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"ALBUMIN-BACTERIOPLASMA CONJUGATES" WITH SPECIAL REFERENCE TO THE ETIOLOGY OF RHEUMATIC FEVER

A PRELIMINARY REPORT¹

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The etiology of rheumatic fever is obscure; antecedent infections of the upper respiratory tract often with hemolytic streptococci are commonly observed, but in the light of present knowledge apparently differ in no fundamental characteristic from those unassociated with rheumatic disease. It is the purpose here to record some observations of the properties of toxic but extremely labile combinations between human tissue fluid or blood serum (especially albumin constituents) and components of living bacterial cells, provisionally termed "albumin-bacterioplasm conjugates," which implicate such substances in the pathogenesis of rheumatic fever.

Tissues and tissue fluids from divers organs (chiefly specimens of tonsil and myocardium from rheumatic and nonrheumatic individuals) were investigated as potential constituents of pathogenic substances when used as nutrient media for the growth of micro-organisms or in the treatment under various conditions of heavy suspensions of bacterial cells. It was found, however, that of the organs investigated only embryonal connective tissue obtained from very fresh human umbilical cords yielded effective fluids—this upon extraction with physiological saline at pH 7.5. Bacteriologically sterile filtrates (obtained after sustained suspension in them at 30° C. and pH 7.0–7.5 for 50 to 70 minutes) of the cells of certain strains of hemolytic streptococci isolated from patients with active rheumatic fever caused the death of mice when given intravenously in relatively small volumes; this property was retained only by filtrates preserved at –50°

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C. The repeated administration of sublethal doses to mice engendered nonpurulent lesions suggestive of those observed in rheumatic carditis. (It was later found that the effectiveness of such tissue fluids used in extraction could be enhanced by preliminary ultraviolet irradiation.)

Since tissue extracts of the type described could be made available in rather limited quantity, further investigation of the properties of fluids effective in this respect was undertaken using human blood serum as the basic vehicle.

"Toxic extracts" of hemolytic streptococci with blood serum have been studied by several investigators (1). These, however, prepared under somewhat different conditions and by the use of untreated serum, apparently owe their effectiveness in large part to two hemolysins: "Streptolysin O", most readily obtained by the concentration of culture filtrates (2) and "streptolysin S" identified as a lipo-protein (3). Most potent albumin-bacterioplasm conjugates, on the other hand, have very weak hemolytic action and are without such effect *in vitro* in comparable dilution.

In experiments devised to evaluate the relative effectiveness of the several serum components (by the addition of prepared serum and plasma fractions to serum, the removal of certain constituents from it by precipitation with salts or alcohol, and by the study of solutions of different fractions in physiological saline) it was found with respect to human serum that albumin was chiefly responsible. Physical influences such as heat, filtration, age of solution, and ultraviolet light were found to be of decisive effect.

The following experiment demonstrates particularly the relative importance of the albumin fraction and the influence of ultraviolet light irradiation. (In assessing the properties of albumin-bacterioplasm conjugates and other preparations studied during the course of these investigations, control observations were made in each instance to insure that the toxic and other attributes demonstrable in the finished products were not inherent in the various solutions as constituted before being placed in contact with bacterial cells.)

Human plasma fractions prepared by precipitation with alcohol in the cold were dissolved in physiological saline in concentrations indicated in table 1. (The concentrations chosen were those which it was anticipated would provide final solutions with relative specific viscosities approximating that of untreated plasma.) One portion of each solution or mixture of solutions received no treatment; another was exposed (while held at temperature near 0° C.) to ultraviolet irradiation of duration and intensity known to increase the relative viscosity of normal human serum from 3 to 5 times. Bacterial cells of a hemolytic streptococcus strain originally isolated from a patient with rheumatic fever were then maintained in diffuse suspension in the

several fluids at 30° C. for 50 minutes at pH 7.5. The bacteria were rapidly removed by centrifugation at 1° to 2° C., and by Berkefeld filtration. The filtrates were immediately frozen and stored at -50° C. until tested by the intravenous injection of 15-20 gm. white mice as indicated in table 1. It is apparent that of the untreated solutions only filtrates from those containing albumin proved toxic and that this property was enhanced by preliminary ultraviolet irradiation except in the instance of the albuminous mixture containing alpha and beta globulin in addition (see table 1).

TABLE 1.—*Toxicity for mice of preparations made with untreated and ultraviolet irradiated saline solutions of human blood plasma fractions*

Saline solutions of human blood plasma fractions		Solution untreated				Irradiated solution			
		Number of survivors of 4 mice injected intravenously with dose volume				Number of survivors of 4 mice injected intravenously with dose volume			
		0.1 cc.	0.2 cc.	0.3 cc.	0.4 cc.	0.1 cc.	0.2 cc.	0.3 cc.	0.4 cc.
	<i>Per-cent</i>								
Gamma globulin	7.5	4	4	4	4	4	4	4	2
Albumin	12.5	4	3	1	0	4	0	0	0
Fibrinogen	1.0	4	4	4	4	4	4	4	4
"IV-3, 4" ¹	6.6	4	4	4	4	4	4	4	4
Gamma globulin	3.75	4	4	4	2	4	2	0	0
Albumin	6.25								
Gamma globulin	3.75								
Fibrinogen	0.5								
Gamma globulin	3.75	4	4	4	4	4	4	4	4
Fibrinogen	0.33								
Albumin	4.2								
Gamma globulin	3.7								
"IV-3, 4" ¹	2.2	4	4	4	2	4	4	4	4
Albumin	4.2								
Fibrinogen	0.5								
Albumin	6.25								

¹ Alcohol precipitation fraction containing alpha and beta globulin.

Five observations suggest that albumin-bacterioplasm conjugates may be concerned in the etiology of rheumatic fever:

1. Forty-seven strains of group A hemolytic streptococcus originating from patients with various types of infections with this organism were tested with respect to their effectiveness in the production of such conjugates. Bacterial culture sediments were maintained in diffuse suspension in human serum to which 5 percent human serum albumin (prepared by alcohol precipitation in the cold) had been added, followed by exposure to ultraviolet irradiation of duration and intensity sufficient to double the relative specific viscosity. Conjugates were prepared using this fluid in a manner similar to that outlined in the preceding section (table 2).

Twenty-three strains yielded preparations which caused the death of mice when injected intravenously. Of these, 15 had been isolated from patients concurrently ill with rheumatic fever and bacterial

TABLE 2.—Effectiveness of various bacterial strains in the formation of albumin-bacterioplasm conjugates

Strain order		Number of survivors of 8 mice injected intravenously with dose volume					Diagnosis	Day of illness	Pharyngitis present?	Strain designation	Remarks
		0.5 cc.	0.4 cc.	0.3 cc.	0.2 cc.	0.1 cc.					
1.		0	0	0	0	8	Rheumatic fever.	4	+	43A1.	Fatal rheumatic fever in young adult.
2.		0	0	0	4	6	do.	2	+	A87.	Severe rheumatic fever in child; extensive cardiac damage.
3.		0	0	2	2	2	Pharyngitis.	1	+	45A.	Severe pharyngitis in bacteriological laboratory worker.
4.		0	0	6	4	8	Scarlet fever followed by rheumatic fever.	?	+	1RSC-150.	
5.		0	4	4	2	8	do.	(?)	+	A57.	Moderately severe scarlet fever in child; mild rheumatic fever.
6.		0	8	4	8	8	Scarlet fever.	?	?	RSC-174.	Strain obtained through courtesy of Dr. Sidney Rothbard.
7.		0	8	8	8	8	Scarlet fever followed by rheumatic fever.	?	?	RSC-86.	Strain obtained through courtesy of Dr. Sidney Rothbard.
8.		0	8	8	8	8	Rheumatic fever.	3	+	42A4.	Severe rheumatic fever in young adult; extensive cardiac damage.
9.		2	6	6	8	8	Abscess.	?	?	153A.	Pus, infected finger (courtesy of Dr. Alice Evans).
10.		6	6	6	8	8	Rheumatic fever.	?	?	45A22.	Courtesy of Dr. A. Kuttner.
11.		6	8	6	8	8	do.	?	?	RSC-178.	Severe scarlet fever with cervical abscess.
12.		2	8	8	8	8	Scarlet fever.	5	+	A68.	Severe scarlet fever through the courtesy of Dr. Sidney Rothbard.
13.		4	8	8	8	8	Well's disease.	?	?	1743B.	Well's disease; lung, autopsy (courtesy of Dr. J. H. Brown).
14.		4	8	8	8	8	?	?	?	WPHL.	Used Hodge-Swift streptolysin, "O" production.
15.		4	8	8	8	8	Rheumatic fever.	14	+	A54.	Fatal rheumatic fever in child.
16.		4	8	8	8	8	do.	5	+	A53.	Severe rheumatic fever in child; extensive cardiac damage.
17.		6	8	8	8	8	Pharyngitis.	1	+	42A5.	Severe pharyngitis in bacteriological laboratory worker.
18.		6	8	8	8	8	Rheumatic fever.	2	+	45A2.	Mild rheumatic fever in child; minimal sequelae.
19.		6	8	8	8	8	do.	4	+	138.	Severe rheumatic fever in child.
20.		6	8	8	8	8	Pharyngitis.	?	?	162A.	Epidemic sore throat, (courtesy of Dr. Alice Evans).
21.		6	8	8	8	8	Rheumatic fever.	?	?	RSC-176.	Strain obtained through courtesy of Dr. Sidney Rothbard.
22.		6	8	8	8	8	Pharyngitis.	3	+	A86.	Intimate rheumatic fever contact (See text).
23.		6	8	8	8	8	Rheumatic fever.	5	+	A33.	Severe rheumatic fever in young adult; extensive cardiac damage.
24.		6	8	8	8	8	do.	6	+	A63.	Moderately severe scarlet fever, uncomplicated.
25.		do.	do.	do.	do.	do.	Puerperal fever.	?	-	D-36.	"Coblebrook's strain" Richards (courtesy of Dr. Lanøfeld).
26.		do.	do.	do.	do.	do.	Rheumatic fever.	34	-	D-2.	Mild rheumatic fever in adult; minimal sequelae.
27.		do.	do.	do.	do.	do.	do.	?	?	N Y-5.	"Laboratory" strain.
28.		do.	do.	do.	do.	do.	Scarlet fever followed by rheumatic fever.	?	?	RSC-116.	Strain obtained through the courtesy of Dr. Sidney Rothbard.
29.		do.	do.	do.	do.	do.	do.	?	?	Do.	Do.
30.		do.	do.	do.	do.	do.	Scarlet fever.	4	?	A59.	Moderately severe scarlet fever complicated by cervical abscesses
31.		do.	do.	do.	do.	do.	do.	5	+	42A9.	Moderately severe scarlet fever; uncomplicated.
32.		do.	do.	do.	do.	do.	Pharyngitis.	3	+	A40.	Moderately severe pharyngitis; uncomplicated.
33.		do.	do.	do.	do.	do.	Scarlet fever	5	+	A84.	Moderately severe scarlet fever; uncomplicated.
34.		do.	do.	do.	do.	do.	Chorea	42	+	A97.	Chorea and active rheumatic fever.
35.		do.	do.	do.	do.	do.	Pharyngitis.	?	+	A79.	Severe pharyngitis; uncomplicated.
36.		do.	do.	do.	do.	do.	Sepsis.	8	+	A32.	Fatal septicemia, child (1895).

