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ENDAMOEBA HISTOLYTICA IN WASHINGS FROM THE HANDS AND FINGER NAILS OF INFECTED PERSONS

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In an earlier publication by Spector and Buky (1) it was shown that hands artificially contaminated with positive stools soon cease to yield living cysts of *E. histolytica* when exposed to conditions permitting of prompt drying of the contaminated hands. In the tests referred to, the authors purposely refrained from making conditions favorable for survival, having in mind rather those that probably would prevail under natural circumstances.

Andrews (2) has recently studied the same subject, using a different procedure in his work. Special efforts were made to contaminate the subjects in the space beneath the finger nails. Andrews found that a few cysts survived 20 minutes, and that ordinary hand washing was generally sufficient to free the hands from infective material.

The present work was designed to determine the presence of cysts of *E. histolytica* on the hands under natural conditions rather than under conditions of artificial contamination. The procedure was as follows: When a carrier was detected in routine examination he or she was asked to return the following day for a second examination. At the second examination, the individual was asked to pass a fresh specimen of feces in the usual manner. The subject was instructed, immediately after the use of toilet paper and before washing the hands, to rinse the hands thoroughly in sterile saline or distilled water contained in a sterile vessel. After this the finger nails were thoroughly cleaned with a sterile toothpick and cut with sterile scissors into the same container. These washings and parings were placed in large sterile centrifuge tubes and centrifuged at a medium low speed for 5 to 10 minutes. The supernatant fluid was carefully removed and the sediment was examined with 1:1000 aqueous eosin and an iodine solution (5 percent aqueous potassium iodide saturated with iodine and diluted with equal parts of distilled water) for the ready detection of cysts and for the determination of their state as to viability.

In order to determine the relative persistence, under the conditions of the experiment, of *E. histolytica* and members of the *Coli-aerogenes* groups of bacteria, Endo plates were made from the washings in 54 cases.

RESULTS

Of the 74 persons thus examined, the finger nails and hand washings of 5, or 6.8 percent, were positive, 2 showed very few live *E. histolytica* cysts of the large variety, 1 showed very few dead *E. histolytica* cysts of the large variety, and 2 showed live cysts of the small variety. One man, a plasterer, showed a number of large cysts of free-living *amoebae*.

Of these 74 washings, 54 were cultured for *B. coli-aerogenes* organisms, of which 15, or 27.7 percent, were positive.

TABLE 1.—*Results of examinations made of stools, hands, and finger-nail washings of persons infected with E. histolytica*

Number of persons	Stool findings positive for *E. histolytica*				Results of hand and finger-nail washings				
					B. coli-aerogenes		E. histolytica		
	Number showing trophozoites	Number showing trophozoites and cysts	Number showing large cysts	Number showing small cysts	Number cultured	Number positive	Number showing large live cysts	Number showing large dead cysts	Number showing small live cysts
74	11	1	49	13	54	15	2	1	2

DISCUSSION

It appears from the data presented that persons whose stools are known to contain living *E. histolytica* do not frequently contaminate their hands with these organisms under ordinary conditions. Only 5 of 74 such persons were found to have contaminated their hands during the procedures connected with the discharge of feces, even when the hands were examined immediately after defecation.

In the light of these findings, it would seem that contamination of food by carriers of *E. histolytica* under the ordinary conditions of food handling must occur infrequently. It must be remembered that the subjects of these tests were examined before their hands were cleansed after defecation and that the material in the space beneath the nails was examined as well as any adhering to the hands and nails. In view of the results of the work of Andrews, already referred to, it would seem that the number of positives obtained in our experiments would have been even smaller had the subjects been

permitted to wash their hands before collecting the material for examination.

REFERENCES

(1) Spector, B. K., and Buky, F.: Viability of Endamoeba histolytica and Endamoeba coli. Pub. Health Rep., 49: 379–385 (1934).
(2) Andrews, Justin: The retention of Endamoeba histolytica cysts under finger nails. Am. Jour. Trop. Med., 14: 439–441 (Sept. 1934).

