from an apparently normal dog and was forwarded to the writers by Mildred M. Galton. Later, Mrs. Galton recognized and forwarded two additional cultures of the same type which also were isolated from dogs.

S. homosassa was a typical representative of the genus *Salmonella*. The organism fermented d-tartrate, utilized citrate, and produced hydrogen sulfide but did not form indol nor liquefy gelatin. Glucose, arabinose, xylose, rhamnose, maltose, trehalose, dulcitol, sorbitol, mannitol, and inositol were fermented promptly with the production of acid and gas. Lactose, sucrose, raffinose, adonitol, and salicin were not attacked.

On serological examination it was found that *S. homosassa* was a member of group H of the Kauffmann-White classification. It was agglutinated to the titer *Salmonella florida* O serum (I, VI, XIV, XXV) and by absorbed XIV and XXV serums. In absorption tests it removed all agglutinins from *S. florida* O serum.

The H antigens of *S. homosassa* were diphasic. Phase 1 was agglutinated to the titer of serum derived from phase 1 of *Salmonella poona* (z), and, in absorption tests, removed all agglutinins from that serum. Phase 1 of *S. homosassa* may be expressed by the symbol z. Phase 2 was agglutinated by serums for the nonspecific antigens of the genus. When tested with single factor serums for antigens 2, 5, 6,

and 7, it was agglutinated only by 5 serum. In absorption tests it reduced the titer of serum for phase 2 of *Salmonella thompson* (1,5) from 1 to 10,000 to 1 to 50. Phase 2 of *S. homosassa* may be expressed as 1,5. Thus the antigenic formula of the organism is I, VI, XIV, XXV: z–1,5.

Summary

A new *Salmonella* type, *Salmonella homosassa*, is represented by three cultures, all of them isolated from rectal swabs taken from apparently normal dogs. The antigenic formula of the organism was I, VI, XIV, XXV: z–1,5.

Salmonella thomasville

By P. R. Edwards, Thelma DeCapito,* and Mary A. Fife

The new type, *Salmonella thomasville*, is represented by only one culture isolated in the laboratories of the Dysentery Vector Control Project at Thomasville, Ga. It was recovered from a rectal swab taken from an asymtomatic dog in the course of routine culturing of animals in a veterinary hospital. *Salmonella tennessee* also was isolated from the same specimen.

On preliminary examination *S. thomasville* was found to possess the usual morphological and biochemical characteristics of the *Salmonella* group. The organism produced hydrogen sulfide and utilized d-tartrate and citrate, but did not produce indol. Gelatin was liquefied after 45 days at 25° C. Glucose, xylose, arabinose, maltose, trehalose, rhamnose, dulcitol, sorbitol, mannitol, and inositol were fermented promptly with the production of acid and gas. Lactose, sucrose, raffinose, salicin, and adonitol were not attacked.

The organism was a member of group E of the Kauffmann-White classification and upon closer examination the somatic antigens were found to be (III), (XV), XXXIV. The organism was agglutinated to the titer of *Salmonella illinois* O serum [(III), (XV), XXXIV] and in absorption tests removed all agglutinins from that serum. As noted by Bruner and Moran,[1] organisms which had the above mentioned antigens possessed a somatic relationship to *Salmonella onderstepoort* (I, VI, XIV, XXV) which is not expressed in the antigenic formula. They are actively agglutinated by I, VI, XIV XXV serum and by absorbed single factor XIV serum.

In the examination of the H antigens, it was found that *S. thomasville* was diphasic. Phase 1 was agglutinated to the titer of, and in absorp-

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[1] Bruner, D. W., and Moran, A. B.: *Salmonella canoga*—a new type. J. Bact. 57: 135–136 (1949).

tion tests removed all agglutinins from, serum derived from phase 1 of *Salmonella madelia*. Phase 1 of *S. thomasville* may be expressed by the symbol y. Phase 2 of *S. thomasville* was agglutinated by 1,2; 1,5; 1,6; and 1,7 serums. When tested with single factor serums for 2, 5, 6, and 7, it was agglutinated only by 5 serum. It was agglutinated to the titer of serum derived from phase 2 of *Salmonella thompson* and in absorption tests reduced the titer of the serum for the homologous organism from 1 to 10,000 to 1 to 200. Phase 2 of *S. thomasville* may be expressed as 1,5. Thus, the antigenic formula for the organism is (III), (XV), XXXIV: y–1,5.