37	do.	Pharyngitis	?	?	1551	"Septic sore throat" (courtesy of Dr. Alice Evans).
38	do.	do.	?	?	1542	"Epidemic sore throat" (courtesy of Dr. Alice Evans).
39	do.	do.	?	?	1638	Erysipela after atypical pneumonia (courtesy of Dr. Alice Evans).
40	do.	do.	?	?	45A15	Purulent arthritis.
41	do.	do.	?	?	45A25	Puerperal sepsis.
42	do.	do.	?	7	45A16	Severe scarlet fever.
43	do.	do.	?	?	45A14	Severe pharyngitis.
44	do.	do.	128	?	F1	Chronic rheumatic fever.
45	do.	do.	10	+	45A18	Moderately severe scarlet fever.
46	do.	do.	?	+	507	From milk (epidemic pharyngitis); (courtesy Dr. Alice Evans).
47	do.	do.	8	+	45A17	Moderately severe scarlet fever.

¹ In the instance of coexisting rheumatic fever, day of illness refers to duration of that illness.

² Culture taken before the onset of rheumatic fever.

infection; two (Nos. 3 and 17) were obtained from individuals developing pharyngitis while working with these organisms in the laboratory, and one came from the inflamed throat of an intimate contact of a child taken ill with rheumatic fever 1 week earlier (No. 22).

Twenty-four strains yielded preparations which did not kill mice. Of these, only five had been isolated from patients with possible rheumatic fever; three of these (Nos. 26, 34, and 44) were encountered relatively late in the course of the rheumatic fever; detailed information is lacking concerning the remaining two (Nos. 28 and 29).

2. Nineteen specimens of serum were obtained from 16 individuals who had apparently completely recovered from active rheumatic fever with definite evidences of carditis having developed during the period of illness from 2 to 16 weeks previously. Patients were selected for this observation in which evidence of antecedent or concurrent bacterial infection had been lacking. Control serums were obtained from two healthy individuals.

A mixture of 0.35 cc. of each serum tested with 0.15 cc. of albumin-bacterioplasm preparation, of which 0.2 cc. intravenously regularly killed mice, was incubated at 37° C. for 30 minutes and then injected intravenously into each of eight mice. A degree of protection against the lethal action of the conjugate was demonstrable in the serums from 9 of the 16 patients (table 3).

TABLE 3.—*Protective influence of serum from patients recovered from rheumatic fever against the lethal effect of intravenous albumin-bacterioplasm conjugate. Eight mice injected with each mixture*

Patient	Weeks re-covered ¹	Number of mice surviving	Patient	Weeks re-covered ¹	Number of mice surviving
1.....	3	3	8.....	5	5
2 { Specimen a.....	5	2	9.....	8	8
2 { Specimen b.....	8	7	10.....	12	6
3.....	8	4	11.....	7	7
4.....	4	2	12.....	16	8
5 { Specimen a.....	2	3	13.....	12	7
5 { Specimen b.....	6	5	14.....	4	7
6.....	3	3	15.....	10	6
7 { Specimen a.....	6	6	16.....	6	8
7 { Specimen b.....	10	6			

CONTROLS

A.....	2
B.....	3

¹ Number of weeks erythrocyte sedimentation rate observed to be within normal limits following active rheumatic fever.

Serum specimens obtained from six patients ill with various other febrile diseases and two healthy controls were also examined in another observation which was conducted in a strictly analogous manner except for the type of disease concerned. No protective effect was demonstrable from any serum.

3. The injection of albumin-bacterioplasm conjugate prepared from homologous serum and serum protein fractions into several species of laboratory animals results in the development of cardiac lesions closely resembling those of rheumatic fever. In early experiments of this type using conjugates made from untreated homologous and heterologous serum or plasma with unaltered protein constituents suggestive lesions were observed (4). Conjugates later prepared either by the use of serum with increased albumin content of homologous origin or by the use of homologous albumin fractions prepared following removal of other constituents by salt precipitation and subject to ultraviolet light irradiation have been found definitely effective in this respect.

4. Serums from rheumatic individuals have been compared with those obtained from patients ill with other febrile diseases both (1) with respect to their effectiveness as extractives in producing the hemolytic "toxic extract" of Weld (1a; 1b) and (2) as cointegrates in the formation of albumin-bacterioplasm conjugates.

In the first series, the serums from 16 patients (7 rheumatic fever, 4 acute hemolytic streptococcus infections, 5 various other febrile illnesses) were tested from 2 to 6 times at intervals of 2 weeks. The extracts were not lethal for mice, but *in vitro* titers of hemolytic potency (1-g) varied between 0.003 and 0.0375 cc. The titers observed in preparations with serums successively obtained from the same individuals remained for the most part at a constant level. Variations which were observed, however, could not be correlated with clinical variations in disease processes.

In a second series, group A hemolytic streptococcus bacterial sediments have been maintained in diffuse suspension at 35° C. and pH 7.0-7.5 for 50 minutes in inactivated serums subject to uniform preliminary treatment with ultraviolet light of moderate intensity. The albumin-bacterioplasm conjugates formed have proved weak for comparative estimations of hemolytic activity but are lethal for mice in doses of 0.2-0.5 cc. intravenously. Serums from five rheumatic-fever patients and six with various febrile illnesses have been tested at intervals similar to those described above, but for 2 months only. The observation to date has been that the serums from rheumatic-fever patients yield more toxic preparations which become weaker with recovery while successive specimens from patients with other febrile illnesses apparently remain of essentially unaltered quality in this respect.

5. The cautious administration of exceedingly small doses of albumin-bacterioplasm conjugate demonstrated that rheumatic fever patients are extremely, and apparently characteristically respon-

sive to its effects. A preparation made with inactivated normal human serum to which 5 percent normal human serum albumin obtained by alcohol precipitation in the cold had been added (followed by ultraviolet irradiation of the mixture) and a suspension of group A hemolytic streptococci, 42A4, was used. It killed mice within 1 hour in doses of 0.1 cc. intravenously, but possessed hemolytic properties in concentration less than conveniently titratable. This was at once apportioned and frozen in appropriately small volumes (using containers suitable for making the final dilution to be employed) as it flowed from a jacketed and chilled filter. These were preserved at -50°C . until melted and diluted with cold inactivated normal human serum *immediately* before intramuscular injection in such manner that the total dose in each instance was contained in 0.5 cc. volume.

First, four adult male volunteers in good nutritional state without evidence of organic disease (although afflicted with gastric neuroses) were treated with relatively sharply increasing intramuscular doses daily for 10 days. Although the development of uncomfortable local reactions, usually between the second and fifth hours after administration, was an immediate consideration which indicated more gradual increase in dosage for some of the individuals (see table 4, MI and RET), it was apparent as well that the substance in doses tolerable from the subjective standpoint with respect to the injection sites was provocative of considerable general reaction in these non-rheumatic individuals. This was evidenced by the occurrence of slight fever and leucocytosis and, particularly, acceleration of the erythrocyte sedimentation rate. Control observations were made of two individuals treated in an exactly comparable manner except that the human serum-albumin, ultraviolet-treated mixture used was not placed in contact with any bacterial substance. Apparently, no abnormalities were thereby induced.

Following this, several individuals convalescent in varying degree from rheumatic fever were treated in a similar manner successively; beginning with those who had resumed normal physical activity for several months. It was evident that, as anticipated, by cautious administration the degree of recovery in each instance could be safely estimated in this manner. The response in individuals adjudged from a clinical standpoint as certainly free from rheumatic activity after several months of observation was comparable to that of the controls described.

At the outset, such treatment of convalescents was terminated upon the first detectable evidence of systemic reaction to inflammation—usually a slight increase in the erythrocyte sedimentation rate. When the observations were gradually extended, as planned, to patients less completely recovered, it appeared that following the

TABLE 4.—*Effect of albumin-bacterioplasm conjugate administered intramuscularly to four healthy individuals and two rheumatic fever patients*

	Conjugate administered			Local reaction first observed at dose volume	Change in erythrocyte sedimentation rate	Change in leucocyte count	Number of days maximum temperature was above 37.5° C.	Electrocardiographic changes
	Number of days during course of which conjugate was administered	Individual dose	Total dosage					
CONTROLS								
BRE	10	Cubic centimeters 0.000025-0.25	Cubic centimeters 0.513	Cubic centimeters 0.06	Millimeter per hour 12-17	Thousands per centimeter 9.6-8.3	Days 1	None.
BRA	10	0.000025-0.25	.518	.025	15-43	6.85-8.0	None	Do.
MI	10	0.000025-0.12	.148	.025	13-45	9.8-10.5	2	Do.
RET	10	0.000025-0.06	.148	.00375	4-29	7.7-10.5	3	Do.
PATIENTS								
A: Rheumatic fever, slightly active	18	0.000025-0.05	.002545	.0004	12-56	11.3-11.5	4	P-R interval: 0.16 to 0.20.
	First 18	0.000025-0.0005	.002545	None	6-23	7.7-10.0	8	None.
B: Rheumatic fever, "recovered"	Total 64	0.000025-0.25	.90	.05	6-41	7.7-13.3	12	Do.
	Additional 10	None given	0	None	41-4.5	11.0-4.8	None	Do.

discontinuance of injections further progress toward recovery was accelerated, particularly in those cases in which treatment chanced to have been prolonged (contrary to intention) after the first appearance of definite effect.