A COMPARATIVE STUDY OF STREPTOCOCCAL IMMUNITY PRODUCED IN RABBITS BY HEAT-KILLED CULTURES, BY ACTIVE BACTERIOPHAGE, AND BY INACTIVATED BACTERIOPHAGE

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In a recent paper (1933) the writer showed that mice and rabbits experimentally infected with a virulent strain of hemolytic streptococcus received no benefit from treatment with a single dose of a specific bacteriophage administered at the same time or a few days previous to the infecting dose. The failure of therapeutic action was ascribed to inhibition of lysis by the body fluids, as demonstrated in test-tube experiments.

In the present study an attempt was made to compare the immunizing properties of bacteriophage preparations and those of antigens made in the usual manner when administered to animals a suitable period of time in advance of the infecting organism.

The use of bacteriophage preparations as antigens for the treatment of human diseases was suggested by certain theoretical considerations. A bacteriophage preparation contains a complex mixture of antigenic substances. It contains the protein of the medium in various stages of degradation; it contains the metabolic products elaborated by the bacteria prior to their dissolution; it contains the lytic principle; and it contains the dissolved bacterial cells. There is a belief that the latter should excel as an immunizing agent.

D'Herelle asserted that in the state of solubility produced by the phage the bacterial substance is particularly adapted to stimulate the cells of the body which enter into the production of immunity. The statement was made following experiments on immunization against avian typhoid, hemorrhagic septicemia in the buffalo, and experimental infection with the Shiga type of dysentery in the rabbit. D'Herelle's claim for the excellence of lysed bacterial substance as an antigen was favorably received by many clinicians, although the controlled experiments of subsequent investigators failed to agree in corroborating the claim.

Although there have been no experimental studies with streptococcus phage as an immunizing agent, it may be purchased on the market for use "in the treatment of localized streptococcus infections

of various types of the skin and soft tissues and in septicemia." Certain statements in the literature seem to justify this use of streptococcus phage.

Referring to the use of streptococcus phage, Dutton states that the bacterial antigens in a filtrate of lysed bacterial cells are specific and more potent than the whole bacteria. Powell, Jamieson, and Jones state that "our rationale of the use of phage has been to utilize it as a means for producing the most desirable form of effective soluble antigen rather than as an ultimate therapeutic agent."

The use of bacteriophage as a "supervaccine" was favorably considered in a recent editorial in the Journal of the American Medical Association. After commenting on the possibly beneficial effect of the nonspecific protein reaction following the intravenous injection of peptone, the advantages of the disintegrated bacteria are thus stated: "It is obvious that any benefit arising from the introduction of specific antigen would be enhanced by their presence in a more soluble and hence more available form." Two weeks after the appearance of this editorial a second editorial appeared in the same journal which virtually revoked the previous favorable comments and warned against relying on a remedy whose usefulness has not been proved. This incident illustrates the confusion which necessarily arose as a result of the utilization of bacteriophage for the treatment of human diseases before the theory that it might be the most efficacious form of antigen had been adequately tested.

Although it cannot be assumed that facts established for one bacterial species and its specific phage will be true in regard to other bacterial species and their respective phages, nevertheless facts established in one case are suggestive of what may be looked for in others. In none of the work briefly reviewed here were the experiments concerned with streptococcus phage as an antigen.

The experiments of Jungblut and Schultz indicate that lysis by bacteriophage changes the bacterial protein to a substance which possesses antigenic properties differing from those of the original protein. They found that no reaction occurred when uterine strips of animals sensitized to intact or autolyzed bacilli of the dysentery and colon types were tested for anaphylaxis with homologous phage lysates; and, vice versa, there was no contraction of uterine strips sensitized to phage lysates upon contact with homologous bacterial autolysates.