The collaboration of Dr. H. G. Young, veterinarian, in providing animals for study in the Dysentery Vector Control Project is gratefully acknowledged.

Summary

A new *Salmonella* type, *Salmonella thomasville*, was isolated from a rectal swab taken from an asymptomatic dog. The organism was represented by the antigenic formula (III), (XV), XXXIV: y–1,5.

Salmonella albany

By Mary G. West,* and P. R. Edwards

Salmonella albany was isolated from the stool of an apparently normal food handler by Marjorie Standifer in the Albany, Ga., laboratory of the Georgia State Department of Health. It was forwarded to the writers by Janie F. Morris, who recognized the organism as an unusual or undescribed *Salmonella* type.

S. albany possessed the usual characteristics of the *Salmonella* group. The organism produced hydrogen sulfide, utilized d-tartrate and citrate, but did not produce indol nor liquefy gelatin. Acid and gas were produced from glucose, arabinose, xylose, rhamnose, maltose, trehalose, sorbitol, mannitol, dulcitol, and inositol within 24 hours. Lactose, sucrose, raffinose, adonitol, and salicin were not fermented.

Serological examination of the organism revealed that *S. albany* was a member of group C_2 of the genus. The organism was agglutinated actively by VI, VIII and VIII, XX serums. Its failure to agglutinate with VI, VII serum indicated that it did not contain antigen VI. It reacted with single factor XX serum and removed all agglutinins from O serum prepared from *Salmonella kentucky* (VIII, XX). The O antigens of *S. albany* are VIII, XX.

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The H antigens of *S. albany* were monophasic and H agglutination occurred only with serums for antigens z_4, z_{23}; z_4, z_{24}; and z_4, z_{32}. When tested with single factor z_{23}, z_{24}, and z_{32} serums, the culture was agglutinated only in z_{24} serum. In absorption tests *S. albany* removed all agglutinins from H serum derived from *Salmonella düsseldorf* (z_4, z_{24}). The antigenic formula of *S. albany* is VIII, XX: z_4, z_{24}.

Summary

A new *Salmonella* type, *Salmonella albany*, was isolated from the stool of an apparently normal food handler. The organism is represented by the antigenic formula VIII, XX: z_4, z_{24}.

Effect of Topically Applied Zinc Chloride and Potassium Ferrocyanide on Dental Caries Experience

By ROBERT W. ANDERSON, D.D.S., and JOHN W. KNUTSON, D.D.S., Dr. P.H.*

On the premise that dental caries is essentially a proteolytic process, Gottlieb evolved several chemical procedures designed to make the tooth substance impervious to invasion by proteolytic bacteria (*1*). The first of these chemical procedures was based on the use of silver nitrate as the protein coagulant (*1,2*). The last involved the use of zinc chloride and potassium ferrocyanide for impregnation of the organic structures of the enamel (*3*).

A series of preliminary reports of the clinical results following the application of Gottlieb's impregnation techniques indicated that the incidence of dental caries was reduced 80 to 90 percent (*1,4,5,6,7,8,9*). On the other hand, the results of laboratory tests of the effect of zinc chloride and potassium ferrocyanide on proteolysis and of two well-controlled clinical studies just recently reported were negative (*10, 11,12*).

The study reported here was made to determine the caries preventive worth of zinc chloride and potassium ferrocyanide applied topically to the teeth of children according to Gottlieb's technique. Briefly, the results indicate that the caries experience in treated teeth during the year following treatment was very similar to that observed in untreated control teeth.