Such instances as, for example, the patient "B" whose course is in part outlined in table 4 are, of course, only suggestive. This individual, a young adult male, had manifest while under close observation intermittent low-grade rheumatic activity for several months following a second attack of rheumatic fever. The erythrocyte sedimentation rate had been within normal limits for only 2 weeks when the observations tabulated "first 18 days" were begun. It is apparent that, in comparison with the controls, a course of injections with much smaller doses extended over a longer period of time provoked a disproportionate degree of fever, increase in erythrocyte sedimentation rate and augmentation of the leucocyte count. With a view, then, of possibly exerting a beneficial influence upon the ultimate course of the disease, the administration of relatively small doses was continued for about 2 months (as indicated in the "total 64 days" of table 4 relating to this case). During this time there was probably a slight increase in tolerance for the substance injected. During the entire period, however, a distinct degree of hypersensitivity, in comparison with the nonrheumatic individuals observed at the outset, was evident. Upon discontinuance of the injections there was surprisingly rapid return to an apparently normal state (suggested in the last line of table 4). In this individual and a few with comparable experience, the disease has remained inactive for the several months following. It is not suggested that this offers evidence of other than a natural course of the disease but it does further indicate that the substance employed is probably, even in rheumatic subjects, of immediate toxic effect only.

An illustration of the profound and incipiently detrimental effects the administration of tolerance-exceeding doses of albumin-bacterioplasm conjugate may exert upon the course of rheumatic fever was presented by the patient "A" whose record is in part shown in table 4. This is the only instance in which the substance was given in the presence of clinical evidence of continuing activity of the disease. It serves, however, to evidence the extreme hypersensitivity of patients with active rheumatic fever to such conjugate as well as to emphasize the inadvisability of such practice.

When this patient first became ill, transient, acute arthritis followed about two weeks of increasing general debility without the concurrent or antecedent recognition of any symptoms suggestive of infection. For one month thereafter, without antipyretic medication, the maximum daily temperature varied between 37° and 37.3° C. and joint pain with slight periarticular edema occasionally recurred. Mean-

while, the erythrocyte sedimentation rate fell gradually and regularly from 63 to 12 mm. per hour although the leucocytes remained constantly 11,000 to 11,500 per cu. mm. During this period of observation the heart sounds and the character of a systolic murmur at the apex (present at the outset) underwent no appreciable change. X-rays of the heart disclosed slight enlargement with prominence of the mitral region, neither varying in degree. Five electrocardiographic tracings taken meanwhile, however, showed P-R intervals varying from 0.15 to 0.19 seconds with, in the earlier records only, a high take-off at the S-T segment, low or rounded T waves (left axis deviation), and low voltage throughout.

The "18-day" conjugate injection period (for patient "A") indicated in table 4 continues from this point. The maximum daily temperature rise, once as high as 38° C., exceeded 37.5 on four occasions corresponding with successive doses of 0.0002 cc., 0.0004 cc., 0.0005 cc., and 0.0003 cc., while considerable local discomfort was associated with the two larger doses indicated. The erythrocyte sedimentation rate concurrently rose to 56 mm. per hour, and although migratory joint inflammatory manifestations were unquestionably increased in general severity, the leucocyte count remained about the same while clinical and roentgenological cardiac findings remained unchanged. Electrocardiographic tracings showed a lengthening of the P-R interval to 0.20 seconds and resembled those, described above, obtained early in the course of the disease.

Following completion of this course of injections, the patient immediately became afebrile; the erythrocyte sedimentation rate was found to be 22 mm. per hour 2 weeks later and remained at that level, and leucocytosis promptly disappeared while the electrocardiogram showed inversion of T₃ waves for a few days only and was thereafter within normal limits. Absence of discernible change in the heart to clinical or roentgenographical examination continued. These observations were unfortunately terminated after one month by circumstances entirely unrelated to the disease process under discussion.

In this instance, the administration of albumin-bacterioplasm conjugate activated both the arthritic and carditic rheumatic processes which had been progressively resolving. The increase in heart involvement apparently did not progress beyond a level of intensity resulting in changes which were demonstrable only electrocardiographically while with discontinuance of the stimulus there was immediate regression. The possibility cannot be excluded that we were here dealing with a spontaneous relapse of the original disease. The sharp coincidence of temporary interruption of a remarkably steady rate of progress in recovery with the period of intendedly therapeutic interference, however, speaks against chance.

It is well known that many diverse, noxious influences may initiate recurrences of rheumatic fever. Such stimuli, however, that have been observed to be effective are usually of much greater and non-selective intensity in comparison with the treatment here, which probably would have exerted an extremely feeble effect upon nonrheumatics. Furthermore, relapses of rheumatic fever are to be sharply differentiated from the effects described here in that they constitute unpredictable and uncontrollable reactivations of the disease of variable character and are not, as in the instances reported here, in duration and intensity directly dependent upon and proportionate to the stimuli applied.

DISCUSSION

Integration of the observations described may entail especial consideration of hyaluronic acid insofar as this substance was probably a constituent common to several of the reagents and tissues involved: Group A hemolytic streptococcus capsule (5, 6), human umbilical cord substance (7), mesenchymal interstitial tissue (8, 9) of the type characteristically and probably primarily affected in rheumatic fever (10) and synovial fluid (11). Furthermore, this polysaccharide acid enters into the formation of more readily dissociable complexes with albumin than with other serum proteins analogously reactive with it (?). "Specific" modifications of the erythrocyte sedimentation rate "especially in rheumatic fever" presumably effected by this carbohydrate have been discussed (12).

SUMMARY

The observations described suggest that depending upon quantitative and possibly qualitative variations in the albumin component, human serums and saline solution mixtures of serum proteins differ in their capacity to form toxic substances, provisionally termed "albumin-bacterioplasm conjugates," upon interaction in suspension with sediments of certain strains of group A hemolytic streptococci. Preliminary studies suggest that this property in serum specimens from patients with active rheumatic fever may be characteristically susceptible of enhancement by ultraviolet irradiation. The action of this and other physical agents exerts a considerable influence upon the effectiveness of the constituents of human serum, particularly the albumin fraction, in the formation of toxic conjugates.

A majority of strains of group A hemolytic streptococcus isolated under circumstances suggesting an etiological relationship of the associated bacterial inflammatory process to the development of rheumatic fever in the affected individual appear characteristically adapted to the formation of most potent conjugates of this type.

With recovery, a degree of protective activity is demonstrable in the serum of some rheumatic fever patients such as does not appear to develop during convalescence following other types of febrile illness investigated.

In several species other than man, albumin-bacterioplasm conjugates prepared with the use of homologous and heterologous serum components, when parenterally administered by several routes, induce the development of cardiac lesions resembling those of rheumatic fever.

Of the several tissue fluids and extracts tested, only those obtained from embryonal connective tissue occurring in human umbilical cords proved to be effective agents in the formation of toxic conjugates.

Human beings are reactive to the intramuscular injection of albumin-bacterioplasm conjugates; rheumatic individuals in comparison with others are exceedingly hypersensitive:

1. Convalescent rheumatic fever patients, differing only quantitatively from controls, react to even comparatively minute doses which exceed individual tolerance levels with pain at the injection site and evidences of systemic disturbance suggestive of extensive tissue damage.

2. One recovering patient with, however, persisting, demonstrable evidence of residual active rheumatic fever responded similarly; in addition, major manifestations of the disease were transiently incited.

There was no evidence in any individual observed that conjugate injection exceeding the tolerance level provoked any noxious effects other than those incident to the immediate toxicity. With gradually increasing doses the development of tolerance or increased resistance to local and systemic effects was observed in both rheumatic and control subjects.

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- (2) Rantz, L. A.: Purified streptolysin—final report, Bulletin No. 56, Aug. 27, 1945. Office of Scientific Research and Development, p. 644.
- (3) Herbert, D., and Todd, E. W.: Oxygen-stable haemolysin of group A haemolytic streptococci (streptolysin S). *Brit. J. Exper. Path.*, **25**: 242 (1944).
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- (5) Kendall, F. E.; Heidelberger, M.; and Dawson, M. H.: A serologically inactive polysaccharide elaborated by mucoid strains of group A hemolytic streptococcus. *J. Biol. Chem.*, **118**: 61 (1937).
- (6) Seastone, C. V.: Occurrence of mucoid polysaccharide in hemolytic streptococci of human origin. *J. Exper. Med.*, **77**: 21 (1943).
- (7) Meyer, K. and Palmer, J. W.: On glycoproteins. II. The polysaccharides of vitreous humor and of umbilical cord. *J. Biol. Chem.*, **114**: 689 (1936).
- (8) Fekete, E. and Duran-Reynals, F.: Hyaluronidase in fertilization of mammalian ova. *Proc. Soc. Exper. Biol. & Med.*, **52**: 119 (1943).
- (9) Duran-Reynals, F.: Tissue permeability and spreading factors in infection: Contribution to host: Parasite problems. *Bact. Rev.*, **6**: 197 (1942).
- (10) Klinge, F.: *Der rheumatismus*, Leipzig, 1933.
- (11) Meyer, K.; and Smyth, E. M.; and Dawson, M. H.: Isolation of mucopolysaccharide from synovial fluid. *J. Biol. Chem.*, **128**: 319 (1939).
- (12) Meyer, K.; Hahnel, E.; and Feiner, R. R.: Experiments on erythrocyte sedimentation rate. *Proc. Soc. Exper. Biol. & Med.*, **58**: 36 (1945).

PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period July–December 1946

There is given herewith a list of publications of the United States Public Health Service issued during the period July–December 1946.

The purpose of this list is to provide a complete and continuing record of Public Health Service publications, for reference use by librarians, scientific workers, and others interested in particular fields of public health work, and not to offer the publications for indiscriminate free distribution.

Single sample copies are available from the Public Inquiries Section, Office of Health Information, United States Public Health Service, Washington 25, D. C.

Quantities may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at prices shown, with a reduction of 25 percent on lots of 100 copies or more of a single publication.

Those publications marked with an asterisk (*) can be obtained only by purchase.

Periodicals

*Public Health Reports (weekly), July–December, vol. 61, Nos. 27 to 52, pages 979 to 1903. 10 cents a number. Subscription price \$4 a year.

