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STUDIES OF THE ACUTE DIARRHEAL DISEASES

I. Differential Culture Media

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PLAN OF SERIES OF STUDIES

The studies reported here and in subsequent papers were initiated in 1935 at the request of the Director of the State Department of Public Health of New Mexico and the Director of the Indian Medical Service. They emphasized the major importance of the diarrheal diseases as a public health problem in the Southwest and the lack of definite information as to etiology and means of prevention. During the first summer the situation in the State as a whole was surveyed, and arrangements for an adequate investigation were completed. A bacteriological and protozoological field laboratory was established in Albuquerque, N. Mex., in June 1936, and the etiological, epidemiological, and clinical study of cases occurring in Bernalillo County and adjacent Indian reservations was started. The investigation has continued for the planned 3-year period. Most of the field observations have been made during the summer, when the case incidence has been high, but these studies have been extended throughout the fall and into the winter months. During the latter period clinical cases were encountered infrequently. It did not seem essential nor was it possible to continue the field work for the entire 12 months of each year.

Large numbers of clinical cases of all degrees of severity were reported by physicians and field nurses. Stool specimens for laboratory examination were obtained during the acute period of the disease whenever possible. Some were examined during convalescence and, in one series, for prolonged periods after clinical recovery. Detailed epidemiological information has been sought on all accessible cases and on most of these reasonably adequate clinical data were obtained. For epidemiological purposes the household contacts of cases and

representative samples of healthy population groups have been examined bacteriologically, and community sanitary surveys have been completed. This was the plan designed for the study of endemic disease. In "epidemics" and institutional outbreaks the procedures were modified when indicated or as necessitated. These field and laboratory observations were supplemented by a statistical study of mortality reports for recent years.

New Mexico as a whole is an area of striking variations and contrasts. Three distinct population groups are involved, the "Anglo-Americans," "Spanish-Americans," and Indians. (The Spanish speaking people of New Mexico correctly object to being designated "Mexicans.") There are communities living in the direst poverty and others in very comfortable circumstances; there are groups with complete lack of sanitary arrangements and those with every modern convenience; there are urban areas and there are isolated villages and ranch homes. Equally wide variations in the incidence of disease were encountered. Considering the State as a whole the diarrheal disorders have continued to be an important cause of mortality and morbidity. In recent years the two neighboring States, Arizona and New Mexico, have stood alone in having mortality rates from all diarrheal diseases (dysentery, and diarrhea and enteritis) which have approached and even exceeded 100 per 100,000 population. Bernalillo County is representative of these areas with a persisting high incidence of diarrheal diseases.

A study of unusual incidence of a disease should be more far reaching than merely to reveal the nature of a local problem. The present study may and should throw further light on conditions which until recently were of universal occurrence and which still exist, to varying degrees, in many areas. It has been our dominant hope, however, that this investigation of the diarrheal diseases in an area of high incidence would materially supplement the information now available about them and facilitate further studies in areas more representative of the country as a whole.

Our investigation was planned and conducted as a unit, but the findings on particular problems will be presented separately. Since the degree of success in any study of enteric infection is dependent largely upon the effectiveness of the differential culture media employed, this subject is given first attention.

LABORATORY PROCEDURES

The cultural procedures adopted have been modified as a result of cumulative experience. It was impracticable during the first summer's study in 1936 to use more than one differential culture medium. Eosin-methylene blue agar was selected as probably the most reliable,

The following year the study reported here was undertaken. The results indicated that our first choice of medium, and the one so generally adopted for stool culture work, was by no means the best for the study of the diarrheal diseases. The media employed during the third year were selected as a result of the findings presented in this study.

Approximately 90 percent of the stool samples for bacteriological examination were collected in the homes of patients. Specimen bottles, containing a small amount of 25 percent glycerine in physiological saline, were left by the public health nurse with instructions for obtaining the specimens. The bottles were collected the following morning and usually reached the laboratory by noon. During the comparative study of differential media the specimens were promptly inoculated on one plate of each of the following freshly prepared agars: (1) Eosin-methylene blue; (2) Endo's; (3) desoxycholate (Leifson) (*1*); and desoxycholate citrate (Leifson) (*1*). The first two were prepared in our laboratory using a fresh beef infusion agar base and for the others a dehydrated product of the Baltimore Biological Laboratory was employed. Each plate was inoculated separately. Only small amounts of inoculum could be used on each of the first three plates, but on the desoxycholate citrate agar undiluted feces could be rather freely applied. All plates were incubated at 37° C. for 20 to 24 hours.

After incubation, the presence or absence of suspicious colonies was noted. If any were observed, the proportion of suspicious to total number of discrete colonies was estimated. Representative suspicious colonies were fished to Russell's double sugar agar (phenol red indicator). If present, at least two such colonies were picked from each plate. The source was indicated by a subletter. The plates were kept at room temperature until the Russell's tubes were read after 16 to 20 hours' incubation. All plates which had not yielded suspicious organisms were reexamined. The tubes giving the reaction indicating the possible presence of *Shigella dysenteriae* were kept for immediate study; gas-producing, *Salmonella*-like organisms were retained for later investigation. To provide a prompt and clinically serviceable report for physicians, a preliminary agglutination test was performed on all of the former, using a polyvalent Flexner and a Sonne antiserum, each in dilutions of 1/200 and 1/400. (At present the "Newcastle" antiserum is also employed.)

The identification of *Shigella dysenteriae* proceeded in the usual manner. The organisms were plated for purity. Inoculations were made into nutrient broth, carbohydrate peptone water (lactose, dextrose, saccharose, mannitol, xylose, and dulcitol) and milk (brom cresol purple indicator). Fermentation tests were read after 24 and 72 hours' incubation at 37° C. The lactose and saccharose tubes were observed daily up to 14 days. Dulcitol was not kept longer at the

time of this study, as the presence of the "Newcastle dysentery bacillus" was not suspected. Milk was observed similarly for 2 weeks. Ninety-six hour broth cultures were used for the determination of indol production.

In the serological examinations the following sera were employed:

Shiga.—Prepared by and obtained from (*a*) Parke Davis (titer 1:500) and (*b*) New York State Laboratories (titer 1:1000).

Schmitz.—Prepared by and obtained from the New York State Laboratories (titer not stated).

Flexner.—(*a*) Polyvalent (V, W, X, Y, Z), prepared by immunizing rabbits with organisms obtained from the Standards Laboratory, Oxford, England (titer 1:6400).

(*b*) Flexner Y prepared by immunizing rabbits with an organism with a very wide antigenic range obtained from the laboratories of the New York City Department of Health.

(*c*) Monovalent for V, W, X, Y, Z, prepared by immunizing rabbits with organisms obtained from the Standards Laboratory, Oxford, England (titers 1:6400 to 1:25600).

(*d*) Monovalent for V, W, X, Y, Z, prepared by and obtained from the Standards Laboratory, Oxford, England (titer 1:250).

Sonne.—Prepared by immunizing rabbits with organisms recently isolated in New Mexico and identified by antiserum from the Virginia State Laboratory.

"Newcastle dysentery bacillus."—(*a*) Prepared by immunizing a rabbit with an organism sent from the Standards Laboratory, Oxford, England (titer 1:2000).

(*b*) Prepared by and obtained from the Standards Laboratory, Oxford, England (titer 1:250).

All mannitol fermenting organisms were first examined with the polyvalent Flexner or the Flexner Y (New York City) and Sonne antisera. The few nonmannitol fermenters isolated were similarly tested with the Shiga and the Schmitz antisera. All agglutination tests were kept in the 56° C. water bath for 4 hours and overnight at room temperature before reading. The subclassification of the Flexner group was carried out at a later time. Routinely, the sera prepared by us were employed, but representative diagnoses were checked with those obtained from Oxford. It was in the course of this subclassification that the "Newcastle dysentery bacillus" of Clayton and Warren (*2*) (*3*) was first recognized. Organisms that were agglutinated only in the low titers by the Flexner antisera and those serologically negative, both mannite positive and negative, were then tested with the "Newcastle" antiserum. All organisms accepted as *Shigella dysenteriae* were agglutinated by some one of the specific antisera in titers as high, or almost as high, as that given with the

homologous strain. The final classification was always on the basis of both the cultural and serological findings.

It proved neither practicable nor necessary to study exhaustively all suspicious organisms from the same specimen picked from the different media. As a routine, one per specimen was studied in detail and the others were identified serologically. However, if either the serological or cultural characteristics were atypical or if the findings throughout were not consistent, then organisms obtained from the different media were investigated in detail.

FINDINGS

During the summer and fall of 1937 a total of 2,886 stool samples from cases, healthy household contacts, and representatives of the general population were examined culturally. Some variety of *Shigella dysenteriae* was isolated from 582 (20.2 percent). (From one specimen the Flexner and Sonne varieties were isolated, from another Sonne and "Newcastle." For purposes of this analysis these double isolations have each been tabulated as two specimens.)

Failure to isolate suspected organisms does not necessarily imply their absence. To obtain a true measure of the reliability of a procedure the number of specimens examined which did actually contain the particular organisms would need to be known. When dealing with specimens obtained from human beings this cannot be determined with certainty. However, if *Shigella dysenteriae* is isolated from a specimen, it is then known that the material under investigation did contain the organisms, and in a series of examinations the number of positives yielded by the respective differential media will be a relative measure of the efficacy of these preparations. For this reason in the analysis which follows the attention necessarily is confined to the 582 known positive specimens. The limitation of this presentation is that all observations must be stated in terms of relative proportions. If for one variety of organisms some one medium is of outstanding value, then the others by comparison will appear unreliable; for another variety the three media might be no more effective than in the first case, but if the fourth is not of outstanding value, then the three will appear more reliable. The ratios given must be evaluated as relative, not absolute, proportions.

As already stated it was our practice to plate each specimen to the four differential media under observation (eosin-methylene blue, Endo's, plain desoxycholate, and desoxycholate citrate agars). There were exceptions to this rule. For a short period the supply of plain desoxycholate agar was exhausted and the number of known positive specimens, in which this medium was employed, was correspondingly decreased. At another time a group of cases was studied in the Fort Defiance Indian Hospital and it was practicable to employ only two

media—the eosin-methylene blue and the desoxycholate citrate agars. Occasionally also, the daily supply of some one medium was inadequate. In table 1 the number of times that each medium was employed in the examination of known positive specimens is given first. It is noted that the eosin-methylene blue was used in the examination of every specimen which proved to be positive and the desoxycholate citrate agar in all but 4; the Endo's was omitted in 16 and the plain desoxycholate in 50 of these examinations. Had there been no omissions, the number of additional positives expected would be 3 on desoxycholate citrate, 4 on Endo's, and 19 on the plain desoxycholate agar.

During the period of this comparative study three varieties of *S. dysenteriae* were found. Members of the Flexner group have been encountered most frequently, with 379 isolations; Sonne strains were obtained from 119 specimens, and from 84 the more recently described "Newcastle dysentery bacillus." The *Shigella alkalescens* has been recovered also; but as its pathogenicity is still questionable, it has not been considered in the present tabulations. Neither the Shiga nor the Schmitz variety has as yet been identified.

The proportion of successful isolations of these organisms from specimens found to be positive on one or more of the media is presented in table 1. It is evident that for each of the three varieties

TABLE 1.—*The number of examinations on each of 4 differential media of specimens found to be positive for Shigella dysenteriae on one or more of these media, and the resulting successful isolations*

Culture medium	Variety of Shigella	Known positive specimens examined	Successful isolations from respective media	
			Number	Percent
Desoxycholate citrate agar	Flexner	377	334	89
	Sonne	119	88	74
	Newcastle	82	46	56
	Total	578	468	81
Desoxycholate agar (plain)	Flexner	341	113	33
	Sonne	113	69	61
	Newcastle	78	39	50
	Total	532	221	42
Eosin-methylene blue agar	Flexner	379	98	26
	Sonne	119	46	39
	Newcastle	84	30	36
	Total	582	174	30
Endo's agar	Flexner	367	87	24
	Sonne	115	34	30
	Newcastle	84	35	42
	Total	566	156	28

the desoxycholate citrate agar is the most effective medium, but it is relatively better for the Flexner group than for either the Sonne or

"Newcastle" strain. The proportion of successes on this medium for the three varieties were as follows: Flexner 89 percent, Sonne 74 percent, and "Newcastle" 56 percent. The other three media, in contrast, had a lower percentage of "successes" for specimens positive for Flexner than for those yielding Sonne or "Newcastle." The proportions for the plain desoxycholate were: Flexner 33 percent, Sonne 61 percent, and "Newcastle" 50 percent, and for the eosin-methylene blue and Endo's, respectively, Flexner 26 percent and 24 percent, Sonne 39 percent and 30 percent, and "Newcastle" 36 percent and 42 percent. These findings are consistent with the belief that the desoxycholate citrate agar was highly effective for the isolation of the Flexner strains, but less so for both the Sonne and "Newcastle" varieties. For these the other media appeared relatively of greater value. The plain desoxycholate was consistently superior to either the eosin-methylene blue or Endo's agar and evidently had particular value for the isolation of Sonne and "Newcastle" strains.