Material and Methods

In April and May 1949, zinc chloride and potassium ferrocyanide were topically applied to the teeth in half the mouth of each of 299 elementary grade school children of Chattanooga, Tenn. The children ranged in age from 7 to 15 years. Approximately half of the children received the application to the teeth in the left side of the mouth; the others were treated on the right side. Teeth in the untreated mouth quadrants served as controls. Before treatment was given, a dental examination of each child was made with mouth mirror and explorer under artificial light and with compressed air available for the examiner's use. The applications were made according to the technique of Gottlieb as follows: (1) The teeth are thorough-

*From the Division of Dental Public Health, Bureau of State Services, Public Health Service. This study was made with the cooperation and assistance of the Tennessee Department of Public Health, and the Chattanooga City County Health Department.

ly cleansed using flower of pumice paste, rubber cups, and dental floss. (2) The teeth are carefully isolated with cotton rolls and thoroughly dried with compressed air. (3) Benzine is applied to the crown surfaces of the teeth and dried with compressed air. (4) A 40-percent solution of zinc chloride is applied to the teeth for 1 minute. (5) A 20-percent solution of potassium ferrocyanide is applied to the teeth and rubbed onto the tooth surfaces until a milky white precipitate forms. (6) A 10-percent aqueous solution of silver nitrate is applied to posterior teeth only.

All solutions were applied with cotton pellets, and linen tape was used on interproximal surfaces. The zinc chloride and potassium ferrocyanide solution contained a wetting agent (polyoxyalkylene sorbitan monolaurate, 1 percent). A maximum of four teeth were isolated and treated at a time, and the procedure was repeated until all the teeth in half the mouth had been treated.

In May 1950, approximately 1 year after treatment, the teeth of children in the study group were reexamined. In making the reexaminations, the examiner did not know whether the teeth in the right or the left half of the mouth had been treated. Only 190 children were available for reexamination; those not reexamined had moved, were absent from school at the time the examinations were made, or had discontinued school attendance. The age distribution of the children initially examined and treated and of those reexamined 1 year later is given in table 1. Age classification refers to age at time of initial examination.

Table 1. *Age distribution of Chattanooga school children initially examined and reexamined at end of study*

Examined	All ages	6	7	8	9	10	11	12	13	14	15
Initial 1949	299	1	35	38	35	35	34	35	30	43	13
Second 1950	190	1	22	28	25	29	28	17	18	18	4

Findings

The caries incidence during the study year in treated and untreated permanent teeth, by upper and lower mouth quadrants is presented in table 2.

In the upper mouth the same number of teeth, 108, were initially attacked by caries in the treated and untreated quadrants. This result is in accord with the bilaterally equal occurrence of caries experience which would normally be expected for the group. The slight difference in the caries incidence rates, calculated on the basis of the number of sound teeth exposed to the risk of attack, is clearly insignificant, 20.0 and 21.1 percent, respectively.

Table 2. *Dental caries experience during a 1-year study period in zinc chloride and potassium ferrocyanide treated and in untreated permanent teeth of 190 Chattanooga children*

Status	Noncarious teeth, April 1949	New DF teeth, May 1950	DF surfaces in new DF teeth	Percent teeth carious
Upper				
Treated	540	108	118	20.0
Untreated	513	108	121	21.1
Lower				
Treated	592	71	88	12.0
Untreated	604	80	88	13.2
Both jaws				
Treated	1,132	179	206	15.8
Untreated	1,117	188	209	16.8

In the lower mouth quadrants, 71 treated and 80 untreated teeth became carious. The percentage attack rates were 12.0 and 13.2, respectively. These differences, based on number of teeth attacked and on percent attack rates, are well within the range of normal sampling variation.

Comparison of the other data presented in table 2, such as the combined caries experience in the teeth of both jaws and in tooth surfaces for treated and untreated categories, reveals no appreciable differences. The conclusion is that under the conditions of this experiment the topical application of zinc chloride and potassium ferrocyanide to the teeth of children, according to the technique of Gottleib, did not significantly reduce the vulnerability of the teeth to caries attack.