Extracts from Public Health Reports (monthly), July–December, Tuberculosis Control Issues Nos. 5 to 10, 30 pages each. 10 cents a number. Subscription price \$1 a year.

*The Journal of Venereal Disease Information (monthly), July–December, vol. 27, Nos. 7 to 12, pages 169 to 324. 5 cents a number. Subscription price 50 cents a year.

*Journal of the National Cancer Institute (bimonthly), August to December, vol. 7, Nos. 1 to 3, pages 1 to 182. 40 cents a number. Subscription price \$2 a year.

Public Health Engineering Abstracts (monthly). July–December, vol. XXVI, Nos. 7 to 12, 32 pages each. No sales stock.

Industrial Hygiene Newsletter (monthly), July–December, vol. 6, Nos. 7 to 12, 12 pages each. 10 cents a number. Subscription price \$1 a year.

National Negro Health News (quarterly), July–December, vol. 14, Nos. 3 and 4, 24 pages each. No sales stock.

Reprints From the Public Health Reports

- 2730. The treatment of trypanosomiasis with p-arsenosphenylbutyric acid. I. Results in 319 cases of early trypanosoma gambiense infections. By Harry Eagle. July 12, 1946. 16 pages. 10 cents.
- 2731. Public Health Service publications. A list of publications issued during the period January–December 1945. July 12, 1946. 9 pages. 5 cents.
- 2732. Studies on marihuana and pyrahexyl compound. By Edwin G. Williams, C. K. Himmelbach, Abraham Wikler, Dorothy C. Ruble, and Bolivar J. Lloyd, Jr. July 19, 1946. 25 pages. 10 cents.
- 2733. Complement-fixation tests for American trypanosomiasis in Texas. By Dorland J. Davis and Thelma de Shazo Sullivan. July 19, 1946. 2 pages. 5 cents.
- 2734. An epidemic of a severe pneumonitis in the bayou region of Louisiana. VII Histopathology in laboratory animals. By G. L. Fite, C. L. Larson, and B. J. Olson. July 26, 1946. 16 pages. 10 cents.
- 2735. An analysis of the design and performance of airplane exhaust generators for the production of DDT aerosols for the control of *Anopheles quadrimaculatus*. By C. W. Kruse and R. L. Metcalf. August 9, 1946. 14 pages. 5 cents.
- 2736. The United States Public Health Service Communicable Disease Center. By Justin M. Andrews. August 16, 1946. 8 pages. 5 cents.
- 2737. Time per service in a children's dental clinic. By Isidore Altman. August 16, 1946. 9 pages. 5 cents.
- 2738. Tularemic pneumonia: Treatment with streptomycin. By R. L. Peterson and R. R. Parker. August 23, 1946. 4 pages. 5 cents.
- 2739. Winter survival of *Aedes aegypti* (L.) in Houston, Tex. By Stephen P. Hatchett. August 23, 1946. 11 pages. 10 cents.
- 2740. Precipitin technique for determining mosquito blood meals. By E. H. Arnold, S. W. Simmons, and Dorothy G. Fawcett. August 23, 1946. 7 pages; 2 plates. 10 cents.
- 2741. Health conditions in certain large cities of the Far East after liberation. By Henry R. O'Brien. September 13, 1946. 12 pages. 5 cents.
- 2742. The health center. Adaptation of physical plants to service concepts. By Joseph W. Mountin and August Hoenack. September 20, 1946. 12 pages. 5 cents.
- 2743. Serological relationships in the epidemic-endemic typhus group as determined by complement fixation. By Ida A. Bengtson. September 20, 1946. 8 pages. 5 cents.
- 2744. Typical structures on replicas of apparently intact tooth surfaces. By David B. Scott and Ralph W. G. Wyckoff. September 27, 1946. 10 pages; six plates. 10 cents.

2745. Chemoprophylaxis of experimental influenza infections in eggs. By R. H. Green, A. F. Rasmussen, Jr., and J. E. Smadel. September 27, 1946. 4 pages. 5 cents.
2746. Separation of the complement-fixing agent from suspensions of yolk sac of chick embryo infected with the Karp strain of tsutsugamushi disease (scrub typhus). By Ida A. Bengtson. September 27, 1946. 6 pages. 5 cents.
2747. A study of rodent ectoparasites in Mobile, Ala. By Lamont C. Cole and Jean A. Koepke. October 11, 1946. 20 pages. 10 cents.
2748. The industrial "control chart" applied to the study of epidemics. By Willis H. Rich and M. C. Terry. October 18, 1946. 12 pages. 5 cents.
2749. An evaluation of three plague vaccines against infection in guinea pigs induced by natural and artificial methods. By N. E. Wayson, Margaret C. McMahon, and Frank M. Prince. October 18, 1946. 8 pages. 5 cents.
2750. Negro mortality. II. The birth rate and infant and maternal mortality. By Mary Gover. October 25, 1946. 10 pages. 5 cents.
2751. The removal of the cercariae of *Schistosoma mansoni* from water by filtration through diatomaceous silica in a small model filter. By Myrna F. Jones and Frederick J. Brady. October 25, 1946. 6 pages; 1 plate. 5 cents.
2752. World health organization. Charter for world health constitution of the world health organization. Arrangement establishing interim commission. August 30, 1946. 22 pages. 10 cents.
2753. Rickettsialpox—A newly recognized rickettsial disease. I. Isolation of the etiological agent. By Robert J. Huebner, Peggy Stamps, and Charles Armstrong. November 8, 1946. 9 pages. 5 cents.
2754. Skin-sensitizing properties of DDT for the guinea pig. By John E. Dunn, Robert C. Dunn, and Barbara S. Smith. November 8, 1946. 6 pages. 5 cents.
2755. Sickness absenteeism among male and female industrial workers during 1945, with a note on the respiratory epidemic of 1945-46. By W. M. Gafafer. November 8, 1946. 10 pages. 5 cents.
2756. Editorial—Health services for Federal employees. A suggested plan for a preventive medical program in a Federal employees' health service. November 15, 1946. 14 pages. 5 cents.
2757. Preparation of mumps vaccines and immunization of monkeys against experimental mumps infection. By Karl Habel. November 15, 1946. 10 pages. 5 cents.
2758. Rickettsialpox—A newly recognized rickettsial disease. IV. Isolation of a rickettsia apparently identical with the causative agent of rickettsialpox from *Allofermayssus sanguineus*, a rodent mite. By Robert J. Huebner, William L. Jellison, and Charles Pomerantz. November 22, 1946. 5 pages. 5 cents.
2759. The effect of topically applied sodium fluoride on dental caries experience. III. Report of findings for the third study year. By John W. Knutson and Wallace D. Armstrong. November 22, 1946. 6 pages. 5 cents.
2760. Trends in dentist-population ratios. By Joseph W. Mountin, Elliott H. Pennell, and Georgie S. Brockett. November 22, 1946. 12 pages. 5 cents.
2761. A skin reaction in rabbits produced by intradermal inoculation of suspensions of killed *Pasteurella tularensis*. By Carl L. Larson. December 13, 1946. 10 pages; 1 plate. 10 cents.

2762. Duration of toxicity of several DDT residual sprays under conditions of malaria-control operations. By Frederick L. Knowles and Clinton S. Smith. December 13, 1946. 6 pages. 5 cents.
2763. Potassium and sodium metaphosphates as sources of phosphorus for animals. By H. F. Fraser, E. R. Smith, and W. C. White. December 13, 1946. 8 pages; 1 plate. 10 cents.
2764. The story of the National Leprosarium. The United States Marine Hospital, Carville, La. By G. H. Faget. December 27, 1946. 16 pages; 2 plates. 5 cents.

Supplements to Public Health Reports

180. Directory of State and territorial health authorities, 1945. (1945 revision.) 1946. 54 pages. 15 cents.
191. Food dehydration wastes. A study of wastes from the dehydration of skim milk, raw, and fermented whey, potatoes, beets, rutabagas, and hominy. By F. E. DeMartini, W. Allan Moore, and G. E. Terhoeven. 1946. 36 pages. 10 cents.
192. Tolerance of man toward hot atmospheres. By E. F. Adolph. 1946. 38 pages. 10 cents.
193. The notifiable diseases. Prevalence of certain important communicable diseases, by States, 1945. 1947. 14 pages. 5 cents.

Public Health Bulletins

294. Control of ringworm of the scalp among school children in Hagerstown, Maryland, 1944-45. By Louis Schwartz, Samuel M. Peck, Isadore Botvinick, Armond Leo Leibovitz, and Elizabeth S. Frasier. 1946. 27 pages. 10 cents.
295. Manual of recommended practice for sanitary control of the shellfish industry, recommended by the United States Public Health Service, 1946. 1946. 44 pages. 15 cents.

Miscellaneous Publications

35. Guide to health organization in the United States. By Joseph W. Mountin and Evelyn Flook. 1947. 71 pages. 20 cents.
- *36. Every American should know. 1946. 16 pages. 10 cents.
37. Medical social service in tuberculosis control. 1946. 22 pages. No sales stock.

Health Education Series

1. Sunburn and suntan. June 1946. 4 pages. 5 cents; \$1.50 per 100.
3. Hot weather comfort. June 1946. 4 pages. 5 cents; \$1.50 per 100.
4. Sunstroke, heatstroke, heat prostration. June 1946. 4 pages. 5 cents; \$1.50 per 100.
5. Care of the feet. 3 pages. June 1946. 5 cents; \$1.50 per 100.
7. Swimming. June 1946. 3 pages. 5 cents; \$1 per 100.
13. Sulfa, penicillin. June 1946. 4 pages. 5 cents; \$1.50 per 100.
17. Hay fever. June 1946. 4 pages. 5 cents; \$1.50 per 100.
19. Asthma. June 1946. 7 pages. 5 cents; \$2.75 per 100.

Film Advertisement

5. "A Message To Women," a motion picture in technicolor. June 1946. 4 pages.

Unnumbered Publications

Index to Public Health Reports, vol. 61, part 1, January-June 1946. 1946. 17 pages. 5 cents.

Extract from Public Health Reports, vol. 61, No. 48, November 29, 1946. A statistical study of delivery with continuous caudal analgesia. 22 pages. 10 cents.