The clinical worth of a medium depends upon its ability to isolate the etiological agents during the course of the disease; its epidemiological value is measured by its efficacy in following the course of an infection in the convalescent and in detecting carriers among healthy contacts and in representative population groups. The examinations were tabulated, therefore, according to the condition of the patient at the time when the feces sample was obtained. About one-half of the positive specimens were collected during the acute phase of the disease, one-quarter from persons still convalescing or recently recovered from a diarrheal illness, and the remainder from healthy individuals known to have been free from any diarrheal disorder for at least the preceding month. The relative efficacy of the four media in the examination of specimens from individuals in these varying conditions is shown for the Flexner strains in table 2. The observations for Sonne and "Newcastle" are recorded by totals only as a similar division of these isolations gave numbers too small to have much significance. For each of these groupings the single medium or the various combinations of media which provided the positive results are given in detail.

It is observed that there was successful isolation from two, three, or four plates in 48.7 percent of those specimens collected from individuals with acute diarrhea. This proportion was 37.3 percent in the specimens from convalescents, 23.4 percent in those from individuals recently recovered, and 17.2 percent when the specimens were obtained from healthy persons. Considering only those in which there was isolation from each of three or four plates, the corresponding percentages were 29.1, 21.0, 13.3, and 6.8, respectively. The positives obtained by successful isolation from one plate only increased from group to group, but this increase was accounted for entirely by the

TABLE 2.—*Culture media, alone or in combination, which yielded Shigella dysenteriae in the 582 positive stool specimens*

Culture media yielding positive results	Specimens positive for S. dysenteriae															
	Flexner										Sonne		"Newcastle"		Total	
	Condition of individual examined								Total							
	Ill		Convalescent		Recently recovered [1]		Healthy [2]									
	Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
One positive plate:																
Desoxycholate citrate	81	42.8	22	51.1	37	61.6	66	75.9	206	54.4	34	28.6	20	23.8	260	44.7
Desoxycholate plain	6	3.2	1	2.3	2	3.3	2	2.3	11	2.9	12	10.1	14	16.7	37	6.4
Eosin-methylene blue	6	3.2	3	7.0	4	6.7	3	3.5	16	4.2	11	9.2	5	5.9	32	5.5
Endo's	4	2.1	1	2.3	3	5.0	1	1.1	9	2.4	0	0	4	4.8	13	2.2
Two positive plates:																
Deso. citrate and plain	20	10.6	3	7.0	3	5.0	3	3.5	29	7.7	19	16.0	3	3.6	51	8.8
Deso. citrate and E. M. B	8	4.2	3	7.0	1	1.7	0	0	12	3.2	1	.8	3	3.6	16	2.7
Deso. citrate and Endo's	5	2.6	0	0	1	1.7	5	5.8	11	2.9	1	.8	2	2.4	14	2.4
Deso. plain and E. M. B	2	1.1	0	0	0	0	0	0	2	.5	0	0	1	1.2	3	.5
Deso. plain and Endo's	0	0	1	2.3	0	0	1	1.1	2	.5	3	2.5	5	5.9	10	1.7
E. M. B. and Endo's	2	1.1	0	0	1	1.7	0	0	3	.8	1	.8	8	9.5	12	2.1
Three positive plates:																
Deso. citrate, plain, and E. M. B	10	5.2	4	9.3	2	3.3	0	0	16	4.2	8	6.7	3	3.6	27	4.6
Deso. citrate, plain, and Endo's	9	4.8	1	2.3	2	3.3	1	1.1	13	3.4	4	3.4	6	7.1	23	4.0
Deso. citrate, E. M. B. and Endo's	6	3.2	2	4.7	0	0	1	1.1	9	2.4	2	1.7	3	3.6	14	2.4
Deso. plain, E. M. B. and Endo's	2	1.1	0	0	0	0	0	0	2	.5	4	3.4	1	1.2	7	1.2
Four positive plates:																
Deso. citrate, plain, E. M. B. & Endo's	28	14.8	2	4.7	4	6.7	4	4.6	38	10.0	19	16.0	6	7.1	63	10.8
Total	189	100.0	43	100.0	60	100.0	87	100.0	379	100.0	119	100.0	84	100.0	582	100.0

[1] Complete clinical recovery within 30 days.
[2] Representative samples of the general population, healthy contacts of clinical cases and previous cases free from symptoms for more than 1 month.

desoxycholate citrate agar. The percentages of the total isolation yielded exclusively by this medium were as follows: Specimens obtained in illness 42.8 percent, during convalescence 51.1 percent, within 1 month after recovery, 61.6 percent, and from healthy individuals 75.9 percent. As the Flexner organisms became less numerous in the specimens and hence more difficult to isolate, the desoxycholate citrate agar had greater relative value. Accepting the evidence of small series, this relationship held true also for Sonne isolations, but there was no such increase in the value of the desoxycholate citrate agar for the isolation of the "Newcastle dysentery bacillus."

In evaluating the relative efficacy of the plain desoxycholate agar as shown in table 2 and further considered in table 3, it is to be remembered that this medium was omitted in 8.6 percent of the examinations and a corresponding increase in the positive observations is warranted to render the results fairly comparable. A similar adjustment for the few omissions in the use of Endo's and the desoxycholate citrate agar would not significantly change the recorded findings.

The practical objective in these comparisons is to ascertain the most effective combination of differential media for the isolation of *S. dysenteriae*. The increases in positive specimens yielded by adding the different media to varying combinations have been determined, therefore, and are given in table 3. First recorded is the number of positives obtained by the use of one plate each of the eosin-methylene blue and the Endo's agar and the increase resulting from the addition of single plates of plain desoxycholate agar, desoxycholate citrate agar, and both. For comparison, the influence of adding eosin-methylene blue and Endo's singly and in combination to the desoxycholate agars is indicated. Lastly, the effect of adding each medium to the other three is presented. Again, the superior value of desoxycholate citrate agar and of the two desoxycholate agars in combination is outstanding. The latter served to increase the number of Flexner positives by as much as 444 percent in specimens collected from individuals free of present or recent illness. For all Flexners the increase was 185 percent, for all Sonne 120 percent, and for the "Newcastle" 79 percent. The desoxycholate citrate alone provided most of this increase. Without this one medium and using the other three plates per specimen, 322 positives would have been found; with it there were 582 isolations, an increase of 260 (81 percent).

Its effectiveness in obtaining Flexner strains from healthy individuals was particularly striking. Using the other three media 21 healthy carriers of *S. dysenteriae* were found, but including this fourth medium 87 were discovered, an increase of 66 (314 percent) provided by the desoxycholate citrate agar. For the isolation of the Sonne and "Newcastle" strains it was more effective than any other single prep-

TABLE 3.—*Number of and percent increase in isolations of Shigella dysenteriae through the addition of specified culture media*

Culture media, alone or in combination, yielding the positive results	Specimens positive for S. dysenteriae															
	Flexner										Sonne		Newcastle		Total	
	Condition of individual examined								Total							
	Ill		Convalescent		Recently recovered [1]		Healthy [2]									
Eosin-methylene blue and Endo's	82		17		18		16		133		54		47		234	
Increase due to—	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Desoxycholate plain	26	32	4	24	5	28	5	31	40	30	31	57	17	36	88	38
Desoxycholate citrate	101	123	25	147	40	222	69	431	235	177	53	98	23	49	311	133
Desoxycholate, plain and citrate	107	131	26	153	42	233	71	444	246	185	65	120	37	79	348	148
Desoxycholate citrate and plain	177		39		52		83		351		107		67		525	
Increase due to—	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Endo's	6	3	1	3	4	8	1	1	12	3	1	0.9	12	18	25	5
Eosin-methylene-blue	8	5	3	8	5	10	3	4	19	5	12	11	13	19	44	8
Endo's and eosin-methylene blue	12	7	4	10	8	15	4	5	28	8	12	11	17	25	57	11
Desoxycholate plain, eosin-methylene blue and Endo's	108		21		23		21		173		85		64		322	
Increase due to—	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Percent*
Desoxycholate citrate	81	75	22	105	37	161	66	314	206	119	34	40	20	31	260	81

Desoxycholate citrate, eosin-methylene-blue and Endo's	183		42		58		85		368		107		70		545			
Increase due to—Desoxycholate plain	*Number* 6	*Percent* 3	*Number* 1	*Percent* 2	*Number* 2	*Percent* 3	*Number* 2	*Percent* 2	*Number* 11	*Percent* 3	*Number* 12	*Percent* 11	*Number* 14	*Percent* 20	*Number* 37	*Percent* 7		
Desoxycholate citrate, and plain, and Endo's	183		40		56		84		363		108		79		550			
Increase due to—Eosin-methylene blue	*Number* 6	*Percent* 3	*Number* 3	*Percent* 8	*Number* 4	*Percent* 7	*Number* 3	*Percent* 4	*Number* 16	*Percent* 4	*Number* 11	*Percent* 10	*Number* 5	*Percent* 6	*Number* 32	*Percent* 6		
Desoxycholate citrate and plain, and eosin-methylene blue	185		42		57		86		370		119		80		569			
Increase due to—Endo's	*Number* 4	*Percent* 2	*Number* 1	*Percent* 2	*Number* 3	*Percent* 5	*Number* 1	*Percent* 1	*Number* 9	*Percent* 2	*Number* 0	*Percent* 0	*Number* 4	*Percent* 5	*Number* 13	*Percent* 2		
Total	189		43		60		87		379		119		84		582			

[1] Complete clinical recovery within 30 days.
[2] Representative samples of the general population, healthy contacts of clinical cases, and previous cases free of symptoms for more than 1 month.

aration but was not so markedly superior. It increased the isolations of these by 40 percent and 31 percent respectively. The total increase over the other three yielded by the plain desoxycholate was 7 percent, by the eosin-methylene blue 6 percent, and by Endo's 2 percent. The first two had particular value in increasing the positive Sonne and "Newcastle" results. The latter was also relatively effective for the detection of "Newcastle" strains; but even so, had it been omitted entirely in the plating of the 2,886 specimens the number of positive Flexners would have been reduced only by 9, the "Newcastle" by 4, and the Sonne not at all.

DISCUSSION

Leifson (*1*) indicated in his original report on these media that all strains of *S. dysenteriae* grew satisfactorily on the plain desoxycholate agar and specifically stated that "the Shiga strains of dysentery bacilli grow better on desoxycholate agar than on either the Endo's or eosin-methylene blue agar." He also concluded that "desoxycholate citrate agar may be relied upon for the isolation of the Flexner type of dysentery bacilli," but that the Shiga, Sonne, *dispar*, and *alkalescens* types of dysentery bacilli were inhibited. Paulson (*4*) also agreed that the desoxycholate citrate agar "inhibits markedly" the Sonne type of *S. dysenteriae*. We have sought an explanation for the difference between these and our observations.

In evaluating the inhibiting effect of the desoxycholate citrate agar we have compared the growth on plates of beef infusion, plain desoxycholate, and the desoxycholate citrate agars. Equal amounts of 24-hour broth cultures were employed as the inoculum. The test organisms have included both recently isolated strains and stored cultures. We have not found any evidence of inhibition of the Flexner varieties. The Sonne cultures have shown considerable variation. The majority of recently isolated organisms grew on the desoxycholate citrate agar without evidence of inhibition, some showed a moderate to marked decrease in the number of colonies, but all did grow. However, on long stored strains, many were totally inhibited, some moderately so, and only a few had as many colonies on the test plates as on the controls. There was also moderate variability in the growth of the "Newcastle dysentery bacillus" on the desoxycholate citrate agar. About one-half of the newly isolated strains grew as well on this medium as on the other media. The remainder were moderately inhibited. The observations were essentially the same for stored organisms. The inhibiting influence was on the number of colonies and to a less degree on the rate of growth. The colonies when they appeared became typical in appearance and of normal size. This medium is likely to be ineffective for the Sonne and "Newcastle"

strains only when these organisms are present in the specimen in small numbers and are unusually sensitive to its inhibiting effect.

The outstanding difference between the plain desoxycholate and the desoxycholate citrate agar is that the former promotes the growth of all the usual intestinal pathogens and the common Gram-negative intestinal bacilli; the latter inhibits most of the nonpathogenic agents, and, to a limited degree, some of the pathogens. Organisms of the *Proteus* group are either inhibited or form discrete colonies. For these reasons the plain desoxycholate agar must be inoculated lightly while the desoxycholate citrate agar may be generously inoculated with undiluted feces. There is a relatively distinct color differentiation between the colonies of pathogenic and common nonpathogenic organisms. The former, after 20 hours' incubation, are readily identified, ordinarily being 1.5 to 2 mm in diameter. These combined characteristics facilitate the use of these media and probably account largely for the superiority of results obtained by their use.

Two related difficulties have been encountered in learning to use these newer media. Many of the discrete colonies of *Proteus* appear highly suspicious on the plates. On the Russell's media these usually yield the reaction characteristic of *Salmonella* but on plating for purity on eosin-methylene blue agar (Difco) the true nature of the organisms is clearly apparent. The number of other *Salmonella*-like organisms has been large. We have not yet satisfied ourselves as to the identity and significance of many of these. Neither have we determined satisfactorily the procedures best designed effectively to handle them.

We have given some attention to the value of MacConkey's medium. It appears to compare favorably with the eosin-methylene blue and Endo's but not with the desoxycholate agars. Despite the fact that the latter were developed for use in the study of typhoid fever, they have proved to be unexpectedly effective in the investigation of certain of the diarrheal diseases. There is reason to hope, however, that bacteriological procedures will be still further improved if media are modified or developed primarily for use in the *Shigella dysenteriae* infections.