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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 July 28, 1951

Poliomyelitis

An increase of nearly 25 percent in the number (990) of cases of poliomyelitis was reported in the United States for the current week compared with the previous week (795). The number also exceeds that for the same week last year. Two regions, the New England and the Middle Atlantic, remained stationary. There was an increase of about 60 percent in the West North Central States as compared with the previous week. An increase from 6 to 20 cases in Minnesota and from 9 to 24 cases in Kansas accounted for the rise in this area. Other individual States showing relatively large percentage increases from the previous week were North Carolina, Tennessee, Oklahoma, Texas, Colorado, and California. Louisiana reported a decrease of 25 percent from the previous week.

The cumulative total of cases for the calendar year is now 5,643 compared with 6,113 for the same period last year. The cumulative total since the seasonal low week is 4,431 compared with 4,982 in 1950.

In Louisiana, 64 percent of all cases reported in the 8-week period ended July 21 occurred in a group of 7 parishes located in the extreme northwestern part of the State. Caddo and Red River Parishes reported 61 and 14 cases, respectively, in this period.

In Texas, the number of new cases reported in Nueces County was 15 for the week ended July 7, 12 for the following week, and 10 for the week ended July 21. In San Patricio County, the largest number reported, 9 cases, was for the week ended July 14, but none were reported for the following week.

In Mississippi, where incidence increased from 16 cases for the week ended July 14 to 42 for the following week, the greatest concentration occurred in Sunflower County. Beginning with the week ended June 30, 1 case was reported with 4, 3, and 14 cases, respectively, for the following 3 weeks.

In Colorado, incidence has been increasing in Denver and the surrounding area and in Pueblo.

Infectious Encephalitis

According to information received from Dr. A. S. McCown, Virginia Department of Health, several cases of infectious encephalitis, five of which were fatal, were reported in Richmond and nearby counties. An investigation being carried on by State and local officials and a representative of the Communicable Disease Center in Atlanta, Ga., is still incomplete, but it reveals that three of the fatal cases, in which the clinical and pathological diagnosis was reasonably certain, resided in Richmond, and the others came from rural areas. The ages of the cases varied from 10 to 23 years. The investigators stress the fact that up to the present time the diagnosis has been based on clinical and pathological findings only, but blood and specimens of brain tissue have been obtained for laboratory examination. Although the cases resemble eastern equine encephalomyelitis infections, no epizootic in animals has been reported in the Richmond area in recent weeks.

Malaria

Dr. A. M. Washburn, Arkansas State Board of Health, states that 79 cases of malaria, all of them confirmed by blood smear, were reported between May 15 and July 22. All were *Plasmodium vivax* infections, and were in military personnel who had returned from Korea. Their ages ranged from 17 to 45 years. Many had been

Comparative Data for Cases of Specified Reportable Diseases: United States

[Numbers after diseases are International List numbers, 1948 revision]

Disease	Total for week ended—		5-year median 1946–50	Seasonal low week	Cumulative total since seasonal low week		5-year median 1945–46 through 1949–50	Cumulative total for calendar year—		5-year median 1946–50
	July 28, 1951	July 29, 1950			1950–51	1949–50		1951	1950	
Anthrax (062)				(1)	(1)	(1)	(1)	42	27	31
Diphtheria (055)	42	53	113	27th	[2] 119	176	307	[2] 2,127	3,304	4,919
Encephalitis, acute infectious (082)	34	31	12	(1)	(1)	(1)	(1)	540	452	311
Influenza (480–483)	242	201	281	30th	130,597	149,348	149,348	116,055	138,764	128,601
Measles (085)	3,727	2,502	2,502	35th	488,138	301,584	578,358	459,437	282,454	543,412
Meningitis, meningococcal (057.0)	56	50	51	37th	3,660	3,413	3,299	2,699	2,500	2,327
Pneumonia (490–493)	443	697	[3]	(1)	(1)	(1)	(1)	44,539	58,469	[3]
Poliomyelitis, acute (080)	990	969	969	11th	[2] 4,431	4,982	4,982	[2] 5,643	6,113	5,793
Rocky Mountain spotted fever (104)	23	41	41	(1)	(1)	(1)	(1)	198	277	302
Scarlet fever (050) [4]	324	279	394	32d	68,425	56,095	79,724	52,734	39,656	57,180
Smallpox (084)				35th	17	43	68	9	23	47
Tularemia (059)	16	28	25	(1)	(1)	(1)	(1)	406	596	599
Typhoid and paratyphoid fever (040, 041) [5]	89	104	123	11th	976	1,290	1,378	1,411	1,800	1,851
Whooping cough (056)	1,262	2,630	2,428	39th	65,790	100,736	85,841	44,188	79,200	57,712