Reprints From the Journal of Venereal Disease Information

267. A microflocculation test for syphilis using cardiolipin antigen. Preliminary report. By Ad Harris, A. A. Rosenberg, and L. M. Riedel. July 1946. 6 pages. 5 cents.
268. Preliminary report on the San Antonio blood test campaign. By Lewis C. Robbins and Walter S. Green. August 1946. 4 pages. 5 cents.
269. A study of syphilis in a Negro high school in the city of Baltimore, 1939-1943. By Edwin N. Hesbacher. August 1946. 5 pages. 5 cents.
270. Results of rapid treatment of early syphilis. By J. R. Heller, Jr. September 1946. 9 pages. 5 cents.
271. The adequate treatment of gonorrhea. By J. R. Heller, Jr. September 1946. 4 pages. 5 cents.
272. Self-interview forms in private physician contact reporting—A new technic in case finding. A preliminary report. By William G. Hollister. Evaluative study of three types of epidemiologic activity on 360 syphilis contacts. By Herman N. Bundesen, Theodore J. Bauer and Amelia H. Baker. Use of telegrams in venereal disease case holding. By Richard A. Koch and Marian Thornton. Experiences with registered letter follow-up in the New York City health department. By Theodore Rosenthal and George Kerchner. October 1946. 14 pages. 5 cents.
273. The nurse as a case finder in venereal disease. By Hazel Shortal. Venereal disease nursing within industry. By Norma F. Whiteside. The clinic nurse in venereal disease. By Philomene E. Lenz. The public health nurse in the rapid treatment center. By Anne M. Burns. November 1946. 14 pages. 5 cents.
275. Studies in syphilis. VII. The end results of untreated syphilis. By Paul D. Rosahn. December 1946. 10 pages. 5 cents.
275. Untreated syphilis in the male Negro. III. Evidence of cardiovascular abnormalities and other forms of morbidity. By Austin V. Deibert and Martha C. Bruyere. December 1946. 15 pages. 5 cents.

Venereal Disease Folders

1. Syphilis . . . its cause . . . spread . . . cure. 1946. 5 pages. 5 cents; \$1.50 per 100.
3. Protecting the unborn baby from syphilis. 1946. 2 pages. 5 cents; \$1.50 per 100.
4. Wedding plans. Venereal disease tests. 1946. 3 pages. 5 cents; \$1.50 per 100.
5. Gonorrhea . . . its cause . . . spread . . . cure. 1946. 4 pages. 5 cents; \$1.50 per 100.

INCIDENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

May 18-June 14, 1947

The accompanying table summarizes the incidence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State for each week are published in PUBLIC HEALTH REPORTS under the section "Incidence of Disease." The table gives the number of cases of these diseases for the 4 weeks ended June 14, 1947, the number reported for the corresponding period in 1946, and the median number for the years 1942-46.

DISEASES ABOVE MEDIAN INCIDENCE

Influenza.—The number of cases of influenza dropped from 15,461 during the preceding 4 weeks to 3,988 during the 4 weeks ended June 14. The incidence was about 1.6 times that reported during the corresponding period in 1946 and 1.4 times the 1942-46 median. For the country as a whole the current incidence was the highest since 1941 when approximately 5,600 cases were reported for these same weeks. The relatively high incidence during the current period was due, no doubt, to the fact that the peak of the recent epidemic was not reached until the latter part of March, whereas in most preceding epidemics the peak has been reached during January or February. In the South Atlantic and East South Central sections the numbers of cases were about twice the preceding 5-year medians, but in other sections the incidence either closely approximated the median or fell below it.

Poliomyelitis.—For the 4 weeks ended June 14 there were 168 cases of poliomyelitis reported, as compared with 567 for the corresponding 4 weeks in 1946 and a 5-year (1942-46) median of 239 cases. The number of cases was lower than the median in all sections of the country except the West North Central and Pacific sections; in the former section the number of cases (14) was 3 times the median and in the latter section the number of cases (65) was twice the seasonal median expectancy. For the second consecutive 4-week periods of 1947 the incidence has been lower than in the corresponding periods in 1946; during these periods in 1946 an outbreak of poliomyelitis started in Florida and later spread into other parts of the country resulting in the highest poliomyelitis yearly incidence in the 18 years for which data are available in this form.

Whooping cough.—The incidence of whooping cough continued at a relatively high level, the number of cases (14,715) reported for the current 4-week period being 85 percent above the incidence for

the corresponding weeks in 1946 and almost 45 percent above the 1942-46 median (approximately 10,000 cases). Slight declines from the medians were reported from the New England, Mountain, and Pacific sections, but in all other sections the incidence was above the normal median expectancy; the greatest increase was reported from the West South Central section where the number of cases was more than 3 times the preceding 5-year median.

DISEASES BELOW MEDIAN INCIDENCE

Diphtheria.—For the 4 weeks ended June 14 there were 655 cases of diphtheria reported, as compared with 1,047 for the corresponding period in 1946, and a 1942-46 median of 676 cases. The incidence was relatively high in the North Atlantic, West North Central, and East South Central sections, but in the other 5 geographic sections the numbers of reported cases were considerably below the normal seasonal expectancy. For the country as a whole the current incidence was the lowest since 1943 when approximately 700 cases were reported for these same weeks.

Measles.—The number of cases of measles reported (32,926) for the current 4-week period was less than 35-percent of the incidence during the corresponding 4 weeks in 1946, and slightly more than 50 percent of the 1942-46 median incidence for this period. The number of cases was relatively low in all sections of the country except the West North Central and East South Central. With the exception of 1945, which was a very low measles year (approximately 19,000 cases for these weeks), the current incidence was the lowest recorded for this period in the 19 years for which data are available in this form.

Meningococcus meningitis.—For the current 4-week period there were 243 cases of meningococcus meningitis reported. The number was about 60 percent of that reported for the corresponding period in 1946 and 40 percent of the 1942-46 median. The number of cases of this disease has been gradually declining after a period of unusually high incidence and the number of cases now stands at about the level of normal non-epidemic years. The incidence was below the 1942-46 median in all sections of the country.

Scarlet fever.—The incidence of scarlet fever continued at a relatively low level, the number of cases reported for the 4 weeks ended June 14 being about 60 percent of the 1942-46 median incidence (approximately 10,000 cases). The number of cases reported from each section of the country was below the median expectancy. This disease has been on the decline since the latter part of 1945 and for the country as a whole the current incidence was the lowest in the 19 years for which these data are available.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period May 18-June 14, 1947, the number for the corresponding period in 1946, and the median number of cases reported for the corresponding period, 1942-46

Division	Current period	1946	5-year median	Current period	1946	5-year median	Current period	1946	5-year median
	Diphtheria			Influenza ¹			Measles ²		
United States.....	655	1,047	676	3,988	2,562	2,854	32,926	100,093	62,904
New England.....	45	37	20	6	3	14	6,301	14,443	6,994
Middle Atlantic.....	107	167	94	31	26	26	6,000	33,469	9,869
East North Central.....	81	136	131	167	106	148	8,726	18,139	11,186
West North Central.....	57	117	46	19	30	34	4,665	3,519	3,519
South Atlantic.....	90	181	108	1,624	871	871	2,685	9,832	4,621
East South Central.....	79	70	42	293	117	140	1,006	1,652	919
West South Central.....	104	160	143	1,445	1,185	1,386	1,402	5,852	2,380
Mountain.....	30	69	50	293	175	346	1,198	4,324	2,789
Pacific.....	62	110	95	110	49	115	943	8,893	8,893
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States.....	243	419	639	168	567	239	6,118	9,485	10,123
New England.....	9	18	36	4	1	5	568	889	1,415
Middle Atlantic.....	51	91	145	12	25	24	1,942	3,175	3,175
East North Central.....	52	73	142	10	33	13	1,790	2,639	2,639
West North Central.....	19	33	64	14	32	5	469	653	700
South Atlantic.....	29	50	88	19	140	43	335	690	690
East South Central.....	33	47	49	13	86	21	132	197	244
West South Central.....	22	56	56	23	165	62	114	188	188
Mountain.....	5	6	11	8	30	8	223	297	419
Pacific.....	23	45	48	65	55	32	545	757	757
	Smallpox			Typhoid and paratyphoid fever			Whooping cough ²		
United States.....	9	37	37	310	321	374	14,715	7,968	10,203
New England.....	0	0	0	6	23	23	878	875	938
Middle Atlantic.....	0	0	0	38	26	36	2,292	1,535	1,959
East North Central.....	2	12	12	47	22	35	2,481	1,687	1,687
West North Central.....	0	7	7	18	16	22	778	284	418
South Atlantic.....	1	1	2	48	58	86	2,174	1,365	1,789
East South Central.....	4	0	3	39	42	42	698	372	518
West South Central.....	2	1	3	74	82	82	3,651	863	1,110
Mountain.....	0	9	5	7	26	19	453	439	495
Pacific.....	0	7	3	33	26	24	1,310	548	1,394

¹ Mississippi, New York, and North Carolina excluded; New York City included.

² Mississippi excluded.

Smallpox.—Nine cases of smallpox were reported during the current 4-week period, as compared with 37 in 1946. The 1942-46 median was represented by the 1946 incidence. Four of the total cases were reported from Alabama and one each in Ohio, Indiana, Georgia, Louisiana, and Texas. Of the 37 cases reported in 1946 Indiana reported 10, Washington 7, Colorado 5, Kansas 4, and the remaining 11 cases were widely scattered over other sections of the country. For the country as a whole the current incidence was the lowest for this period in the 19 years for which these data are available.

Typhoid and paratyphoid fever.—These diseases also continued at a relatively low level, 310 cases being reported for the 4 weeks ended June 14, as compared with 321 for the corresponding period in 1946 and a 1942-46 median of 374 cases. The incidence was above median

expectancy in the East North Central and Pacific sections, about normal in the Middle Atlantic, West North Central, and East South Central sections and below the seasonal expectancy in the other four sections.

MORTALITY, ALL CAUSES

For the 4 weeks ended June 14 there were 35,072 deaths reported to the National Office of Vital Statistics by 93 large cities. The median number reported for the corresponding period in 1944-46 was 34,956. For the 4-week period the number of deaths was slightly above the 1944-46 median; during the week ended May 31 the number of deaths was about 5 percent below the median, but for the other 3 weeks of the current 4-week period the numbers of deaths were above the 1944-46 medians.