We employ at present both of the desoxycholate agars, two plates of the plain and one of the citrate. Two plates of the desoxycholate citrate agar proved to have little if any superiority over one plate. Apparently so heavy an inoculum may be employed that the organisms, if present, will almost always be found on the first plate. We still retain one plate of eosin-methylene blue agar (beef infusion base) as we believe that there are a few organisms which will successfully grow on this artificial medium though failing to do so on either of the other preparations now used.

CONCLUSION

The relative efficacy of four differential media for the isolation of *Shigella dysenteriae* from fecal specimens is compared.

Desoxycholate citrate agar (Leifson), which inhibits most of the nonpathogenic fecal organisms and permits the use of a heavy inoculation, is of outstanding value.

Plain desoxycholate agar (Leifson) is somewhat superior to either eosin-methylene blue agar or Endo's agar, particularly for the Sonne and "Newcastle," varieties of *Shigella dysenteriae*.

ACKNOWLEDGMENTS

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CLEGG'S AMOEBA CULTURE METHOD FOR GROWING *MYCOBACTERIUM LEPRAE*[1]

By FLORENCE L. EVANS, Ph. D., *Assistant Bacteriologist, United States Public Health Service*

INTRODUCTION

Among the numerous experimental attempts to cultivate the etiological agent of leprosy from tissue of infected individuals, there is one which stands out because of the fact that other workers were able, in some instances at least, to duplicate the original results. This is the method of Clegg (*1*) (*2*) which makes use of a symbiotic culture of *Vibrio comma* or other bacteria and amoebas. Currie, Brinckerhoff, and Hollmann (*3*), working independently of one another, each succeeded in establishing ameba-cholera-lepra cultures. Currie also succeeded in obtaining the acid-fast organism in pure culture, and at the time of their publication (1910) it was growing in its third generation. Duval (*4*) was also able to isolate an acid-fast organism by Clegg's method from an ear lobe removed at autopsy.

Application of the amoeba-symbiont method to the cultivation of the Stefansky bacillus was made by Currie and Hollmann (*5*) (*6*) with no success. However, Hollmann (*7*) persisted and finally succeeded in obtaining growth which was isolated in the ninth generation by heating the mixed culture. Currie, Clegg, and Hollmann (*8*) summarized the properties of 7 strains of acid-fast organisms growing in pure culture which had been isolated by Clegg in Manila, by Currie, Brinckerhoff, and Hollmann working independently in Hawaii, and by Currie, Clegg, and Hollmann working together in Hawaii. Some of these strains are still growing on artificial media.

McCoy (*9*) applied this method to 83 specimens of leprous tissue and secured pure cultures of acid-fast organisms in five instances. He also obtained pure cultures four times using *Vibrio cholera* alone, and twice without the use of an added symbiont. Contaminating organisms were, however, present in the tissue in these two instances. Walker (*10*), using *Escherichia coli* as the symbiont with the amoeba, secured growth in a small percentage of his cultures. The material used was described as swabs from nasal mucosa or from superficial lesions. He also obtained growth in about the same percentage of cultures when the material was inoculated onto Musgrave and Clegg's medium without *added* symbionts (italics ours). Thus, at least 8 investigators have shown that an acid-fast bacillus can be isolated from leprous tissue in a small percentage of cases by the use of a symbiotic growth of *Vibrio comma* or other bacteria and an amoeba. In some cases (Duval, McCoy, and Walker) similar or identical organisms grew in the absence of amebas.

[1] From the United States Marine Hospital, Carville, La.

EXPERIMENTAL

The first series of experiments along this line was an attempt to repeat the original method of Clegg. The amoebas were wild strains isolated from (*a*) a warm stream of industrial waste, and (*b*) three strains from stagnant pools. The symbionts used were (*a*) *Escherichia coli* isolated from human feces, and (*b*) *Vibrio comma* from the National Institute of Health.

The amoebas were purified by Clegg's method of ringed plates, using the same symbiont as was used for the experimental cultures. The bacterial symbionts were checked regularly for purity by plating. The experimental cultures were prepared by spreading a pure culture of the symbiont over the plate and inoculating with the amoebas from a well-developed amoeba culture. This plate was incubated for 24 hours, when a good growth of amoebas was usually present. It was then inoculated with the material from a leprous patient, and sealed with adhesive plaster or a paraffin-vaseline mixture. In some cases the symbiont bacteria were allowed to grow for 24 hours before the amebas were added.

The inoculated plates were incubated at 37° C. for 2 weeks to several months before they were opened. They were not discarded until they had completely dried up. If smears gave any indication of growth of the acid-fast bacilli, subcultures were made on one or more of the following: Another amoeba-symbiont plate, legume agar-gentian violet plate, legume agar slants (*11*). Upon indication of growth in subculture, further transplants were made, and these were continued as long as there appeared to be growth occurring.

In case the smears from subcultures indicated luxuriant enough growth for isolation, this was attempted. Several methods were tried. One was treatment of a heavy suspension in saline with sterile .5 percent H_2SO_4 at 37° C. for 30 minutes. After centrifugation, the sediment was again suspended in saline and planted on legume agar. A second method was to incubate with an equal quantity of sterile 4-percent NaOH for half an hour at 37° C. The sediment was resuspended in saline and planted on legume agar. The third method was to heat at 60° C. for 30 minutes, cool, and plant on media. The fourth method consisted of continued plating on legume agar until it was fairly certain that a pure culture had been obtained.

Altogether, 52 specimens were used in these experiments. Of these, 30 were cutaneous or subcutaneous leprous nodules removed aseptically from living patients. Three others were portions of organs removed after death from 3 different patients. One specimen each of liver, spleen, and testis made up this group. A third group of 18 consisted of venous blood drawn aseptically during life from patients who were having an acute reaction, or who had had a series

of tuberculin injections. One specimen of pus from the pleural cavity was also included.

Throughout these experiments some of the amoeba-symbiont plates were sealed and incubated without the addition of leprous emulsions. These plates were examined just as the experimental plates were. There was a total of 65 control plates, of which 38 were incubated at 37° C. until discarded, and of which 25 were incubated at 37° C. about 2 months and then at room temperature until discarded. Portions of the emulsions prepared from tissue, and portions of the blood specimens were planted on tubes of media in the ordinary way.

RESULTS

Symbiotic cultures of amoebas to which tissue or blood samples from patients with leprosy had been added showed evidence of growth of acid-fast micro-organisms in those prepared from 21 of the 52 samples. This occurred 18 times with specimens of nodules and 3 times with specimens of blood. Indications of growth consisted of an apparent marked increase in numbers of acid-fast bacilli, and (or) the appearance of short, stout, bacillary or coccoid, deeply staining, acid-fast organisms. These forms were apparently the same as those referred to by Clegg (*1*) (*2*), and McCoy (*9*). In subcultures on ameba-symbiont culture, legume agar-gentian violet plates, or legume agar slants, evidence of further growth occurred in four instances with tissue specimens, and only once with a blood specimen. Additional subcultures resulted in one pure culture of an acid-fast bacillus from a tissue specimen and one from the blood specimen. Expressed as percentage, 40 percent of the total number of samples showed evidence of growth of acid-fast microorganisms. Pure cultures were isolated from 3.8 percent of the original 52 specimens. In no case was an acid-fast organism detected in smears from the control plates, nor was there evidence of multiplication of these organisms in cultures without amoebas and symbiont.

The two cultures obtained were from different patients and were identical in appearance and behavior. After a week or 10 days on fresh legume agar the colonies were smooth, glistening, and hemispherical. The consistency was similar to that of butter, and the growth was deep orange in color. Smears stained by Ziehl-Neelsen's method revealed an acid-fast, slender, very pleomorphic organism morphologically resembling *Coryn. diphtheriae*. Old cultures on glycerine agar became coarsely ridged.

Of the four methods of purification tried, only one, namely, repeated streaked platings, proved successful. The other three were apparently lethal for the acid-fast organism as well as for the symbionts.

After the *Mycobacterium* cultures were purified, suspensions in saline were heated at 60° C. for 30 minutes, cooled immediately, and planted on legume agar. Apparently this treatment killed these strains, as no growth occurred on the cultures.

DISCUSSION

The results of these attempts to repeat Clegg's original method of cultivating acid-fast micro-organisms from specimens obtained from patients suffering from leprosy serves to confirm the findings of others. However, the objection to this method is valid, and the number of experiments reported thus far is insufficient to overrule it. The possibility remains that the *Mycobacterium* strains involved are common saprophytic types carried over with the amoebas in small numbers. Most of the cultures which have been isolated by this method are reported to be chromogenic. McCoy (*9*) states that 2 of his strains showed only a slight pigmentation even in old cultures. However, he does not state whether or not these 2 strains were isolated with the aid of the amoebas. The control plates included in these experiments never showed the presence of acid-fast bacilli; but, on the other hand, obviously growing cultures were obtained in only 2 instances (3.8 percent) with the experimental group. It was believed that growth occurred in 21 of the primary cultures and in 5 of the first subcultures. This was obviously true in the 2 cultures which continued to grow, but it may have been an error in the others, owing to the large number of Hansen's bacilli in the inoculum. On the other hand, Duval (*4*) and others believe that these organisms will continue to multiply as long as fragments of tissue from the inoculum are present regardless of the substrate on which it is planted. This is certainly a possible explanation of the other 19 primary cultures and the other 3 subcultures which showed evidence of growth.

Obviously, another possibility is that the *Mycobacterium* strains might be saprophytes occurring in the tissue. For example, *Mycobacterium smegmatis* is known to occur commonly on certain surfaces of the body. Some of the workers are quite frank in saying that some of their material contained bacteria other than Hansen's bacillus, and of course the presence of extraneous acid-fast organisms, cannot be ruled out under these circumstances. The specimens used in the experiments reported here were remarkably free from contaminating bacteria. The three organ specimens (liver, spleen, and testis) obtained post mortem were frankly contaminated by post mortem invaders, but none of the amoeba-symbiont cultures from these specimens gave positive cultures of acid-fast bacilli. Routine cultures of the other specimen material used failed to show the presence of the ordinary saprophytic types of bacteria.

SUMMARY

Two cultures of a chromogenic *Mycobacterium* similar to those isolated by Clegg and others were obtained by the use of amoeba cultures growing symbiotically with *Vibrio comma* or *Escherichia coli*.

The possible etiological connection between such cultures and leprosy is discussed.

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GLUCOSE TOLERANCE IN RHEUMATIC FEVER

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Although the incidence of rheumatic fever among patients who subsequently develop diabetes does not differ from that in unselected groups (*1*), both rheumatic heart disease (*1*) and active rheumatic fever (*2*) are extremely rare in individuals with established diabetes (*3*). These observations suggest that the presence of the diabetic state, although lowering resistance to many purulent infections (*2*) and not apparently affecting the incidence of tonsillitis in rheumatic subjects (*1*), is associated with conditions distinctly unfavorable for the evolution of rheumatic fever. On the other hand, although guinea pigs with chronic hemolytic streptococcal infections more frequently develop purulent carditis when rendered glycosuric with phloridzin than when untreated (*4*), in animals with such chronic infections re-

* With the technical assistance of Mr. C. F. Butler.

ceiving injections of insulin, nonpurulent carditis remotely resembling that of rheumatic fever often occurs (*5*). Thus diabetes affords unfavorable soil for the appearance of rheumatic fever and rheumatic carditis, while hyperinsulinism in guinea pigs mediates the induction of nonpurulent cardiac lesions remotely resembling those present in rheumatic fever. For these reasons, the purpose of the investigations reported here was to determine by means of the oral glucose tolerance test whether evidence of hyperinsulinism is demonstrable in patients with active rheumatic fever.[1]

The carbohydrate metabolism has not been extensively studied in rheumatic fever, although transient or persistent diabetes has apparently been induced by attacks of this disease (*6*, *7*). In possibly related types of illness, including rheumatoid arthritis (*8*), however, several investigators have observed a decreased sugar tolerance (*9*, *10*, *11*, *12*), although there is not complete agreement on this point (*13*, *14*).

There is evidence suggesting that decreased tolerance in rheumatoid arthritis may be due to associated liver damage (*15*). In many febrile and infectious states (*16*, *17*), as well as in diseases affecting glands of internal and external secretion, altered glucose tolerance has been observed. The outcome of the test is also affected by diverse physiological and extrinsic factors including age, character of antecedent diet, and muscular exertion. The occurrence of great variations in tests repeated on the same individual (*18*), especially in children (*19*), has been emphasized; but under controlled conditions, especially with respect to food intake preceding the examination, consistent results have been obtained by some investigators (*21*). Several drugs in common use have been found to influence the type of curve (*22*, *23*). The technique of glucose tolerance tests and the factors influencing the results are extensively discussed in the textbook of Peters and Van Slyke (*24*) and for this reason only the most recent or pertinent sources have been referred to above.

METHODS

Material.—Rheumatic fever patients were compared with those suffering from a variety of other febrile diseases. In view of the diverse factors which are known to influence the glucose tolerance test, the patients to be compared at one time were "matched" as closely as possible. Two to four patients of nearly the same age, of the same sex, and of approximately equal weight, one with rheumatic fever and the others with various febrile diseases were examined each day. Only those were selected to form each group who had been in the

[1] Steincrohn (J. Am. Med. Assoc., 111: 1837 (1938)) has recorded additional references to the literature which suggest that a degree of hypoglycemia is characteristic of rheumatic fever and presented evidence of increased glucose tolerance in 9 of 11 patients observed.

same institution, subject to the same environment, and receiving the same diet for an equivalent length of time. In so far as possible, only those were compared in whom the duration of illness, height and duration of fever, and erythrocyte sedimentation rate were approximately the same. No drugs were taken by any patient for at least 24 hours before examination.