[1] Not computed. [2] Deductions—North Carolina, week ended June 30: Diphtheria and poliomyelitis, 1 case each. [3] Data not available. [4] Including cases reported as streptococcal sore throat. [5] Including cases reported as salmonellosis.

wounded and had been in the United States for 6 to 9 months before having initial attacks. About one-half of these cases were natives of Arkansas. A large proportion have been on furlough at their homes, some having initial attacks during such time. Only 1 has been detached from military service.

Psittacosis

Dr. D. S. Fleming, Minnesota Department of Health, has reported a case of psittacosis in a 12-year-old boy who had been raising homing pigeons for 2 years. The boy became ill early in May with cough and dyspnea and was hospitalized on May 30. On June 6 a complement fixation test with psittacosis antigen was positive in serum dilution of 1 to 128. Blood specimens from 10 pigeons in the suspected loft were obtained on June 27. Eight of the specimens showed complement fixation titers of 1 to 8 or higher. Material from 7 of the pigeons was sent to the Communicable Disease Center Laboratory in Montgomery, Ala., where a psittacosis virus was reported in a specimen from 1 pigeon.

Rabies in Animals

The Veterinary Public Health Section, Iowa Department of Health, states that rabies in animals was reported in 65 of the 99 counties of the State during the first 6 months of 1951. A total of 299 cases was reported in 10 different species of animals: 126 in dogs, 64 in skunks, 65 in cattle, 13 in swine, 12 in cats, 7 each in foxes and raccoons, 2 each in squirrels and sheep, and 1 in a horse.

Epidemic Conjunctivitis

Dr. J. R. Enright, Hawaii Board of Health, has reported an outbreak of acute conjunctivitis in which three-fourths of the cases were in preschool and school children. It became apparent in February that an increase in conjunctivitis was occurring. Inquiry of physicians revealed the following monthly totals of patients seen from January through June: 109, 310, 434, 544, 468, and 93. A study of school absences indicated a total of about 3,000 cases in school children. An estimated total of 5,000 to 6,000 is considered to have occurred on all of the islands. Symptoms lasted from 3 to 12 days and some relapses were observed. No bacterial or viral agent was recovered, but a virus was suspected as the etiological agent. Response to antibiotic therapy was good. There appeared to be a primary spread by droplet infection in the schools with further family spread at home.

Infectious Hepatitis

Dr. Milton Tully, New York State Health Department, reported an outbreak of infectious hepatitis in rural Chemung County. Twenty cases occurred from January 11 to July 8, half of them in June.

Cases were found principally in school children and were linked by personal contact. Family contact appeared to be more important than school contact.

Plague Infection in Lincoln County, Washington

Dr. V. B. Link, Western Communicable Disease Center Laboratory, reported that the following specimens obtained in Lincoln County were proved positive for plague: (1) Specimen No. 51–WB–26, consisting of 39 fleas (*Megabothris clantoni clantoni*) taken from 43 sage brush voles (*Lagurus curtatus*) which were trapped July 5, 1951, 12 miles southeast of Wilbur (9.6 miles south on State Highway 4B and then 5 miles east on county road); and (2) Specimen No. 51–WB–27, consisting of 137 fleas (61 *Thrassis gladiolis johnsoni* and 76 *M. clantoni clantoni*) taken from 38 *L. curtatus*, trapped July 7, 1951, 17 miles north of Odessa, on State Highway 4B.