DEATHS DURING WEEK ENDED JUNE 14, 1947

[From the Weekly Mortality Index, issued by the National Office of Vital Statistics]

	Week ended June 14, 1947	Correspond- ing week, 1946
Data for 93 large cities of the United States:		
Total deaths	8,856	8,752
Median for 3 prior years	8,752	-----
Total deaths, first 24 weeks of year	233,515	231,340
Deaths under 1 year of age	745	680
Median for 3 prior years	636	-----
Deaths under 1 year of age, first 24 weeks of year	18,696	14,801
Data from industrial insurance companies:		
Policies in force	67,279,051	67,204,686
Number of death claims	11,944	11,714
Death claims per 1,000 policies in force, annual rate	9.3	9.1
Death claims per 1,000 policies, first 24 weeks of year, annual rate	9.8	10.4

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 JUNE 21, 1947

Summary

Of the 76 cases of poliomyelitis reported in 27 States for the current week (last week 45, 5-year median 125), the smallest number reported for any corresponding week since 1942, only 5 States reported more than 3 cases each, as follows (last week's figures in parentheses): California 23 (17), Washington 6 (1), Colorado 5 (2), New York 4 (0), Minnesota 4 (1). For the corresponding week last year the total was 204 cases, and the least number reported for any corresponding week of the past 4 years was 116 (in 1945). The total for the year to date is 1,124, as compared with 1,579 for the first 25 weeks last year and a 5-year (1942-46) median of 894. Since March 15, the approximate average date of lowest seasonal incidence, 513 cases have been reported, as compared with 1,112 for the same period last year and a 5-year median of 592.

Of the total of 29 cases of Rocky Mountain spotted fever reported for the current week, Indiana reported 5, Virginia 4, New Jersey, Maryland, and Oklahoma 3 each, Ohio and Illinois 2 each, Pennsylvania 1, and 6 other States in the South Atlantic and South Central areas 1 each. The total for the year to date is 153, as compared with 154 for the same period last year, which is also the 5-year median.

Three cases of smallpox were reported during the week—1 each in Michigan, South Dakota, and Kansas.

Totals of cases reported for the current week are below the respective corresponding 5-year medians for all of the diseases listed in the following tables except amebic dysentery, Rocky Mountain spotted fever, and whooping cough. Cumulative figures to date are above the medians for influenza, poliomyelitis, amebic and undefined dysentery, tularemia, and whooping cough. Figures for undulant fever, both current and cumulative, are above the corresponding averages of the past 2 years.

Deaths registered during the week in 93 large cities of the United States totaled 8,492, as compared with 8,856 last week, 8,628 and 9,111, respectively, for the corresponding weeks of 1946 and 1945, and a 3-year (1944-46) median of 8,628. The total for the year to date is 242,006, as compared with 239,968 for the corresponding period last year.

Telegraphic morbidity reports from State health officers for the week ended June 21, 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.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Med- ian 1942- 46	Week ended—		Med- ian 1942- 46	Week ended—		Med- ian 1942- 46	Week ended—		Med- ian 1942- 46
	June 21, 1947	June 22, 1946		June 21, 1947	June 22, 1946		June 21, 1947	June 22, 1946		June 21, 1947	June 22, 1946	
NEW ENGLAND												
Maine	0	2	0	—	—	—	14	201	69	0	0	0
New Hampshire	0	0	0	—	—	—	2	101	7	0	0	0
Vermont	0	0	0	—	—	—	129	225	131	0	0	0
Massachusetts	4	8	2	—	—	—	274	1,662	676	0	0	9
Rhode Island	0	0	0	1	1	—	140	91	91	0	0	1
Connecticut	0	1	1	1	1	1	525	484	200	0	1	2
MIDDLE ATLANTIC												
New York	17	22	14	14	12	12	567	2,234	996	10	9	17
New Jersey	3	9	3	4	—	3	450	1,404	432	1	2	3
Pennsylvania	6	24	9	(2)	(2)	(2)	162	1,109	553	1	9	10
EAST NORTH CENTRAL												
Ohio	2	11	2	4	3	2	627	548	182	7	3	3
Indiana	7	0	2	—	—	1	63	143	63	0	2	2
Illinois	3	6	7	—	1	4	288	315	315	10	2	17
Michigan ³	12	4	9	1	—	1	235	334	334	2	1	6
Wisconsin	1	4	1	14	11	9	866	1,109	892	1	1	2
WEST NORTH CENTRAL												
Minnesota	2	5	2	—	—	—	377	67	117	1	2	2
Iowa	0	3	1	—	—	—	108	174	85	1	2	0
Missouri	9	2	2	—	2	—	86	71	65	0	1	5
North Dakota	0	0	1	2	4	4	33	11	11	0	0	0
South Dakota	0	2	0	—	—	—	4	10	7	0	0	0
Nebraska	0	4	2	—	—	—	4	68	56	0	1	0
Kansas	3	3	1	—	1	1	10	30	63	1	1	2
SOUTH ATLANTIC												
Delaware	0	0	0	—	—	—	—	17	3	0	0	0
Maryland ³	3	10	5	3	4	2	12	540	74	0	2	3
District of Columbia	0	0	0	—	—	—	8	91	46	0	2	2
Virginia	0	3	3	94	76	40	135	200	112	2	3	8
West Virginia	3	2	1	17	2	2	18	18	23	1	0	0
North Carolina	1	6	4	—	—	—	35	138	120	1	0	1
South Carolina	1	2	2	88	114	80	53	142	40	0	1	1
Georgia	2	5	4	6	3	3	26	60	29	0	0	0
Florida	16	3	2	16	2	6	37	32	33	3	1	1
EAST SOUTH CENTRAL												
Kentucky	4	1	2	—	—	1	13	84	17	1	6	3
Tennessee	5	4	4	12	16	8	20	96	28	0	6	3
Alabama	0	3	3	1	10	14	104	121	48	1	1	5
Mississippi ³	6	2	2	3	—	—	9	—	—	0	0	1
WEST SOUTH CENTRAL												
Arkansas	2	1	3	8	9	8	39	36	33	0	1	1
Louisiana	5	3	3	1	1	1	45	55	42	0	4	1
Oklahoma	1	0	1	35	4	7	4	32	32	2	1	1
Texas	9	26	23	219	366	189	169	545	260	6	6	6
MOUNTAIN												
Montana	0	1	0	2	1	1	91	93	74	0	0	0
Idaho	0	0	0	4	12	—	4	21	21	0	0	1
Wyoming	0	1	0	1	—	—	2	10	18	0	0	0
Colorado	1	4	5	9	6	18	55	133	64	1	1	1
New Mexico	1	3	2	4	2	1	27	45	11	0	0	1
Arizona	1	10	1	25	14	26	37	94	34	0	0	0
Utah ³	4	0	0	—	2	2	19	104	104	0	1	1
Nevada	0	0	0	—	—	—	—	1	1	0	0	0
PACIFIC												
Washington	0	1	5	—	—	1	11	65	130	1	1	3
Oregon	3	2	2	5	1	2	14	196	59	0	0	0
California	8	19	19	6	7	10	127	1,251	1,251	3	11	13
Total	145	222	168	590	678	609	6,078	14,611	8,695	57	85	122
25 weeks	6,015	8,203	6,178	298,811	187,745	77,756	164,502	601,359	499,064	2,060	3,883	5,275
Seasonal low week ⁴	(27th)	July 5-11		(30th) July 26-Aug. 1			(35th) Aug. 30-Sept. 5			(37th) Sept. 13-19		
Total since low	13,582	19,847	15,055	331,786	540,993	113,618	187,389	627,483	537,077	3,032	5,387	7,727

¹ New York City only.² Philadelphia only.³ Period ended earlier than Saturday.⁴ Dates between which the approximate low week ends. The specific date will vary from year to year.

Telegraphic morbidity reports from State health officers for the week ended June 21, 1947, and comparison with corresponding week of 1946 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median 1942-46	Week ended		Median 1942-46	Week ended—		Median 1942-46	Week ended—		Median 1942-46
	June 21, 1947	June 22, 1946		June 21, 1947	June 22, 1946		June 21, 1947	June 22, 1946		June 21, 1947 ³	June 22, 1946	
NEW ENGLAND												
Maine.....	0	0	0	4	7	14	0	0	0	0	0	0
New Hampshire.....	0	0	0	2	7	2	0	0	0	1	0	0
Vermont.....	0	0	0	0	1	4	0	0	0	0	0	0
Massachusetts.....	0	0	0	54	100	164	0	0	0	0	9	3
Rhode Island.....	1	0	0	4	4	5	0	0	0	0	0	0
Connecticut.....	1	2	2	18	17	17	0	0	0	1	0	1
MIDDLE ATLANTIC												
New York.....	4	7	7	165	263	219	0	0	0	2	5	6
New Jersey.....	1	4	1	43	99	71	0	0	0	0	3	3
Pennsylvania.....	0	1	1	66	127	127	0	0	0	9	3	3
EAST NORTH CENTRAL												
Ohio.....	2	2	2	85	145	101	0	1	0	0	0	3
Indiana.....	2	2	0	18	31	20	0	0	0	2	0	1
Illinois.....	3	12	3	53	97	87	0	0	0	2	2	2
Michigan ³	1	0	1	129	75	99	1	0	0	1	2	2
Wisconsin.....	0	1	0	53	49	86	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota.....	4	1	1	23	34	34	0	0	0	1	1	0
Iowa.....	1	1	0	18	11	15	0	0	0	2	0	0
Missouri.....	0	1	1	14	13	14	0	2	0	1	2	2
North Dakota.....	2	2	0	0	5	5	1	0	0	0	0	0
South Dakota.....	0	0	0	1	6	6	0	0	0	0	0	0
Nebraska.....	3	1	0	6	9	9	0	0	0	0	1	0
Kansas.....	0	7	1	22	15	15	1	0	0	0	0	0
SOUTH ATLANTIC												
Delaware.....	0	0	0	1	1	1	0	0	0	0	0	0
Maryland ³	1	0	0	10	21	27	0	0	0	1	1	2
District of Columbia.....	0	0	0	1	7	8	0	0	0	0	0	0
Virginia.....	0	0	0	11	23	23	0	0	0	1	1	4
West Virginia.....	0	1	0	6	6	13	0	0	0	1	4	4
North Carolina.....	1	4	1	8	8	11	0	0	0	2	5	5
South Carolina.....	0	1	1	4	1	1	0	0	0	2	3	2
Georgia.....	2	4	1	0	4	7	0	0	0	4	4	11
Florida.....	0	34	1	4	2	2	0	0	0	2	3	2
EAST SOUTH CENTRAL												
Kentucky.....	1	2	1	7	16	16	0	0	0	6	3	3
Tennessee.....	1	0	1	4	15	9	0	1	0	3	6	3
Alabama.....	2	16	3	4	8	3	0	0	0	0	1	2
Mississippi ³	0	4	2	2	1	3	0	0	0	1	2	4
WEST SOUTH CENTRAL												
Arkansas.....	⁶ 1	1	2	1	2	2	0	0	0	4	3	3
Louisiana.....	1	8	7	6	6	4	0	1	0	1	6	6
Oklahoma.....	0	5	3	3	3	3	0	0	0	5	1	2
Texas.....	3	44	39	12	14	25	0	0	0	19	15	16
MOUNTAIN												
Montana.....	0	0	0	4	2	6	0	0	0	0	2	1
Idaho.....	0	0	0	1	1	4	0	1	0	1	1	1
Wyoming.....	1	0	0	0	4	4	0	0	0	0	0	0
Colorado.....	5	11	2	22	31	24	0	0	0	3	0	2
New Mexico.....	0	3	0	4	4	4	0	0	0	1	0	1
Arizona.....	2	0	0	4	4	12	0	0	0	0	0	0
Utah ³	0	1	1	9	13	13	0	0	0	0	0	0
Nevada.....	0	0	0	0	1	0	0	0	0	0	0	6
PACIFIC												
Washington.....	6	2	0	18	16	23	0	0	0	2	0	2
Oregon.....	1	1	0	4	16	11	0	0	0	2	0	1
California.....	23	18	9	90	137	137	0	0	0	5	9	6
Total.....	76	204	125	1,018	1,482	1,509	3	6	6	88	98	104
25 weeks.....	⁶ 1,124	1,581	894	58,021	80,891	91,042	139	250	263	1,334	1,448	1,666
Seasonal low week ⁴	(11th) Mar. 15-21			(32nd) Aug. 9-15			(35th) Aug. 30-Sept. 5			(11th) Mar. 15-21		
Total since low.....	⁶ 513	1,112	592	84,707	119,462	129,363	193	326	380	849	973	1,081