The patients were weighed and placed in adjoining beds the preceding evening, and at about 7 a. m., while fasting, the first specimens of capillary blood for glucose determinations were taken. Each patient then received 1.0 gm. of glucose per kilogram of body weight by mouth, and thereafter for 2½ hours specimens were collected at intervals of 30 minutes. The dose of glucose administered is that recommended by Peters and Van Slyke (*24*).

Blood glucose.—Capillary blood glucose was determined by the method of Miller and Van Slyke (*25*). The blood was laked with acid cadmium sulfate solution, and sodium hydroxide was added at the bedside. The specimens were then kept in a portable refrigerator and the procedures completed in the laboratory within 6 hours. According to the originators of this method, samples remain stable under such conditions.

Erythrocyte sedimentation rate.—Five cc. of venous blood were withdrawn and delivered into bottles each containing 10 mg. of dry potassium oxalate which had been recrystallized and adjusted in pH as recommended by Peters and Van Slyke (*24*). The erythrocyte sedimentation rate was determined at room temperature by observing after one hour the fall in millimeters of the erythrocyte level in a 20 cm. column of blood sustained in a vertical tube of 3.0 mm. internal diameter.

RESULTS

In the manner described, curves indicating the degree of glucose tolerance were obtained in 10 patients with rheumatic fever and 14 with various febrile diseases. The results in 9 groups of patients, the individuals in each group being comparable with each other, are shown in the accompanying figures, in which the age, temperature, erythrocyte sedimentation rate, and duration of illness are also noted. In none of the groups is it definitely apparent that the patient with rheumatic fever, in comparison with those suffering from other febrile diseases, possessed an increased degree of glucose tolerance. On the other hand, in groups 4, 6, 7, and 9, the rheumatic patients showed a relatively decreased glucose tolerance. This may, perhaps, be accounted for by the occurrence of slightly higher temperatures in the rheumatic fever patients in some instances. In each group, however, temperatures had been closely comparable during preceding days and, except in group 7, the erythrocyte sedimentation rates agreed closely.

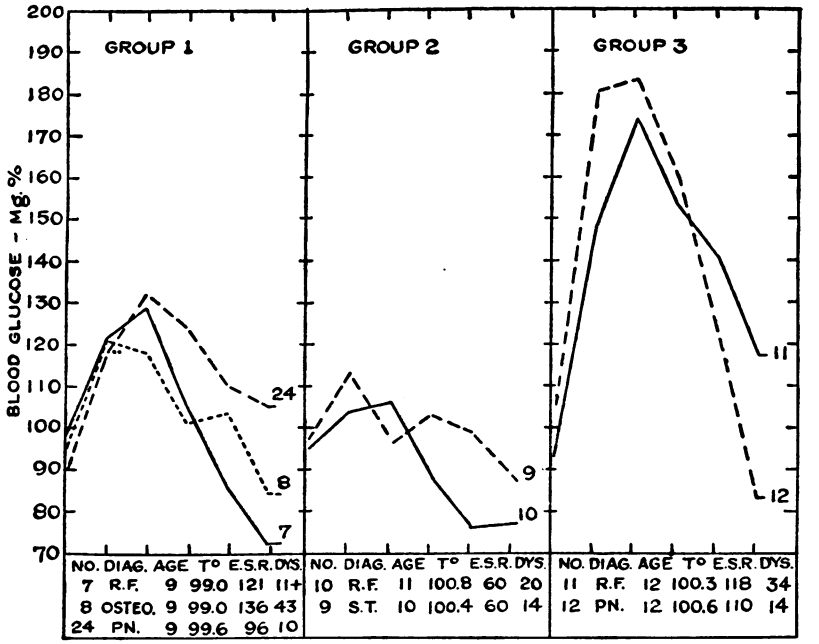

FIGURE 1.—In this and subsequent figures the following abbreviations are employed: No. = case number; E. S. R. = erythrocyte sedimentation rate; Dys. = days duration of illness; R. F. = rheumatic fever; Osteo. = osteomyelitis; Pn. = pneumonia; S. T. = sore throat; G. C. = gonorrheal arthritis.

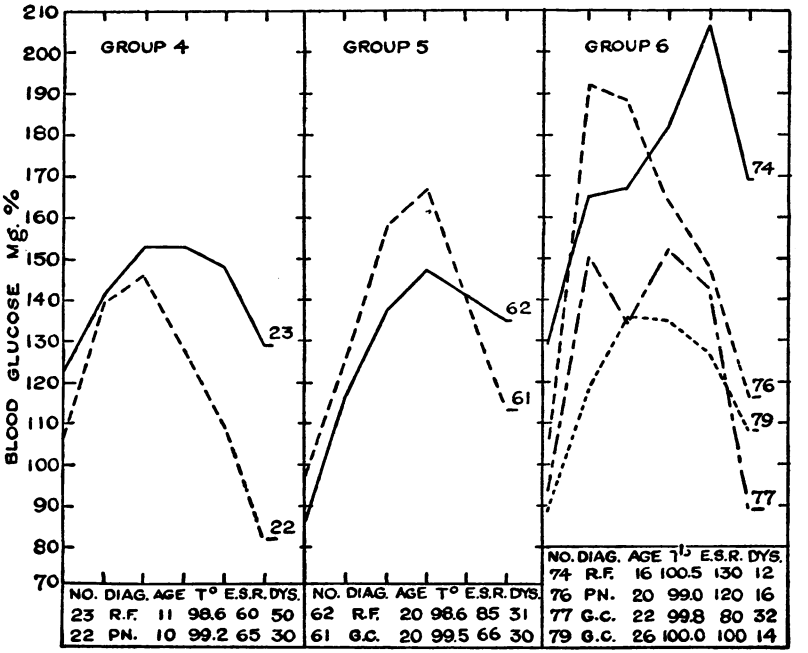

FIGURE 2.—See legend, figure 1.

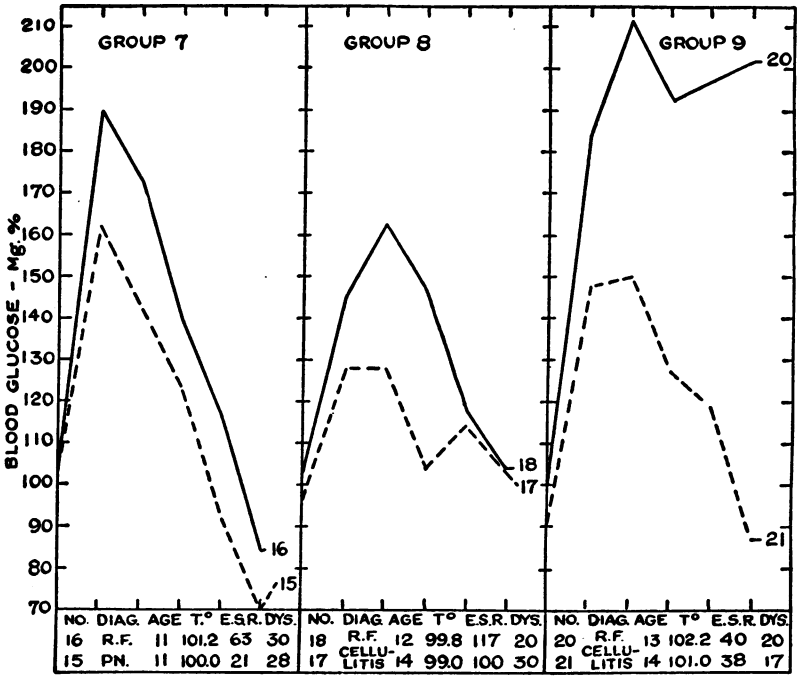

FIGURE 3.—See legend, figure 1.

DISCUSSION

In a functional test so variable and so susceptible to the influence of many diverse factors as that of glucose tolerance it is obviously unsafe to draw conclusions from only a few observations. Since all of the known, controllable, disturbing factors were eliminated by the distribution of patients into appropriate groups, and since there was no exception in any group, the conclusion that, on the basis of glucose tolerance tests, there is no demonstrable evidence for hyperinsulinism in patients with active rheumatic fever is probably justifiable. The results suggest, indeed, that in rheumatic fever as in rheumatiod arthritis relative degrees of decreased glucose tolerance are frequently present. These observations are by no means irreconcilable with those indicating that diabetes is relatively incompatible with rheumatic fever, for it is recognized that diabetes is a much more complex state than that incident merely to hyperglycemia due to a relative deficiency in insulin secretion (*26*).

CONCLUSIONS

1. On the basis of glucose tolerance tests, no association between rheumatic fever and hyperinsulinism is demonstrable.

2. In the limited number of patients studied, a decrease in glucose tolerance in patients with active rheumatic fever, as compared with those suffering from other febrile diseases, was frequently observed.

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ESTIMATED LIFE EXPECTANCY FOR THE UNITED STATES, 1938

The total life expectancy at birth for the United States in 1938 was 62.0 years according to computations based on certain estimated factors. This figure compares with an expectancy of 60.26 in 1931 and 60.9 (estimated) in 1937.

The important factors in the computation of life tables are the age specific death rates, which are based upon the age distribution of the population, and on the annual number of deaths by ages. Although it would appear that the actual average age at death of persons in the general population should be the life expectancy at birth, this is not likely to be true, as the age distribution of the living population is not likely to be identical with that of the stationary population which is a function of the computed expectancy. The expectation of life at birth is the average age at death of a hypothetical group of persons each of whom is subject to the same age specific mortality rates throughout his lifetime.

The accompanying table, showing the expectation of life at birth for the total population of the United States for the years 1931 to 1938 was furnished by Dr. Louis I. Dublin, of the Metropolitan Life Insurance Co. The figures for 1937 and 1938 are based on estimates. Dr. Dublin states that, in arriving at the estimates for 1938, he was guided by the course of the death rates in the United States from 1931 to 1937, by provisional data from a large number of States, and by the course of life expectancy among a large group of policyholders for a period of years through 1938. For the 7 years since 1931 a gain in expectancy of 1.74 years is indicated, while a gain of 1.1 years is shown in 1938 over 1937.

Expectation of life in the United States, 1931–38

Year	Expectancy at birth	Increase or decrease
1931	60.26	
1932	61.07	+0.81
1933	61.26	+.19
1934	60.79	−.47
1935	61.37	+.58
1936	60.81	−.56
1937	[1] 60.9	+.09
1938	[1] 62.0	+1.1

[1] Estimated.

RECOVERY IN AN UNUSUAL CASE OF CYANIDE POISONING

In the issue of Public Health Reports for November 25, 1938, pp. 2094–95, there was published a report of an unusual case of poisoning with hydrocyanic acid which occurred during fumigation. The special interest attached to this case lay in the prolonged symptoms. The patient remained unconscious for three days, during which period oxygen was administered; and during the first two of these days he became cyanotic whenever oxygen was discontinued. At the time of the original report the patient still showed mental symptoms 25 days after the poisoning. In a communication dated February 5, 1939, the physician in attendance on this case states that recovery is now complete and that his patient has returned to full-time duty.

INFLUENZA PREVALENCE

For the week ended February 18, 1939, the State health officers reported to the Public Health Service 6,895 cases of influenza, as compared with 3,802 for the preceding week and with 8,591 for the median number of cases reported in the corresponding week of the past 5 years. This increase might have been expected, both from the earlier press reports of local outbreaks of respiratory infection and from the 5-year and 9-year median curves, which show peaks at about this time of the year. Virginia, Texas, South Carolina, and Illinois reported the largest numbers of cases for the week of February 18.

For the week ended February 11, a group of large cities scattered throughout the country, with an aggregate population of approximately 33,000,000, reported 813 deaths from pneumonia, as compared with a 5-year average of 983 and with 802 for the corresponding week last year.

DEATHS DURING WEEK ENDED FEBRUARY 4, 1939

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

	Week ended Feb. 4, 1939	Corresponding week, 1938
Data from 88 large cities of the United States:		
Total deaths	9,477	[1] 9,049
Average for 3 prior years	[1] 9,691	
Total deaths, first 5 weeks of year	45,839	46,023
Deaths under 1 year of age	555	[1] 538
Average for 3 prior years	[1] 583	
Deaths under 1 year of age, first 5 weeks of year	2,690	2,719
Data from industrial insurance companies:		
Policies in force	68,258,073	69,801,473
Number of death claims	13,366	13,870
Death claims per 1,000 policies in force, annual rate	10.2	10.4
Death claims per 1,000 policies, first 5 weeks of year, annual rate	10.1	10.1

[1] Data for 86 cities.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables, a zero (0) indicates a positive report and has the same significance as any other figure, while leaders (....) represent no report, with the implication that cases or deaths may have occurred but were not reported to the State health officer.