Reported Cases of Selected Communicable Diseases: United States, Week Ended July 28, 1951

[Numbers under diseases are International List numbers, 1948 revision]

Area	Diphtheria (055)	Encephalitis, infectious (082)	Influenza (480–483)	Measles (085)	Meningitis, meningococcal (057.0)	Pneumonia (490–493)	Poliomyelitis (080)
United States	**42**	**34**	**242**	**3,727**	**56**	**443**	**990**
New England	**1**			**297**		**15**	**32**
Maine				43			2
New Hampshire				9			1
Vermont				33			1
Massachusetts				168			22
Rhode Island	1			17		1	
Connecticut				27		14	6
Middle Atlantic	**4**	**6**		**988**	**11**	**54**	**76**
New York	3	5	(1)	523	5		50
New Jersey		1		292	2	22	9
Pennsylvania	1			173	4	32	17
East North Central	**8**	**6**	**25**	**993**	**9**	**66**	**188**
Ohio	3			277	3		31
Indiana	3	2	21	40		2	6
Illinois	1	2	1	220	4	24	58
Michigan		1	3	87	1	40	58
Wisconsin	1	1		369	1		35
West North Central	**2**	**3**		**141**	**5**	**35**	**80**
Minnesota	1	1		14		1	20
Iowa				12	1	2	13
Missouri				37	1	1	9
North Dakota				27		25	4
South Dakota		2		8	1		2
Nebraska	1			3			8
Kansas				40	2	6	24
South Atlantic	**9**	**4**	**83**	**345**	**10**	**52**	**97**
Delaware				6			3
Maryland	1	1		140	1	3	2
District of Columbia				16		14	5
Virginia	1		74	71	2	23	5
West Virginia	1			6	2		3
North Carolina	3			14	1		15
South Carolina	2		8	1		6	8
Georgia	1		1	36		6	42
Florida		3		55	4		14
East South Central	**5**	**2**	**2**	**65**	**11**	**23**	**119**
Kentucky				21		4	7
Tennessee	2	2		18	6		44
Alabama	3			21	5	2	41
Mississippi			2	5		17	27
West South Central	**8**	**1**	**64**	**171**	**2**	**142**	**182**
Arkansas	1		46	11		15	22
Louisiana				2		16	31
Oklahoma			18	9	1	22	38
Texas	7	1		149	1	89	91
Mountain	**2**	**4**	**52**	**235**	**1**	**16**	**99**
Montana		1	11	64			
Idaho				26			3
Wyoming	1			41			4
Colorado	1		14	8		11	62
New Mexico				12			2
Arizona		3	27	41		5	7
Utah				43	1		13
Nevada							8
Pacific	**3**	**8**	**16**	**492**	**7**	**40**	**117**
Washington	1			30	1	1	9
Oregon		1	10	80		1	7
California	2	7	6	382	6	38	101
Alaska							
Hawaii				40		2	1

[1] New York City only.

Reported Cases of Selected Communicable Diseases: United States, Week Ended July 28, 1951—Continued

[Numbers under diseases are International List numbers, 1948 revision]

Area	Rocky Mountain spotted fever (104)	Scarlet fever [1] (050)	Smallpox (084)	Tularemia (059)	Typhoid and paratyphoid fever [2] (040, 041)	Whooping cough (056)	Rabies in animals
United States	**23**	**324**		**16**	**89**	**1,262**	128
New England		**19**		**1**	**6**	**45**	
Maine					1	4	
New Hampshire		3				5	
Vermont							
Massachusetts		13			3	32	
Rhode Island					2		
Connecticut		3		1		4	
Middle Atlantic		**72**			**10**	**152**	10
New York		44			1	60	5
New Jersey		8			1	59	
Pennsylvania		20			8	33	5
East North Central		**72**			**4**	**209**	17
Ohio		11			1	65	1
Indiana		3			2	6	11
Illinois		7			1	26	1
Michigan		37				63	3
Wisconsin		14				49	1
West North Central		**18**		**4**	**3**	**64**	33
Minnesota		2		4		2	12
Iowa		2			1	19	9
Missouri		4			2	16	8
North Dakota		6				2	
South Dakota		2				1	
Nebraska						1	4
Kansas		2				23	
South Atlantic	18	**24**		**2**	**5**	**201**	18
Delaware						9	
Maryland	5	5				5	
District of Columbia		2				4	
Virginia	4	4		1		30	5
West Virginia		1			2	49	
North Carolina	9	7			1	70	
South Carolina					1	1	5
Georgia				1	1	8	8
Florida		5				25	
East South Central	**2**	**22**			**24**	**135**	22
Kentucky		7			8	47	6
Tennessee	2	13			10	55	6
Alabama		2			4	10	6
Mississippi					2	23	4
West South Central	**2**	**10**		**8**	**17**	**310**	28
Arkansas	1	1		5	3	21	5
Louisiana					2	4	
Oklahoma	1	5		2	3	63	2
Texas		4		1	9	222	21
Mountain	**1**	**9**		**1**	**11**	**54**	
Montana		2				5	
Idaho					3	2	
Wyoming				1		1	
Colorado	1	1			2	13	
New Mexico					4	6	
Arizona		3			2	23	
Utah		3				4	
Nevada							
Pacific		**78**			**9**	**92**	
Washington		4				11	
Oregon		7				3	
California		67			9	78	
Alaska						1	
Hawaii		2					