³ Period ended earlier than Saturday.

⁴ Dates between which the approximate low week ends. The specific date will vary from year to year.

⁵ Including paratyphoid fever reported separately, as follows: South Carolina 1; Georgia 2; Kentucky 1; Tennessee 2; Oklahoma 2; Texas 2; Colorado 1; California 2.

⁶ Delayed report: Poliomyelitis, Arkansas, week ended May 3, 1 case, included in cumulative totals only.

Telegraphic morbidity reports from State health officers for the week ended June 21, 1947, and comparison with corresponding week of 1946 and 5-year median—Con.

Division and State	Whooping cough			Week ended June 21, 1947							
	Week ended—		Median 1942-46	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
	June 21, 1947	June 22, 1946		Ame- bic	Bacil- lary	Un- spec- ified					
NEW ENGLAND											
Maine.....	4	9	14								2
New Hampshire.....		3	2								
Vermont.....	9	11	16								3
Massachusetts.....	140	139	96		2						5
Rhode Island.....	14	21	19								
Connecticut.....	64	26	26								5
MIDDLE ATLANTIC											
New York.....	235	136	177	13				3			9
New Jersey.....	244	123	157	2							1
Pennsylvania.....	121	78	197					1			1
EAST NORTH CENTRAL											
Ohio.....	231	62	107	1				2			5
Indiana.....	47	38	38					5			
Illinois.....	82	107	107	6			1	2	2		13
Michigan ¹	252	130	130	1	51						12
Wisconsin.....	140	106	106								12
WEST NORTH CENTRAL											
Minnesota.....	32	9	25	3					2		10
Iowa.....		77	28								23
Missouri.....	46	6	15								1
North Dakota.....	1	3	7								
South Dakota.....	1		2								1
Nebraska.....		2	6								1
Kansas.....	58	31	44								4
SOUTH ATLANTIC											
Delaware.....			1					1			
Maryland ¹	84	23	82			3		3	2		
District of Columbia.....	19	9	9								
Virginia.....	132	92	92			121		4	1		
West Virginia.....	17	58	23								
North Carolina.....	61	78	184					1			
South Carolina.....	77	30	41	8	9				1	1	2
Georgia.....	41	16	31		2			1	3	6	7
Florida.....	87	40	15							4	1
EAST SOUTH CENTRAL											
Kentucky.....	40	19	45					1			
Tennessee.....	40	36	34					1			
Alabama.....	63	14	29							1	5
Mississippi ¹	24				1					1	4
WEST SOUTH CENTRAL											
Arkansas.....	97	10	16	11				1	5		1
Louisiana.....	55	18	13	8	10						1
Oklahoma.....	49	29	22	2	1			3	1		
Texas.....	643	248	248	55	295	63			1	13	5
MOUNTAIN											
Montana.....	17	12	12			1					
Idaho.....	13	13	7	1							
Wyoming.....	1	14	3								
Colorado.....	43	27	30								2
New Mexico.....	11	26	16		1					1	1
Arizona.....	28	11	13			25					
Utah ¹	27	9	37						1		3
Nevada.....											
PACIFIC											
Washington.....	17	22	16	2							1
Oregon.....	28	13	13								1
California.....	252	68	191	8			2			1	
Total.....	3,687	2,052	2,364	121	372	213	3	29	19	31	143
Same week, 1946.....	2,052			69	623	123	17	22	20	111	148
Median, 1942-46.....	2,354			54	488	231	9	22	20	94	140
25 weeks: 1947.....	74,168			1,296	7,574	5,175	164	153	751	903	2,690
1946.....	47,063			1,017	8,636	2,997	225	154	443	1,255	2,241
Median, 1942-46.....	62,419			793	8,033	2,426	225	154	443	1,255	2,271

¹ Period ended earlier than Saturday.

² 2-year average, 1945-46.

Anthrax: New Jersey 1 case. *Leptosy:* Texas 3 cases; California 1 case.

Alaska, week ended June 21: Chickenpox 10; impetigo 2.

WEEKLY REPORTS FROM CITIES ¹

City reports for week ended June 14, 1947

This table lists the reports from 86 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.

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0		0	9	0	1	1	0	0	0	13
New Hampshire:												
Concord	0	0		0		0	1	0	0	0	0	
Vermont:												
Barre	0	0		0	11	0	0	0	0	0	0	
Massachusetts:												
Boston	3	0		0	44	0	7	0	15	0	1	22
Fall River	0	0		0	25	0	0	0	1	0	0	9
Springfield	0	0		0	3	0	0	0	1	0	0	6
Worcester	0	0		0	16	0	2	0	3	0	0	4
Rhode Island:												
Providence	0	0		0	86	0	1	0	2	0	0	10
Connecticut:												
Bridgeport	0	0		0	26	0	1	0	1	0	0	
Hartford	0	0		0	99	0	0	0	1	0	1	
New Haven	0	0		0	85	0	0	0	13	0	0	20
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0		0		0	3	0	5	0	0	4
New York	11	0	3	1	406	1	48	0	66	0	1	90
Rochester	0	0		0	3	0	1	0	5	0	0	12
Syracuse	0	0		0		0	2	0	11	0	0	34
New Jersey:												
Newark	0	0		0	26	2	0	0	6	0	0	33
Trenton	1	0		0	6	0	3	0	4	0	0	2
Pennsylvania:												
Philadelphia	1	0	1	0	33	3	11	1	19	0	1	71
Pittsburgh	0	0		1	9	0	6	0	18	0	0	28
Reading	0	0		0	1	0	0	0	0	0	0	
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	2	0		1		2	2	0	3	0	0	5
Cleveland	0	0		0	120	2	3	0	13	0	0	75
Columbus	0	0		0	109	0	2	0	8	0	0	22
Indiana:												
Fort Wayne	0	0		0	1	0	3	0	0	0	0	2
Indianapolis	1	0		0	2	0	7	0	6	0	0	19
South Bend	0	0		0	11	2	0	0	0	0	0	2
Terre Haute	0	0		0		0	0	0	0	0	0	
Illinois:												
Chicago	0	0		0	48	2	28	0	24	0	0	21
Springfield	0	0		0	5	0	1	0	1	0	0	3
Michigan:												
Detroit	3	0		1	10	2	8	0	62	0	0	75
Flint	0	0		0		0	1	0	6	0	0	1
Grand Rapids	0	0		0	5	0	0	0	7	0	0	6
Wisconsin:												
Kenosha	0	0		0	14	0	0	0	1	0	0	6
Milwaukee	0	0		0	50	0	3	0	12	0	0	27
Racine	0	0		0		0	0	0	9	0	0	10
Superior	0	0		0		0	0	0	0	0	0	
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0		0	1	1	0	0	0	0	0	9
Minneapolis	0	0		0	49	1	3	0	13	0	0	
St. Paul	0	0		0	439	0	5	0	3	0	0	16
Missouri:												
Kansas City	0	0		0	5	0	3	0	4	0	0	6
St. Joseph	0	0		0		0	0	0	0	0	0	
St. Louis	1	0	1	0	62	1	6	0	2	0	0	38

¹ In some instances the figures include nonresident cases.