Cases of certain diseases reported by telegraph by State health officers for the week ended Feb. 11, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median

Division and State	Diphtheria				Influenza				Measles			
	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934-38, median	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934-38, median	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934-38, median
NEW ENG.												
Maine	36	6	1	2	6	1	11	6	97	16	155	155
New Hampshire	0	0	0	0	----	----	4	----	30	3	91	44
Vermont	0	0	0	0	----	----	----	----	362	27	300	75
Massachusetts	2	2	2	6	----	----	----	----	966	822	204	612
Rhode Island	8	1	0	1	----	----	----	----	99	13	2	26
Connecticut	6	2	4	4	77	26	4	9	1,807	609	16	124
MID. ATL.												
New York	15	37	30	31	[1] 126	[1] 183	[1] 18	[1] 38	499	1,246	673	860
New Jersey	11	9	19	13	73	61	7	17	32	27	1,000	226
Pennsylvania	17	33	64	46	----	----	----	----	86	170	6,866	1,835
E. NO. CEN.												
Ohio	12	15	35	33	----	----	----	20	18	24	1,808	407
Indiana	58	39	43	38	31	21	12	52	21	14	516	405
Illinois	21	32	32	36	149	227	24	48	24	36	4,848	436
Michigan [2]	13	12	26	12	1	1	2	6	341	323	1,902	64
Wisconsin	2	1	3	3	114	65	28	121	1,244	708	2,180	865
W. NO. CEN.												
Minnesota	14	7	2	4	2	1	4	4	2,534	1,307	9	120
Iowa	16	8	11	11	16	8	8	14	312	154	55	55
Missouri	13	10	22	22	54	42	162	184	13	10	848	457
North Dakota	15	2	1	2	110	15	6	33	2,162	296	15	15
South Dakota	38	5	0	0	75	10	----	----	2,397	319	----	4
Nebraska	11	3	5	5	----	----	----	7	84	22	12	51
Kansas	47	17	12	11	8	3	24	61	56	20	417	84

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers, for the week ended Feb. 11, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Diphtheria				Influenza				Measles			
	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median
SO. ATL.												
Delaware	20	1	0	1	------	------	------	------	------	------	24	74
Maryland [3]	28	9	17	12	318	103	20	45	3,330	1,080	35	112
Dist. of Col	41	5	10	10	41	5	1	4	170	21	11	11
Virginia [3]	49	26	24	24	1,036	553	------	------	186	99	633	633
West Virginia	22	8	7	18	70	26	46	151	62	23	323	32
North Carolina [3]	29	20	27	23	26	18	38	67	1,255	859	1,662	778
South Carolina [3]	49	18	2	3	1,915	701	645	1,009	63	23	375	32
Georgia [3]	18	11	11	11	196	118	------	490	212	128	327	------
Florida [3]	30	10	12	8	3	1	------	4	283	94	409	36
E. SO. CEN.												
Kentucky	10	6	12	12	89	51	38	101	188	108	450	183
Tennessee	23	13	18	16	132	75	168	207	113	64	824	182
Alabama [3]	9	5	13	13	327	186	331	334	500	284	846	256
Mississippi [2 3]	15	6	8	8	------	------	------	------	------	------	------	------
W. SO. CEN.												
Arkansas	20	8	10	8	216	87	235	166	278	112	302	13
Louisiana	44	18	5	13	48	20	44	44	428	177	------	71
Oklahoma	8	4	18	12	416	207	284	284	392	195	60	59
Texas [3]	24	29	80	56	514	621	940	901	108	130	167	107
MOUNTAIN												
Montana	9	1	0	4	393	42	------	34	4,119	440	5	20
Idaho	31	3	1	0	------	------	5	5	1,082	106	5	63
Wyoming	22	1	1	1	------	------	------	------	2,007	92	13	12
Colorado	58	12	11	3	448	93	------	------	294	61	554	64
New Mexico	37	3	7	7	111	9	1	10	630	51	76	29
Arizona	74	6	7	4	1,398	114	168	175	86	7	3	13
Utah [3]	0	0	0	0	238	24	------	------	1,301	131	81	24
PACIFIC												
Washington	6	2	4	1	3	1	4	4	641	208	22	107
Oregon	5	1	2	2	199	40	76	76	169	34	17	53
California	20	24	27	40	35	43	111	461	1,854	2,261	185	282
Total	20	491	646	646	180	3,802	3,469	4,577	523	12,954	29,326	21,268
6 weeks	23	3,520	4,055	4,268	164	20,877	18,420	18,420	412	61,192	128,262	84,091

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median
NEW ENG.												
Maine	0	0	0	0	0	0	0	0	169	28	11	18
New Hampshire	10	1	0	0	0	0	0	0	132	13	7	10
Vermont	0	0	0	0	0	0	0	0	107	8	21	16
Massachusetts	2.4	2	2	2	0	0	0	0	300	255	308	245
Rhode Island	0	0	2	0	0	0	0	0	38	5	31	30
Connecticut	0	0	0	0	0	0	0	0	362	122	97	69
MID. ATL.												
New York	1.2	3	4	4	0.8	2	0	1	259	647	690	699
New Jersey	0	0	1	2	0	0	0	0	205	172	115	164
Pennsylvania	4	7	7	6	0.5	1	0	0	247	487	472	647

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended Feb. 11, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median	Feb. 11, 1939. rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median
E NO. CEN.												
Ohio	2.3	3	3	3	0.8	1	0	0	397	517	472	472
Indiana	0	0	5	4	1.5	1	0	0	452	304	188	235
Illinois	0	0	4	12	0	0	1	1	339	518	805	756
Michigan [2]	0	0	1	1	0	0	1	1	533	504	497	497
Wisconsin	1.8	1	0	1	0	0	0	0	524	298	206	361
W. NO. CEN.												
Minnesota	0	0	1	1	1.9	1	0	0	299	154	150	136
Iowa	0	0	2	1	0	0	0	0	326	161	251	182
Missouri	0	0	1	1	0	0	0	0	129	100	202	145
North Dakota	0	0	1	0	0	0	0	0	66	9	0	45
South Dakota	0	0	0	0	0	0	0	0	158	21	23	23
Nebraska	4	1	0	0	0	0	0	0	137	36	53	53
Kansas	0	0	1	2	0	0	0	0	500	179	267	209
SO. ATL.												
Delaware	0	0	0	0	0	0	0	0	0	0	16	7
Maryland [2]	0	0	2	4	0	0	0	0	164	53	83	73
Dist. of Col	0	0	1	1	0	0	0	0	146	18	15	19
Virginia [2]	1.9	1	10	10	0	0	0	0	101	54	56	56
West Virginia	2.7	1	3	3	0	0	0	0	142	53	50	50
North Carolina [2]	2.9	2	3	3	0	0	0	0	121	83	50	50
South Carolina [2]	11	4	1	0	0	0	0	0	30	11	2	6
Georgia [2]	1.7	1	1	0	0	0	2	0	37	22	14	12
Florida [2]	0	0	2	0	3	1	0	0	36	12	10	8
E. SO. CEN.												
Kentucky	5	3	6	6	1.7	1	4	1	134	77	68	61
Tennessee	7	4	1	5	1.8	1	0	0	78	44	54	37
Alabama [2]	1.8	1	9	1	4	2	0	1	42	24	22	22
Mississippi [2 3]	8	3	1	1	2.5	1	5	0	15	6	8	11
W. SO. CEN.												
Arkansas	2.5	1	3	3	2.5	1	0	0	30	12	15	15
Louisiana	7	3	1	0	2.4	1	0	0	17	7	14	15
Oklahoma	2	1	1	2	0	0	0	0	143	71	47	27
Texas [2]	0.8	1	5	8	0	0	1	1	74	89	169	109
MOUNTAIN												
Montana	0	0	1	1	0	0	1	0	197	21	34	34
Idaho	0	0	0	0	0	0	0	0	265	26	17	10
Wyoming	0	0	0	0	0	0	0	0	131	6	18	18
Colorado	5	1	0	0	0	0	0	0	178	37	80	80
New Mexico	0	0	0	0	12	1	0	0	247	20	38	38
Arizona	0	0	1	1	0	0	0	0	49	4	22	28
Utah [2]	10	1	0	0	0	0	0	0	149	15	66	66
PACIFIC												
Washington	3	1	0	2	0	0	0	0	216	70	61	61
Oregon	0	0	1	1	0	0	1	1	234	47	80	58
California	0.8	1	1	6	1.6	2	2	2	164	200	171	266
Total	1.9	48	89	104	0.7	17	18	20	224	5,620	6,146	6,662
6 weeks	2.1	323	552	578	0.7	102	124	134	211	31,802	35,937	36,535

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended Feb. 11, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases	1934–38, median	Feb. 11, 1939, rate	Feb. 11, 1939, cases	Feb. 12, 1938, cases
NEW ENG.											
Maine	0	0	0	0	12	2	0	1	380	63	61
New Hampshire	0	0	0	0	0	0	0	0	10	1	6
Vermont	0	0	0	0	0	0	0	0	349	26	21
Massachusetts	0	0	0	0	1	1	1	1	308	262	158
Rhode Island	0	0	0	0	8	1	1	0	420	55	25
Connecticut	0	0	0	0	0	0	0	1	226	76	48
MID. ATL.											
New York	0	0	0	0	1	2	2	5	203	506	385
New Jersey	0	0	0	0	0	0	1	1	549	461	158
Pennsylvania	0	0	0	0	4	8	4	8	237	466	261
E. NO. CEN.											
Ohio	13	17	67	2	0	0	1	3	166	216	120
Indiana	171	115	42	2	7	5	0	1	28	19	16
Illinois	2	3	41	11	3	4	1	3	269	410	105
Michigan [2]	26	25	6	1	4	4	19	6	200	189	208
Wisconsin	21	12	4	11	4	2	1	2	572	326	152
W. NO. CEN.											
Minnesota	8	4	26	11	0	0	0	1	109	56	45
Iowa	160	79	41	25	2	1	1	1	51	25	17
Missouri	17	13	27	17	1	1	3	2	13	10	90
North Dakota	7	1	11	2	7	1	0	0	73	10	15
South Dakota	8	1	9	6	0	0	2	1	15	2	25
Nebraska	8	2	5	5	0	0	0	0	38	10	7
Kansas	14	5	32	10	3	1	1	0	33	12	105
SO. ATL.											
Delaware	0	0	0	0	0	0	0	0	79	4	7
Maryland [2]	0	0	0	0	3	1	0	1	130	42	71
Dist. of Col	0	0	0	0	0	0	0	0	365	45	12
Virginia [3]	0	0	1	0	7	4	1	4	131	70	78
West Virginia	5	2	0	0	5	2	5	2	67	25	62
North Carolina [3]	0	0	2	0	1	1	3	2	457	313	385
South Carolina [3]	0	0	0	0	8	3	3	3	290	106	61
Georgia [3]	0	0	0	0	5	3	5	3	33	20	72
Florida [3]	0	0	0	0	6	2	0	1	124	41	6
E. SO. CEN.											
Kentucky	2	1	35	0	12	7	0	4	17	10	64
Tennessee	7	4	10	1	5	3	3	3	67	38	74
Alabama [3]	0	0	1	1	7	4	3	1	37	21	16
Mississippi [2 3]	25	1	2	0	0	0	0	3	------	------	------
W. SO. CEN.											
Arkansas	0	0	10	1	7	3	6	1	27	11	54
Louisiana	0	0	0	0	29	12	12	5	27	11	19
Oklahoma	42	21	27	1	14	7	2	2	4	2	39
Texas [3]	32	39	25	20	8	10	20	16	57	69	261
MOUNTAIN											
Montana	0	0	12	11	9	1	0	1	122	13	16
Idaho	10	1	28	3	0	0	2	2	10	1	8
Wyoming	0	0	9	5	22	1	0	0	22	1	19
Colorado	63	13	5	2	0	0	1	1	279	58	12
New Mexico	0	0	0	0	37	3	6	3	259	21	37
Arizona	98	8	0	0	0	0	0	0	61	5	45
Utah [2]	0	0	6	0	0	0	0	0	407	41	46
PACIFIC											
Washington	6	2	48	16	6	2	0	2	96	31	167
Oregon	10	2	30	7	5	1	1	1	60	12	28
California	9	11	37	5	3	4	6	4	75	92	271
Total	15	382	599	241	4	107	117	117	174	4,306	3,958
6 weeks	16	2,385	3,618	1,245	4	661	706	706	108	16,011	23,904

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Typhus fever, week ended Feb. 11, 1939, 27 cases as follows: Virginia, 1; North Carolina, 1; South Carolina, 8; Georgia, 9; Florida, 2; Alabama, 1; Mississippi, 2; Texas, 3.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningitis, meningococcus	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid and paratyphoid fever
June 1938										
North Carolina	9	49	10	91	3,224	186	5	80	8	94
November 1938										
Connecticut	2	13	20	----	204	----	0	174	0	8
December 1938										
Alaska	0	----	4	----	----	----	0	1	0	----
January 1939										
Arkansas	3	49	668	68	114	33	1	65	17	7
Dist. of Col	2	43	12	----	48	----	0	55	0	1
Michigan	3	34	3	----	1,725	----	0	2,369	9	6
Pennsylvania	23	184	----	----	523	----	0	1,619	0	44
West Virginia	9	49	109	----	111	3	3	265	3	28

June 1938

North Carolina:	Cases
Chickenpox	128
German measles	9
Rocky Mountain spotted fever	8
Septic sore throat	10
Tularaemia	3
Typhus fever	2
Undulant fever	3
Whooping cough	1,523

November 1938

Connecticut:	Cases
Chickenpox	244
Conjunctivitis, infectious	1
Dysentery (amoebic)	1
Dysentery (bacillary)	7
German measles	13
Mumps	131
Ophthalmia neonatorum	1
Rabies in animals	2
Septic sore throat	6
Tetanus	2
Undulant fever	15
Whooping cough	288

December 1938

Alaska:	Cases
Chickenpox	5
Encephalitis, epidemic or lethargic	1
Whooping cough	25