[1] Including cases reported as streptococcal sore throat.
[2] Including cases reported as salmonellosis.

FOREIGN REPORTS

CANADA

Reported Cases of Certain Diseases—Week Ended July 14, 1951

Disease	Total	New found-land	Prince Ed-ward Island	Nova Scotia	New Bruns-wick	Que-bec	On-tario	Mani-toba	Sas-katch-ewan	Al-berta	Brit-ish Co-lum-bia
Brucellosis	2					2					
Chickenpox	595	3		33		70	322	20	20	83	44
Diphtheria	7					7					
Dysentery, bacillary	1										1
German measles	135	1		4		12	61	3	5	23	26
Influenza	28			15				6			7
Measles	793	17		57	24	170	126	42	6	220	131
Meningitis, meningococcal	7	1					2	4			
Mumps	202	12		9		21	89	5	8	32	26
Poliomyelitis	27			4	1		16		1	1	4
Scarlet fever	113					35	13	16	11	13	25
Tuberculosis (all forms)	216	8		2	45	75	25	28	14	19	
Typhoid and paratyphoid fever	12					9	1	1		1	
Venereal diseases:											
Gonorrhea	310	11		9	3	79	39	47	40	32	50
Syphilis	71	4		7	1	23	13	2	10	5	6
Primary	3					1			2		
Secondary	3					2			1		
Other	65	4		7	1	20	13	2	7	5	6
Whooping cough	118	2		7	1	48	29	8	2	9	12

NOTE.—No report received from Canada for week ended July 7, 1951.

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

The following reports include only items of unusual incidence or of special interest and the occurrence of these diseases, except yellow fever, in localities which had not recently reported cases. 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.

Plague

Burma. During the week ended July 21, 1951, one imported case of plague was reported in Rangoon.

Smallpox

Afghanistan. During June 1951, 74 cases of smallpox were reported.

Cameroon (French). For the period July 1–10, 1951, 6 cases of smallpox were reported as compared with 13 for the previous 10-day period.

French West Africa. Smallpox was reported for the period July 1–10, 1951, as follows: Ivory Coast, 5 cases; Sudan, 28; and Upper Volta, 1.

India. In three ports of India the incidence of smallpox increased during the week ended July 21, 1951. Cases reported were as follows (figures for the previous week are in parentheses): Madras, 40 (21); Calcutta, 15 (9); and Bombay, 5 (4).

Pakistan. One case of smallpox was reported in Chittagong for the week ended July 21, 1951.

Yellow Fever

Colombia. One fatal case of jungle yellow fever was reported on May 28, 1951, in San Vicente de Chucuri, Santander Department.

Panama. A patient from the area of Almirante, near the Costa Rican border, was sent to the hospital on June 9, 1951, as a yellow fever suspect. The protection test was positive for serum drawn on June 12 and 15. A virus was isolated from the serum drawn on June 12. This virus has been tentatively identified as yellow fever. The patient recovered.