City reports for week ended June 14, 1947—Continued

Division, State, and City	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Pollomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha.....	0	0	-----	0	4	0	2	1	1	0	0	1
Kansas:												
Topeka.....	0	0	-----	0	1	0	0	0	1	0	0	2
Wichita.....	0	0	-----	0	2	0	1	0	3	0	1	6
SOUTH ATLANTIC												
Delaware:												
Wilmington.....	0	0	-----	0	2	0	0	0	2	0	0	4
Maryland:												
Baltimore.....	3	0	-----	0	11	1	3	0	5	0	0	67
Cumberland.....	0	0	-----	0	-----	0	1	0	0	0	0	1
Frederick.....	0	0	-----	0	-----	0	0	0	0	0	0	-----
District of Columbia:												
Washington.....	0	0	-----	1	6	0	6	0	3	0	0	6
Virginia:												
Lynchburg.....	0	0	-----	0	-----	0	0	0	0	0	0	-----
Richmond.....	0	0	-----	0	31	0	0	0	1	0	0	1
Roanoke.....	0	0	-----	0	9	0	0	0	0	0	0	-----
West Virginia:												
Wheeling.....	0	0	-----	0	-----	0	2	0	0	0	0	-----
North Carolina:												
Raleigh.....	0	0	-----	0	-----	0	0	0	0	0	0	5
Wilmington.....	0	0	-----	0	1	0	0	0	0	0	0	1
Winston-Salem.....	0	0	-----	0	3	0	0	0	0	0	0	-----
South Carolina:												
Charleston.....	0	0	-----	0	2	0	4	0	0	0	1	-----
Georgia:												
Atlanta.....	0	0	1	1	1	0	4	0	0	0	0	5
Brunswick.....	0	0	-----	0	-----	0	0	0	0	0	0	-----
Savannah.....	0	0	-----	0	1	0	2	0	0	0	0	7
EAST SOUTH CENTRAL												
Tennessee:												
Memphis.....	0	0	1	1	6	0	7	0	1	0	0	5
Nashville.....	0	0	-----	1	1	0	2	0	1	0	0	8
Alabama:												
Birmingham.....	0	0	1	0	4	1	1	0	1	0	0	1
Mobile.....	0	0	-----	0	3	0	2	0	0	0	0	1
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock.....	0	0	-----	0	-----	0	2	0	0	0	0	-----
Louisiana:												
New Orleans.....	2	0	1	0	34	1	1	0	3	0	2	14
Shreveport.....	1	0	-----	0	-----	0	2	0	0	0	0	-----
Oklahoma:												
Oklahoma City.....	0	0	-----	0	-----	0	3	0	0	0	0	-----
Texas:												
Dallas.....	0	0	-----	0	42	0	2	0	1	0	0	4
Galveston.....	0	0	-----	0	-----	0	0	0	0	0	0	-----
Houston.....	0	0	-----	0	-----	0	1	0	0	0	0	-----
San Antonio.....	0	0	-----	0	1	0	2	0	1	0	0	1
MOUNTAIN												
Montana:												
Billings.....	0	1	-----	0	-----	0	0	0	0	0	0	-----
Great Falls.....	0	0	-----	0	-----	0	0	0	2	0	0	-----
Helena.....	0	0	-----	0	3	0	0	0	1	0	0	-----
Missoula.....	0	0	-----	0	-----	0	0	0	0	0	0	-----
Colorado:												
Denver.....	2	0	2	0	3	0	3	1	8	0	0	4
Pueblo.....	0	0	-----	0	-----	0	2	0	0	0	0	-----
Utah:												
Salt Lake City.....	0	0	-----	0	-----	0	0	1	6	0	0	1

City reports for week ended June 14, 1947—Continued

Division, State, and City	Diphtheria cases	Enecephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle.....	0	0	-----	0	3	0	2	0	1	0	0	5
Spokane.....	0	0	-----	0	-----	0	1	1	2	0	0	1
Tacoma.....	0	0	-----	0	2	0	0	0	0	0	0	1
California:												
Los Angeles.....	2	0	-----	1	7	1	1	5	20	0	0	57
Sacramento.....	2	0	-----	0	2	0	1	1	0	0	0	1
San Francisco.....	1	0	2	0	6	0	2	0	5	0	0	5
Total.....	36	1	13	9	2,010	23	224	12	414	0	8	915
Corresponding week, 1946*	60	-----	36	10	4,239	-----	235	-----	567	0	10	496
Average 1942-46*	56	-----	27	11	3,569	-----	257	-----	742	0	17	797

* Exclusive of Oklahoma City.

† 3-year average, 1944-46.

‡ 5-year median, 1942-46.

Dysentery, amebic.—Cases: New York 4; St. Louis 1; Memphis 1; New Orleans 2; Los Angeles 1.*Dysentery, bacillary.*—Cases: New York 2; Detroit 2.*Dysentery, unspecified.*—Cases: Cincinnati 20; San Antonio 22.*Rocky Mt. spotted fever.*—Cases: St. Louis 1; Washington, D. C., 1.*Tularemia.*—Cases: St. Louis 1; New Orleans 1.*Typhus fever, endemic.*—Cases: New York 1.**CORRECTION—NO SMALLPOX IN NEWARK, N. J.**

The report of a fatal case of smallpox in Newark, N. J. on April 17 (Pub. Health Rep., May 16, 1947, p. 720) was an error, the case having occurred in Camden, as stated in the Public Health Reports for May 9 (p. 694). Dr. Charles V. Crater, city health officer of Newark, in calling attention to this error, states that there has not been a smallpox death in Newark in more than 30 years. The case in Camden was probably a contact with the New York City infection.

Rates (annual basis) per 100,000 population, by geographic groups, for the 86 cities in the preceding table (latest available estimated population, 34,263,100)

	Diphtheria case rates	Enecephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Polymyellitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England.....	7.8	0.0	0.0	0.0	1,056	0.0	34.0	2.6	97	0.0	5.2	217
Middle Atlantic.....	5.1	0.0	1.9	0.9	226	2.8	34.6	0.5	63	0.0	0.9	128
East North Central.....	3.6	0.0	0.0	1.2	228	2.1	35.3	0.0	92	0.0	0.0	167
West North Central.....	2.0	0.0	2.0	0.0	1,132	6.0	40.2	2.0	54	0.0	2.0	157
South Atlantic.....	5.2	0.0	1.7	3.5	117	1.7	38.3	0.0	19	0.0	1.7	169
East South Central.....	0.0	0.0	11.8	11.8	83	2.9	70.8	0.0	18	0.0	0.0	89
West South Central.....	7.6	0.0	2.5	0.0	196	2.5	33.0	0.0	13	0.0	5.1	48
Mountain.....	16.5	8.3	16.5	0.0	50	0.0	41.3	16.5	140	0.0	0.0	41
Pacific.....	7.9	0.0	3.2	1.6	32	1.6	11.1	11.1	44	0.0	0.0	111
Total.....	5.5	0.2	2.0	1.4	307	3.5	34.2	1.8	63	0.0	1.2	140

PLAGUE INFECTION IN OREGON AND WASHINGTON

Under dates of June 13 and 19, respectively, plague infection was reported proved in specimens collected in Oregon and Washington as follows:

OREGON

Klamath County.—Tissue from organs of 1 marmot, *Marmota flaviventris*, taken June 2 on Keno Road to Highway No. 97.

WASHINGTON

Kittitas County.—126 fleas from 75 meadow mice, *Microtus* sp., and 119 fleas from 43 chipmunks, *Eutamias* sp., taken on June 5 from Kittitas County divide above Hanson's Creek.

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended May 31, 1947.—During the week ended May 31, 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	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox.....		14	1	297	296	35	45	61	115	864
Diphtheria.....				11	5	3	2		1	22
Dysentery:										
Amebic.....					2					2
Bacillary.....				1						1
Encephalitis, infectious.....						1				1
German measles.....				77	52	1	8	2	5	145
Influenza.....					6	1			19	26
Measles.....		18	4	115	356	113	37	70	117	830
Meningitis, meningococcus.....				1	1					2
Mumps.....		40		66	378	29	34	16	91	654
Poliomyelitis.....					1					1
Scarlet fever.....			4	67	64	3	1	3	10	152
Tuberculosis (all forms).....		4	32	141	34	19	13	9	56	308
Typhoid and paratyphoid fever.....				11	1	1			1	14
Undulant fever.....				11	1				1	13
Veneral diseases:										
Gonorrhea.....	1	11	6	133	108	24	16	39	92	480
Syphilis.....		15	3	81	72	11	9	10	38	239
Other forms.....									1	1
Whooping cough.....		1	1	24	66	20	2	14	38	166

FINLAND

Notifiable diseases—March 1947.—During the month of March 1947, cases of certain notifiable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis.....	17	Paratyphoid fever.....	109
Diphtheria.....	629	Poliomyelitis.....	10
Dysentery.....	5	Scarlet fever.....	254
Gonorrhea.....	1,077	Syphilis.....	468
Malaria.....	2	Typhoid fever.....	97

NOTE.—Report for the month of February 1947 has not been received.

JAMAICA

Notifiable diseases—4 weeks ended May 31, 1947.—During the 4 weeks ended May 31, 1947, cases of certain notifiable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox.....	12	21	Puerperal sepsis.....	1	
Dysentery, unspecified.....	4	3	Scarlet fever.....	1	
Erysipelas.....		1	Tuberculosis (respiratory).....	33	53
Leprosy.....		1	Typhoid fever.....	6	104
Poliomyelitis.....		1	Typhus fever (murine).....	2	1

MADAGASCAR

Notifiable diseases—January–March 1947.—For the months of January, February, and March 1947, cases of certain notifiable diseases were reported in Madagascar as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis.....	41	Poliomyelitis.....	205
Diphtheria.....	8	Puerperal infections.....	3
Dysentery, unspecified.....	9	Relapsing fever.....	2
Leprosy.....	6	Scarlet fever.....	1
Measles.....	63	Trachoma.....	3
Plague.....	140	Typhoid fever.....	212

NEW ZEALAND

Notifiable diseases—5 weeks ended May 3, 1947.—For the 5 weeks ended May 3, 1947, certain notifiable diseases were reported in New Zealand as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis.....	4	1	Ophthalmia neonatorum.....	1	—
Diphtheria.....	94	—	Puerperal fever.....	8	—
Dysentery:			Scarlet fever.....	84	—
Amebic.....	3	—	Tetanus.....	4	—
Bacillary.....	10	—	Trachoma.....	5	—
Erysipelas.....	17	—	Tuberculosis.....	190	49
Lead poisoning.....	1	—	Typhoid fever.....	10	3
Malaria.....	1	—	Undulant fever.....	1	—

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

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during 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 HEALTH REPORTS for the last Friday in each month.

Cholera

Indochina (French)—Cochinchina.—For the period May 21–31, 1947, 118 cases of cholera with 78 deaths were reported in Cochinchina, French Indochina.

Smallpox

Siam (Thailand).—Smallpox has been reported in Siam (Thailand), as follows: Weeks ended—May 3, 1947, 150 cases, 31 deaths; May 10, 1947, 136 cases, 25 deaths.

Typhus Fever

Bulgaria.—Typhus fever has been reported in Bulgaria as follows: Weeks ended—April 19, 1947, 48 cases, 4 deaths; April 26, 1947, 44 cases, 5 deaths; May 3, 1947, 42 cases, 3 deaths; May 10, 1947, 50 cases, 4 deaths.