January 1939

	Cases
Anthrax:	
Pennsylvania	2
Chickenpox:	
Arkansas	274
District of Columbia	106
Michigan	2,865
Pennsylvania	5,494
West Virginia	213
Dengue:	
Arkansas	1
Dysentery:	
Arkansas (amoebic)	2
Arkansas (bacillary)	1
Michigan (amoebic)	2
Michigan (bacillary)	7
Pennsylvania (amoebic)	1
Pennsylvania (bacillary)	1
West Virginia (amoebic)	1
Encephalitis, epidemic or lethargic:	
District of Columbia	1
German measles:	
Michigan	69
Pennsylvania	44
Hookworm disease:	
Arkansas	2
Jaundice, infectious:	
Michigan	20
Leprosy:	
Arkansas	1
Mumps:	
Arkansas	15
Michigan	661
Pennsylvania	2,899
West Virginia	118

January 1939

	Cases
Ophthalmia neonatorum:	
Arkansas	1
Pennsylvania	6
Puerperal septicemia:	
Arkansas	2
Rabies in animals:	
Arkansas	33
Michigan	1
Rabies in man:	
Pennsylvania	1
West Virginia	1
Rocky Mountain spotted fever:	
District of Columbia	1
Septic sore throat:	
Arkansas	31
Michigan	15
West Virginia	2
Trachoma:	
Arkansas	1
Trichinesis:	
Michigan	1
Tularaemia:	
Arkansas	11
District of Columbia	2
Pennsylvania	3
West Virginia	3
Typhus fever:	
Pennsylvania	1
Undulant fever:	
Arkansas	1
Michigan	65
Pennsylvania	10
Vincents infection:	
Michigan	13
Whooping cough:	
Arkansas	58
District of Columbia	115
Michigan	1,077
Pennsylvania	1,981
West Virginia	125

WEEKLY REPORTS FROM CITIES

City reports for week ended Feb. 4, 1939

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	204	1,270	157	4,327	992	2,002	28	391	19	1,200	------
Current week [1]	147	411	71	3,733	758	1,416	83	360	25	1,264	------
Maine:											
Portland	0	------	0	0	7	0	0	1	0	6	37
New Hampshire:											
Concord	0	------	0	0	0	0	0	2	0	0	13
Manchester	0	------	0	0	1	3	0	0	0	0	9
Nashua	0	------	0	0	0	1	0	0	0	0	9
Vermont:											
Barre	0	------	0	0	0	0	0	2	0	0	4
Burlington	0	------	0	0	0	0	0	0	0	2	16
Rutland	0	------	0	0	2	0	0	0	0	0	5
Massachusetts:											
Boston	0	------	0	292	28	63	0	3	0	41	226
Fall River	0	------	0	0	3	1	0	1	0	0	35
Springfield	0	------	0	30	2	1	0	0	0	0	50
Worcester	0	------	0	0	7	21	0	1	0	39	48
Rhode Island:											
Pawtucket	0	------	0	0	1	0	0	0	0	2	16
Providence	0	------	0	16	8	6	0	1	0	33	64
Connecticut:											
Bridgeport	0	------	0	1	4	3	0	0	0	3	32
Hartford	0	1	0	278	4	5	0	2	0	18	------
New Haven	0	1	0	32	5	4	0	0	0	7	49
New York:											
Buffalo	0	------	0	72	10	45	0	8	1	19	161
New York	23	159	13	56	196	189	0	88	4	119	1,933
Rochester	1	------	0	80	3	14	0	1	1	20	63
Syracuse	0	------	0	19	5	16	0	1	0	31	41
New Jersey:											
Camden	0	1	2	0	3	4	0	0	0	0	38
Newark	0	25	1	5	8	57	0	2	1	85	100
Trenton	1	------	1	0	3	8	0	2	0	10	39
Pennsylvania:											
Philadelphia	7	5	5	30	27	56	0	18	2	91	512
Pittsburgh	3	2	1	4	18	25	0	10	0	36	186
Reading	0	------	0	0	1	3	0	1	0	0	32
Scranton	0	------	------	1	------	29	0	------	0	19	------
Ohio:											
Cincinnati	9	3	1	0	7	20	0	6	0	2	161
Cleveland	2	9	0	4	18	79	0	5	0	73	194
Columbus	2	1	1	1	11	4	0	1	0	5	91
Toledo	1	1	1	4	1	15	0	7	0	16	89
Indiana:											
Anderson	0	------	0	1	0	6	0	0	0	4	10
Fort Wayne	1	------	0	0	5	5	0	1	0	0	37
Indianapolis	7	------	0	3	13	58	57	4	0	7	113
Muncie	0	------	0	0	1	1	1	0	0	2	14
South Bend	0	------	0	0	1	7	0	0	0	1	23
Terre Haute	1	------	0	0	3	3	1	0	0	0	17
Illinois:											
Alton	0	------	0	0	0	0	0	0	0	1	10
Chicago	25	15	4	16	39	165	1	36	0	172	706
Elgin	0	------	0	0	0	10	0	0	0	3	10
Moline	0	------	0	0	0	0	0	0	0	3	5
Springfield	0	1	0	0	4	8	0	0	0	0	35
Michigan:											
Detroit	6	1	2	7	20	102	0	15	0	101	257
Flint	0	------	0	139	4	32	0	0	0	0	21
Grand Rapids	0	------	0	2	3	30	0	0	0	0	41
Wisconsin:											
Kenosha	0	------	0	0	0	0	0	0	0	22	7
Madison	0	------	0	1	2	4	0	0	0	14	13
Milwaukee	0	------	0	6	3	57	0	4	0	78	101
Racine	0	------	0	13	0	0	0	1	0	6	13
Superior	0	------	1	0	0	1	0	1	0	0	7

[1] Figures for Boise, Idaho, and Tacoma, Wash., estimated; reports not received.

City reports for week ended Feb. 4, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0	------	0	0	0	0	0	1	0	4	15
Minneapolis	0	------	0	186	7	11	0	4	0	29	114
St. Paul	0	------	0	562	11	29	0	1	0	8	61
Iowa:											
Cedar Rapids	0	------	-------	0	-------	0	1	-------	0	2	-------
Davenport	0	------	-------	0	-------	6	3	-------	0	0	-------
Des Moines	0	------	0	2	0	20	2	0	0	0	23
Sioux City	0	------	-------	12	-------	2	0	-------	0	3	-------
Waterloo	3	------	-------	1	-------	13	0	-------	0	0	-------
Missouri:											
Kansas City	0	------	0	0	9	27	0	3	0	0	93
St. Joseph	0	------	0	0	7	0	0	1	0	0	22
St. Louis	1	------	1	0	23	33	1	8	1	25	242
North Dakota:											
Fargo	0	------	0	0	1	1	0	0	0	0	9
Grand Forks	0	------	-------	4	-------	0	0	-------	0	0	-------
Minot	0	------	0	40	0	0	0	0	0	0	3
South Dakota:											
Aberdeen	0	------	-------	20	-------	1	2	-------	0	0	-------
Sioux Falls	0	------	0	81	0	2	0	0	0	0	9
Nebraska:											
Omaha	0	------	1	8	1	2	1	1	0	0	53
Kansas:											
Lawrence	0	------	0	0	3	0	0	0	0	0	5
Topeka	0	------	0	0	1	5	0	0	0	0	-------
Wichita	0	------	0	0	4	3	0	0	0	0	37
Delaware:											
Wilmington	0	------	0	1	5	3	0	2	0	1	35
Maryland:											
Baltimore	1	43	4	922	28	15	0	13	0	17	229
Cumberland	0	------	0	0	1	0	0	0	0	0	12
Frederick	0	------	0	0	1	0	0	0	0	0	9
Dist. of Col.:											
Washington	8	11	4	18	18	19	0	10	1	31	190
Virginia:											
Lynchburg	1	------	0	19	0	3	0	0	0	4	9
Norfolk	0	80	0	1	7	2	0	0	0	1	56
Richmond	0	------	2	4	6	5	0	2	0	4	52
Roanoke	0	------	0	0	4	1	0	1	0	0	21
West Virginia:											
Charleston	0	2	0	0	1	0	0	1	0	0	25
Huntington	1	------	-------	0	-------	2	0	-------	0	0	-------
Wheeling	0	------	0	1	1	1	0	2	0	5	18
North Carolina:											
Gastonia	2	------	-------	0	0	0	0	-------	0	2	-------
Raleigh	1	------	0	0	0	3	0	0	0	1	5
Wilmington	0	------	0	0	1	0	0	0	0	6	9
Winston-Salem	2	------	0	90	1	1	0	0	0	1	10
South Carolina:											
Charleston	2	65	0	1	1	1	0	2	1	4	23
Florence	0	------		0	2	0	0	0	0	0	9
Greenville	0	------	0	0	2	0	0	0	0	6	9
Georgia:											
Atlanta	1	12	0	2	11	13	0	6	1	1	94
Brunswick	0	------	0	11	0	0	0	0	0	0	4
Savannah	1	15	0	0	4	1	0	1	0	4	33
Florida:											
Miami	0	------	0	0	3	3	0	2	0	0	41
Tampa	2	------	0	19	1	0	0	2	1	2	21
Kentucky:											
Ashland	0	4	0	0	2	0	0	0	0	1	10
Covington	1	1	0	0	0	18	0	1	0	0	16
Lexington	0	------	0	0	4	0	2	1	0	0	24
Louisville	1	------	1	5	6	8	0	3	0	4	93
Tennessee:											
Knoxville	0	------	1	1	0	1	0	2	0	0	24
Memphis	0	------	2	1	7	4	0	2	0	13	66
Nashville	1	------	5	0	2	2	0	2	1	4	61
Alabama:											
Birmingham	0	5	2	0	9	2	0	4	0	0	84
Mobile	1	------	1	2	1	0	0	0	1	0	23
Montgomery	0	------	-------	9	-------	1	0	-------	0	3	-------
Arkansas:											
Fort Smith	0	8	-------	7	-------	2	0	-------	0	1	-------
Little Rock	1	------	2	0	4	3	0	2	0	0	5

City reports for week ended Feb. 4, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Louisiana:											
Lake Charles	0		0	3	0	0	0	0	0	0	5
New Orleans	2	1	3	33	25	15	0	11	5	3	168
Shreveport	1		0	1	5	1	0	5	0	1	39
Oklahoma:											
Oklahoma City	1	1	0	0	3	8	1	1	0	0	29
Tulsa	3			4		6	0		0	0	
Texas:											
Dallas	1	2	2	1	8	7	14	3	1	0	87
Fort Worth	0	18	2	0	9	7	0	2	0	0	39
Galveston	0		0	0	0	0	0	2	1	0	17
Houston	4	1	0	8	12	3	0	9	0	0	100
San Antonio	0	9	4	0	9	0	0	5	0	0	76
Montana:											
Billings	0		0	70	2	0	0	0	0	0	14
Great Falls	0		0	1	0	0	0	0	0	0	4
Helena	0		0	74	0	0	0	0	0	0	2
Missoula	0	2	2	14	0	0	1	0	0	0	8
Idaho:											
Boise											
Colorado:											
Colorado Springs	0		1	12	3	9	0	0	0	5	20
Denver	10		2	6	8	4	0	7	0	32	106
Pueblo	0		0	2	2	5	0	2	0	1	13
New Mexico:											
Albuquerque	0		0	0	2	2	0	2	0	0	14
Utah:											
Salt Lake City	1		0	2	1	7	0	1	0	1	33
Washington:											
Seattle	0		1	11	4	9	0	2	0	1	82
Spokane	0		0	25	5	1	0	0	0	0	32
Tacoma											
Oregon:											
Portland	0		0	0	7	3	2	1	0	0	101
Salem	0			0		2	0		0	0	
California:											
Los Angeles	20	16	1	90	18	56	1	12	2	26	375
Sacramento	0		0	25	3	3	6	1	0	0	29
San Francisco	2	3	0	414	12	21	0	9	0	10	189

State and city	Meningitis, meningococcus		Poliomyelitis cases	State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Rhode Island:				South Carolina:			
Providence	1	1	0	Charleston	1	0	1
New York:				Georgia:			
Buffalo	3	1	0	Atlanta	2	1	0
New York	2	0	1	Tennessee:			
Pennsylvania:				Knoxville	1	0	0
Philadelphia	1	0	0	Alabama:			
Pittsburgh	1	1	0	Birmingham	1	0	0
Ohio:				Louisiana:			
Cleveland	1	0	0	New Orleans	0	0	1
Indiana:				Texas:			
Muncie	0	1	0	Houston	1	0	0
Illinois:				Colorado:			
Chicago	2	0	0	Denver	0	1	0
Maryland:				Oregon:			
Baltimore	0	1	0	Portland	1	0	0

Encephalitis, epidemic or lethargic.—Cases: New York, 2; Chicago, 1; Fargo, 1.
Pellagra.—Cases: Baltimore, 1; Charleston, S. C., 1; Savannah, 2; Memphis, 1; Birmingham, 1; San Antonio, 1; San Francisco, 1.
Typhus fever.—Cases: Charleston, S. C., 1; Atlanta, 1; Savannah, 1. Deaths: Houston, 1.

FOREIGN AND INSULAR

FINLAND

Communicable diseases—December 1938.—During the month of December 1938, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	376	Poliomyelitis	9
Dysentery	3	Scarlet fever	516
Influenza	2,435	Typhoid fever	15
Paratyphoid fever	20	Undulant fever	2

ITALY

Communicable diseases—4 weeks ended December 4, 1938.—During the 4 weeks ended December 4, 1938, cases of certain communicable diseases were reported in Italy as follows:

Disease	Nov. 7-13	Nov. 14-20	Nov. 21-27	Nov. 28-Dec. 4
Anthrax	27	20	22	30
Cerebrospinal meningitis	12	16	22	16
Chickenpox	197	188	320	327
Diphtheria	706	682	793	702
Dysentery	38	12	32	33
Hookworm disease	26	15	27	26
Lethargic encephalitis	1	1		2
Measles	812	934	1,185	1,228
Mumps	122	185	163	148
Paratyphoid fever	152	115	115	88
Poliomyelitis	84	66	46	47
Puerperal fever	40	42	40	37
Rabies				1
Scarlet fever	361	343	310	335
Typhoid fever	1,024	828	778	594
Undulant fever	41	52	36	33
Whooping cough	276	234	218	283

SWEDEN

Notifiable diseases—December 1938.—During the month of December 1938, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Scarlet fever	2,451
Diphtheria	6	Syphilis	28
Dysentery	424	Typhoid fever	10
Gonorrhea	1,050	Undulant fever	10
Paratyphoid fever	3	Weil's disease	6
Poliomyelitis	[1] 51		

[1] Includes 8 cases nonparalytic at time of notification.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

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

CHOLERA

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

Place		June 26–July 30, 1938	July 31–Aug. 27, 1938	Aug. 28–Sept. 24, 1938	Sept. 25–Oct. 29, 1938	Week ended— November 1938 5	12	19	26	December 1938 3	10	17	24	31	January 1939 7	14	21	28
Afghanistan: [1] Kabul	C						18											
China:																		
Amoy	C								7									
	D								3									
Canton	C	16	13	19	12													
	D	5	2	4														
Foochow	C			95	40	17	17	22	21	77		31	10					
	D			41	21	2	1		2	5		1	1					
Hankow	C	213	162	73	2													
Hong Kong	C	202	128	68	46	7	8	7	7	2	3	1		5	2	2	1	
	D	158	54	42	21	5	2	11	2	3	2	1		3			2	
Kwangtung Province	C	11,295	2,581	2,870	142													
	D	2,724	696	752	26													
Macao	C	537	182	113	112	21	14	1	7	1								
	D	399	127	41			6	1	3	1								
Mukden	C		P															
Shanghai	C	2,053	3,876	988	401	15	10	5	2		6		4					
Swatow	C	518	27	37	12		7					1						
Tientsin	C	9	28	5														
Tsingtao	C		P															
Yunnanfu. [2]																		
Chosen (Korea)	C			47	2													
	D			27	1													
India	C	48,514	55,794	45,668	34,396	2,701	2,710	3,060	2,920	2,352	1,350	622						
	D	22,283	25,767	20,788	17,568	1,423	1,519	1,585	1,629	1,972	835	301						
Allahabad	C	18	5					2										
Assam	C	530	236	1,093	2,253	465	757	1,014	1,319	1,046	629	419	421	348	194	157	62	
	D	296	101	555	921	237	439	566	738	720	452	214	236	216	121	121	44	
Bengal Presidency	C	1,281	728	4,598	9,443	2,645	2,932	3,450	3,526	3,741	3,066	3,062	2,252	2,114		1,970		
	D	587	362	2,288	5,048	1,541	1,671	2,015	1,948	2,177	1,778	1,721	1,203	1,194		987		
Bombay Presidency	C	767	2,123	1,478	1,496	324	250	257	206	227	66	96						

Bombay	D	277	749	684	663	136	105	122	89	59	23	44						
	C		3															
Calcutta	C	144	70	89	114	20	34	41	41	34	38	20	15	7	14	11	18	
Cawnpore	C	202	101	26	4													
	D	49	34	8	1													
Central Provinces and Berar	C	14,427	27,998	24,285	8,028	418	391	240	86	102	57	28	5	36	33	48		
Chittagong	C	2	3								1							
Delhi	C	14	1															
Howrah	C	156	103	137	126	5			27	37	23	35						
Madras Presidency	C	3,613	1,898	1,842	1,663	116	66	45	26	63	64	70	130					
	D	1,501	850	731	733	47	33	20	15	27	31	26	49					
Madras	C	3	2	2	4	1	2	1		1		1		1				
	D				2			2						1				
Negapatam	C						2	3		1	4		1	1	2			
	D						1				2							
Northwest Frontier Province	C	419	468	114	26	6												
Orissa Province	C	233	52	12	33		1	1			15		1	4	13		11	
Punjab	C	542	88	15														
Rangoon	C			1	1													
Sind State	C	221	61	1														
India (French):																		
Chandernagor Territory	C	8		1			1											
Karikal Territory	C				1							1			1			
Pondichery Province	C				3													
Yanaon	C	2																
India (Portuguese): Damao	C			7														
Indochina (French):																		
Annam Province	C	923	440	35	7													
Tonkin Province	C	451	23	7	77													
Hanoi	C	34	4															
Japan:																		
Fukuoka Prefecture—Wakamatsu	C	2			3													
Hiroshima Prefecture—Fukuyama	C				3													
Okayama Prefecture	C	8																
	D	4																

On vessels:
S. S. *Tuk Sang* at Hong Kong from Shanghai and Swatow - 1 case - June 5, 1938
S. S. *Kikukawa Maru* at Fukuoka from Shanghai - 57 cases - July 28, 1938
S. S. *Mau Sang* at Hong Kong from Saifdakan - 1 case - July 18, 1938

On Vessels—Continued.
S. S. *Kweiyang* at Bangkok from Swatow and Hong Kong - 1 case - Aug. 5, 1938
S. S. *Ethiopia* at Madras - 1 case - Sept. 5, 1938

[1]Cholera also reported present early in June in South Afghanistan, Afghanistan.
[2]Information dated Nov. 30, 1938, stated that cholera had appeared in villages near Yunnanfu, China. In one village of approximately 1,000 persons, 500 were said to have died.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

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

Place		June 26–July 30, 1938	July 31–Aug. 27, 1938	Aug. 28–Sept. 24, 1938	Sept. 25–Oct. 29, 1938	Week ended— November 1938 5	12	19	26	December 1938 3	10	17	24	31	January 1939 7	14	21	28
Argentina. (See table below.)																		
Belgian Congo	C	3	3	1						1								
Brazil. (See table below.)																		
British East Africa:																		
Kenya	C	9	4	2	1					1								
Uganda	C	59	45	53	63	14	4	9		4	3	1	1		3	1		
	D	61	44	50	62	14	4	8		4	3	1	1		3	1		
Ceylon:																		
Colombo	C		1															
	D		1															
Plague-infected rats		1	2															
China:[2]																		
Dutch East Indies: Java and Madura	C	157	120	120	150													
	D	157	120	120	145													
Ecuador: Guayaquil	C	1				1	1											
	D					1	1											
Plague-infected rats							3											
Egypt: Asyut Province	C																	1
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua District					6													
Hamakua Mill Sector							2	3	8		[3] 23		10	7				
Kaiwiki														1				
Kukaiau														10	2		1	
Paauhau Sector			1		10	5		4	3	4			5	1				
India	C	488	907	1,223	2,139	406	453	525	339	412	552	299						
	D	275	409	498	975	171	156	251	159	148	231	146						
Bassein	C	4	2	2														
Plague-infected rats		1							1									
Bombay Presidency	C	27	49	83	106	30	33	35	33	30	18	25						
	D	14	27	40	63	15	14	15	21	14	12	18						
Central Provinces and Berar	C		126	412	584		186	146	98	181	215	90	148	43	215	195	142	

Ceylon	C		1		1			2										
	D		1					2										
Plague-infected rats			2	10	13	1	2	1	2	2	1		3					1
Madras Presidency	C	231	227	195	382	48	61	66	40	36	56	20	10					
	D	84	97	88	156	29	23	29	12	11	22	17	2					
Rangoon	C	3	1	2											1		1	1
	D	3	1	2											1			1
Madagascar. (See table below.)																		
Peru. (See table below.)																		
Siam:																		
Prae	C															1	6	
Svargalok Province	C																	11
Tak urban area	C													3				3
Tunisia: Tunis	C				2		1	1			2							
Plague-infected rats		2				1											2	
Union of South Africa (see also table below)	C	4		3								2				6		
Cape Province—Port Elizabeth	C	3	2	1	1									1				
	D	1												1				
Orange Free State	C												2	3				
United States.[4]																		

Place		July 1938	August 1938	September 1938	October 1938	November 1938	December 1938
Argentina: Salta Province	C		1	1			
Bolivia (see also table above)	C	6	4	[5] 103			
Brazil:							
Alagoas State	C			1			
Pernambuco State	C		4	4	20	17	

Place		July 1938	August 1938	September 1938	October 1938	November 1938	December 1938
Madagascar (central region)	C	22	33	60	70	73	
	D	20	31	60	64	64	
Peru	C	1	4	7	6	6	7
Libertad Department	C		1			3	2
Lima Department	C	1	3	6	6	2	4

[1] Including plague in the United States and its possessions.

[2] According to information dated Aug. 12, 1938, 23 deaths from plague occurred in Kirin Province, China, up to Aug. 10, 1938, and 16 deaths from plague occurred in South Hin-An Province from July 28 to Aug. 8. Information dated Aug. 25, 1938, states that 17 cases of plague had occurred in South Hsingan Province and that 10 cases of plague with 10 deaths were reported in Northern Kirin Province between July 29 and Aug. 10.

[3] For 2 weeks.

[4] Last reported human case; Aug. 30, 1937, Fresno County, Calif. Intensive plague work is being conducted in the Western States and detailed reports of plague-infection found in animals and insect hosts are published currently in the PUBLIC HEALTH REPORTS. The following summarizes recent reports for 1938: *Arizona*—Insects, Sept. 27; *California*—Ground squirrels, July, August, October, Dec. 11; insects, July, August, October, Dec. 22; *Idaho*—Insects, July; *New Mexico*—Prairie dogs, August, September; insects, August, September; *Utah*—Insects, July; *Wyoming*—Ground squirrels, July; insects, July, August.

[5] For the period Sept. 8–Oct. 7, 1938.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

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

Place		June 26–July 30, 1938	July 31–Aug. 27, 1938	Aug. 28–Sept. 24, 1938	Sept. 25–Oct. 29, 1938	Week ended— November 1938 5	12	19	26	December 1938 3	10	17	24	31	January 1939 7	14	21	28
Algeria:																		
Algiers Department	C				1													
Constantine Department	C		1															
Philippeville	C		1															
Angola. (See table below.)																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil. (See table below.)																		
British East Africa: Tanganyika	C	158	94	30	38	19	13	14							1			
Canada:																		
Alberta	C	[1] 1																
Manitoba	C	[1] 10												[1] 1		[1] 6		
Ontario	C		9		1			2				[1] 1		[1] 1				
Saskatchewan	C	[1] 11		[1] 1	[1] 2	[1] 3		[1] 6				[1] 3		[1] 2		[1] 9		
China:																		
Amoy	C					1	1											
Dairen	C									1				1				
Hankow	C	6			1													
Hong Kong	C	5					1	1		3	1	9	11	6		5	7	6
	D	3									5	4	8	6		2	6	5
Shanghai	C	7	7	4	53	28	82	64	144	222	211	339	297	195	247	242	188	157
Tientsin	C										2							
Chosen (Korea). (See table below.)																		
Colombia (see also table below): Cartagena	D	1																
Dahomey. (See table below.)																		
Dutch East Indies:																		
Batavia	C			[1] 1														
Surabaya	C											[1] 1						
Ecuador: Guayaquil. (See table below.)																		
France. (See table below.)																		
Great Britain: England and Wales—																		
Lancaster County	C	2	3															
Liverpool	C													1		1		
York County	C								3									

Greece. (See table below.)																		
Guatemala. (See table below.)																		
India	C	4,562	1,635	1,206	1,225	276	260	558	534	881	1,106	1,025						
	D	1,242	510	330	259	50	67	130	154	218	282	303						
Assam	C	87	49	10	33	6	4	20	9	16	5	3	28	28	27	19		
Bassein	C	1																
Bengal Presidency	C	389	166	123	146	28	20	51	55	58	54	74	56	58				
	D	132	59	51	49	7	3	4	15	12	7	20	24	20				
Bombay Presidency	C	684	401	281	361	46	30	114	24	100	172	126						
	D	119	77	37	51	7	1	14	5	13	19	25						
Bombay	C	37	15	9	5							1		1	2		3	7
	D	28	11	3								1			2		2	4
Calcutta	C	86	31	28	10	4	6	14	18	10	17	30	24	35	71	89	100	
	D	54	23	18	7	1	3	4	9	6	5	21	18	16	30	48	76	
Central Provinces and Berar	C	144	28	15	14		3			2	21	12	11		21	5	34	
Cochin	C										1							
Delhi	C	1		1			1	1	3	5	1	3	10	4	14	25	18	39
Howrah	C	24	17	27	18	5				5	2	4						
Jodhpur	C			1														
Karachi	C		1						[1] 1					[2] 3	1		1	1
Madras Presidency	C	539	511	306	281	79	93	80	111	155	190	147	239					
	D	113	98	64	50	5	24	10	16	25	35	26	39					
Madras	C	185	132	100	81	22	50	26	62	32	49	32	29	44	26	17	57	71
Moulmein	C								4								1	
Northwest Frontier Province	C	95	75	24	37	16	17	15	27	68	56	99	44	23	96	20	39	
Orissa Province	C	442	258	119	46	7	14	1	13	30	34	47	63	34	40	45	126	
Punjab	C	41	16	13	10		5	32	20	40	13	16	49	17	43	31	38	
Rangoon	C	2	6	4	3	1	1	2	1				1	1	4	2	2	1
Sind State	C	167	112	63	29	49	14	18	38	40	59	94	22	87		73	85	
India (French): Chandernagor Territory	C		3									1						
Indochina (French) (see also table below):																		
Tonkin Province	C	88	45	46	34	12	35	17	31	35	41	23	99	69	57	19	68	70
Hanoi	C																	1
Saigon-Cholon	C	5	3	7	9					2			2	5	3			2
Iran	C		1		3									1				
Iraq	C			3								1			5		1	
Ivory Coast. (See table below.)																		
Japan:																		
Kobe	C										1	2			1			
Nagasaki	C									5	2							
Okayama Prefecture	C							1		1								
Tokyo	C											1	1					
Lithuania. (See table below.)																		
Malta. (See table below.)																		
Mexico (see also table below):																		
Mexico, D. F	C	7	1											1				
Monterrey	C		3															4
Tampico	C							1										
Morocco. (See table below.)																		
Nigeria	C	102	280		156	87												
Lagos	C	2	1	13	7													

[1] For 2 weeks.

[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

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

Place		June 26–July 30, 1938	July 31–Aug. 27, 1938	Aug. 28–Sept. 24, 1938	Sept. 25–Oct. 29, 1938	Week ended—											
						November 1938				December 1938					January 1939			
						5	12	19	26	3	10	17	24	31	7	14	21	28
Niger Territory. (See table below.)																		
Northern Rhodesia	C	22	6	6	9	-----	-----	-----	-----	-----	2	4	-----	-----	-----	-----	-----	-----
Nyasaland	C	-----	1	6	3	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Portugal (see also table below).																		
Lisbon	C	7	5	5	8	4	5	8	3	-----	2	2	1	1	2	3	12	-----
Oporto	C	-----	-----	1	10	-----	-----	-----	-----	-----	3	-----	2	-----	-----	4	1	-----
Salvador. (See table below.)																		
Siam	C	-----	-----	33	-----	-----	-----	-----	-----	-----	-----	-----	2	4	25	22	1	-----
Sierra Leone	C	1	-----	-----	-----	-----	-----	-----	-----	1	-----	1	-----	-----	-----	-----	-----	-----
Southern Rhodesia	C	983	403	97	57	33	54	23	15	-----	15	9	3	-----	-----	-----	-----	-----
Sudan (Anglo-Egyptian)	C	1	4	2	30	-----	10	9	1	12	6	1	7	5	4	12	6	6
Union of South Africa. (See table below.)																		
Venezuela. (See table below.)																		

On vessels:

S. S. *Ellenga* at Rangoon from Calcutta	1 case	July	19, 1938
S. S. *Plantier* at Aden	1 case	Aug.	2, 1938
S. S. *Pronto* at Tangku-Taku from Hong Kong	1 case	Aug.	8, 1938
S. S. *Defender* at Aden	1 case	Aug.	19, 1938
S. S. *Katori Maru* at Kobe from London, Singapore, Hong Kong, and Shanghai	3 cases	Aug.	20, 1938
S. S. *Conte Biancamano* at Suez from Shanghai, Colombo, Bombay, and Massowah	1 case	Sept.	10, 1938

On vessels—Continued.

S. S. *Hartlebury* bound for New York via Durban [3]	1 case	Dec.	1, 1938
S. S. *Nagasaki Maru* at Nagasaki from Shanghai	1 case	Dec.	7, 1938
S. S. *Pyrrhus* at Yokohama from Shanghai	1 case	Dec.	10, 1938
S. S. *Westpoint* at sea en route Surabaya	1 death		Do.
S. S. *Tyles* at Yokohama from Hong Kong and Shanghai	1 case	Dec.	13, 1938
S. S. *Nagasaki Maru* at Nagasaki from Shanghai	1 case	Dec.	16, 1938
S. S. *Bellerophon* at Hong Kong from Yokohama, Kobe, and Shanghai	1 case	Dec.	22, 1938

Place		July 1938	August 1938	September 1938	October 1938	November 1938	December 1938
Angola	C	35	62				
Belgian Congo	C	262	163	185	354	357	
Bolivia:							
Cochabamba Department	C	2	[4] 2	[5] 1		[6] 4	
Chuquisaca Department	C		[4] 3				
La Paz Department	C	5	[4] 27	[5] 16		[6] 19	
Oruro Department	C			[5] 4		[6] 1	
Potosi Department	C	2				[6] 15	
Santa Cruz Department	C	5	[4] 8	[5] 7		[6] 2	
Tarija Department	C					2	
Brazil:							
Bahia	C		1				
Porto Alegre	C		1				
Chosen (Korea)	C	4				1	
Colombia	C	124	68	60	74		
Dahomey	C		16				14
Ecuador: Guayaquil and vicinity	C				3	6	2
France	C			1			
Greece	C	5				3	5
Guatemala	C		1			16	
Indochina (French) (see also table above)	C	409	206	113	166	174	475
	D	89	48	35	25	14	65
Ivory Coast	C		10				

Place		July 1938	August 1938	September 1938	October 1938	November 1938	December 1938
Lithuania	D		1				
Malta	C						9
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C			2	6		
Colima State	C						
Hidalgo State	C				30	7	
Mexico, D. F	C		1	2		2	
Nuevo Leon State—Monterrey	C		3				
Queretaro State	C		16	3			
San Luis Potosi State—San Luis Potosi	C					7	
Sonora State	C		1				
Morocco	C	4	1			3	4
Portugal (see also table above)	C		40	78	72	169	
	D		4	3	7	12	
Salvador	C				1		
Union of South Africa:							
Cape Province	C		1	1			
Natal	C		25	1			
Orange Free State	C		1				
Transvaal	C		33	18			
Venezuela	D	2	3	3	1		

[3] Patient removed from vessel and died in hospital in Iloilo district, P. I.
[4] For the period Aug. 1 to Sept. 7, 1938.
[5] For the period Sept. 8 to Oct. 7, 1938.
[6] For the period Oct. 8 to Nov. 30, 1938.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

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

Place		June 26–July 30, 1938	July 31–Aug. 27, 1938	Aug. 28–Sept. 24, 1938	Week ended— October 1938					November 1938				December 1938					January 1939	
					1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14
Algeria:																				
Algiers Department	C	13	5	2	1	5				1	1	3	1	7		13		7	1	2
Algiers	C											3		5						
Constantine Department	C	42	20	25	3	2			3		2	1	3	5	17	11	1	10	6	13
Bone	C	3	4		1						1									
Constantine	C	5	1	1							1				3			4		
Philippeville	C		7	11					3	1				3						1
Oran Department	C	9	12	1		1			4	4							1	4	16	7
Australia: Adelaide	C	1																		
Basutoland	C	2	3	1																
Belgium. (See table below.)																				
Bolivia. (See table below.)																				
British East Africa: Kenya	C		3	2						3							1	2		
Bulgaria	C	4																		
Chile	C	43	40	81	12	5	13	23	19											
Antofagasta Province	C					2			3											
Concepcion	C	3			1															
Coquimbo Province	C	8	1																	
Llanquihue Province	C			16																
Nuble Province	C	10	16	10	1															
Santiago Province	C	4	14	39	8	5			18											
Tarapaca Province	C	10	1																	
Valdivia Province	C	1	1	4	2															
Valparaiso	C	3	1	2			3	1		2		1	1			1	1	3		
China (see also table below):																				
Dairen	C	1								1							1			
Shanghai	C	62		8	2	3			2											
Chosen (Korea). (See table below.)																				
Colombia: Barranquilla	D	1																		
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	3	1	1													1	1		
Asyut Province	C	2	2	2																
Behetra Province	C	10	6	10																
Cairo	C	8	2	1												1		1		1

Dakahliya Province	C	29																		
Gharbiya Province	C	4	6	8		8														
Girga Province	C	5	1	5		1														
Giza Province	C	22	1																	
Kalyubiya Province	C	7	1																	
Minufiya Province	C	27																		
Minya Province	C		1				1													
Sharkiya Province	C	7		1																
Provinces	C	245	95	28	9	1	4	18			2	1	5			18	11	14	2	9
Greece. (See table below.)																				
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C	3	3	4	2	1	2			3	2	3		3	1		2	1		1
Hungary	C	1														1	1	1		
Iran	C										1									
Iraq	C		1	3	1									1		1				
Latvia. (See table below.)																				
Libya:																				
Garian	C		1																	
Suani Benaden	C																			3
Lithuania. (See table below.)																				
Mexico (see also table below):																				
Guadalajara	D													1						
Mexico, D. F	C	15	1	6		2	2	4	2	2	2	5	1	4		1	3	1		
Monterrey	C				1															
Nuevo Laredo	D												2							
San Luis Potosi	D																1			
Torreon	D		2		1			1								1				
Morocco	C	226	55	11		4		2	3	16		39	27		41	20	19	37	31	27
Casablanca	C	23	5																	
Palestine:																				
Haifa	C			3	1		1	1			1	1		1						
Jaffa	C	2	4	9	3		1	4	1						3		2	1		
Poland	C	215	58	37	10	17	14	7	15	18	24	25	27	67	43	47	104	60	77	62
	D	9		1		1			2	3	1	1	1	2	1	5	6	6	7	2
Portugal. (See table below.)																				
Rumania. (See table below.)																				
Straits Settlements: Singapore	C	1	1								1									
Syria:																				
Beirut	C								1					1						
Lebanese Republic	C							1												
Trans-Jordan	C							1				1								
Tunisia:																				
Tunis	C	11	3	9	4	8		2	5	3	5	3		32			8	2	8	13
Provinces	C	245	86	73	5	19		9	7			12			49	117	49	46	106	112
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia	C	34	11	7	8	1		2	3		2	2	1	3	16	3	3			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

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

Place		July 1938	August 1938	September 1938	October 1938	November 1938	December 1938
Belgium: Brussels	C			2			
Bolivia:							
Cochabamba Department	C	1	[1] 1				
La Paz Department	C	5		[2] 6		[3] 14	
La Paz	C	2	[1] 1	[2] 3		[3] 11	
Oruro Department	C	2	[1] 1	[2] 1		[3] 3	
Potosi Department	C	3	[1] 7				
Santa Cruz Department	C					[3] 1	
China: Manchuria—Harbin	C	1	2	5	2	16	
Chosen (Korea)	C	22	1	12		21	
Czechoslovakia	C		3				
Greece	C	5			4		
Guatemala	C	108	20	6	3	38	2
Latvia	C	1				1	
Lithuania	C	3				3	
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C				1		
Hidalgo State	C		4	1	5	1	
Jalisco State—Guadalajara	C			1			

Place		July 1938	August 1938	September 1938	October 1938	November 1938	December 1938
Mexico—Continued.							
Mexico State	C			4	6	7	
Mexico D. F	C		5	10	10	13	
Nayarit State	C					1	
Oaxaca State	C				2	3	
Puebla State—Puebla	C			1	2	3	
Queretaro State	C		1	1	1	2	
San Luis Potosi State—San Luis Potosi	C			1	2	1	
Tamaulipas State	C			1			
Portugal	C	3	2	2		7	
Rumania	C	10	5	8	27	77	
Turkey	C	12		17	13	21	
Istanbul	C	4	2	5	2	2	
Union of South Africa:							
Cape Province	C	98	62	165		91	
Natal	C	1	1	4		8	
Orange Free State	C	10		7		2	
Transvaal	C		1				

[1] For the period Aug. 1 to Sept. 7, 1938.
[2] For the period Sept. 8 to Oct. 7, 1938.
[3] For the period Oct. 8 to Nov. 30, 1938.

YELLOW FEVER

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

Place		June 26–July 30, 1938	July 31–Aug. 27, 1938	Aug. 28–Sept. 24, 1938	Week ended— October 1938					November 1938				December 1938					January 1939	
					1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14
Belgian Congo: Buta	C												[1] 1							
Brazil: [2]																				
Amazonas State	D	1																		
Rio de Janeiro State	D																			1
Colombia: Cundinamarca Department	D	2	2																	
Dahomey: Allada	C	1																		
French Equatorial Africa:																				
Chad—Fort Lamy	C																			1
Gabon—Koula Mouton	C	1																		
Sosso	C										1									
Gold Coast	C	3		3		1	3													
	D	1		1		1														
Ivory Coast	C	[1] 1				2	1				[3] 2	3	3	[3] 2		[3] 3				
	D		1													2				
Nigeria [4]	C		[1] 2	1		1					1	2	1		[1] 1	[1] 1				1
	D		[1] 1																	
Port Harcourt	C												1							
Sudan (French):																				
Kona	C												[1] 1	3						
Kouy	C			[1] 1																
Sangha	C														1					
Tougan	C						3													
On vessel: S. S. *St. Octave* at Grand Bassam Roadstead from Bordeaux, Dakar, Konakry, Tabou, and Sassandra	C													1						

[1] Suspected.
[2] See also reports of yellow fever in Brazil in preceding issues of the PUBLIC HEALTH REPORTS.
[3] Includes one suspected case.
[4] During the week ended Feb. 4, 1939, 1 suspected fatal case of yellow fever was reported in Ikoidong, Calabar Province, Nigeria.