The reported experiments showing protection against various diseases by treatment with phage were reviewed recently by Larkum and also by Kendrick. A number of investigators, working with various races of phage, were able to demonstrate protection in animals treated with phage. Only a very few experiments, however, have been carried out to compare the efficacy of phage with that of killed

intact cells as an immunizing agent. A brief review of these experiments follows:

Compton reported an experiment with 5 mice treated with antiplague phage, 6 treated with vaccine, and 4 untreated controls. None of the vaccine-treated mice, and none of the controls survived the test dose of virulent control bacilli, whereas two of the phage-treated mice survived. Compton's results have been quoted repeatedly as a demonstration of the efficacy of phage as an immunizing agent without mentioning that his conclusions were based on only two surviving mice. The many times that this insignificant experiment has been quoted bears witness to the lack of adequate experimental data on the value of bacteriophage as an immunizing agent.

Maitra and Mallick failed to demonstrate protection against cholera organisms in rabbits treated with bacteriophage. They then treated rabbits (the number was not given) with cholera vaccine to which phage had been added, and found no better protection than in rabbits treated with vaccine alone. Kendrick treated 23 rabbits with bacteriophage and 6 with killed virulent *Salmonella suipestifer*. Three of the animals treated with phage, and 1 treated with killed bacteria survived the lethal test dose; 25 untreated controls died. The difference between the protection afforded by the two kinds of vaccine was insignificant, though the slight difference was in favor of the killed bacteria.

EXPERIMENTAL PROCEDURES

The experimental animals were white mice and rabbits weighing from 2 to 2.5 kilograms. When two or more lots of animals were immunized in comparative experiments, those of the higher and lower weights were distributed as evenly as possible between the lots.

Two strains of hemolytic streptococci were used in these experiments. They were chosen on account of their high degree of virulence for rabbits. Streptococcus 639 was used in experiments previously reported (1933, 1934). Streptococcus 687 was received from Dr. M. G. Colvin, who used it in his studies. He obtained it from an abscess in a guinea pig.

Strains 639 and 687 belong to distinct phagological groups according to their sensitiveness to nascent phage, as reported in the previous publication (1934). Strain 687 is sensitive to the four types of streptococcus phage, A, B, C, and D. On the other hand, strain 639 is sensitive to only one type, B. Reciprocal agglutinin absorption tests showed that strains 639 and 687 belong to serologically distinct groups, for neither absorbed agglutinins from the heterologous immune serum.

The streptococcus cultures were maintained in broth containing 10 percent of rabbit blood. Transfers were made about once a year. The cultures were incubated overnight, then they were capped with vaseline and kept in a refrigerator at a temperature slightly above freezing. Kept in this manner, the virulence of the cultures remains undiminished indefinitely. When animal inoculations were to be made, a few drops of the stock culture were added to a tube of broth. After incubation overnight, the culture was diluted for use according to the needs of the experiment. Both strains 639 and 687 were usually lethal to white mice in 1×10^{-8} cc of 24-hour broth culture, which contained only a few units of streptococci, the unit being a single coccus, a pair, or a chain from which a colony would develop on blood agar.

The B type of phage was used in all the experiments reported in this paper. As in the previous report (1934), the lytic filtrates are designated by a combination of the designations of the type of phage and the streptococcus culture which served as a substratum. Thus the lytic filtrates used in this study were B/639 and B/687.

SUSCEPTIBILITY OF RABBITS TO EXPERIMENTAL STREPTOCOCCUS INFECTION

In order to give a correct interpretation to the results of the immunity experiments in rabbits it was necessary to establish the susceptibility of rabbits to experimental infection with strains 639 and 687. Tables 1 and 2 give the available data. The animals which supplied these data were the control animals in various experiments carried out over a period of about 2 years. The results are comparable, however, because there has been no deterioration in the virulence of the stock cultures.

Table 1 shows that a dose of 0.0001 cc of culture 639 killed rabbits, but that higher dilutions were innocuous. A considerable percentage of animals, however, appeared to be immune. Some of those which showed immunity resisted as much as 100 times the dose which was fatal to the majority of animals.

Table 2 shows that the virulence for rabbits of strain 687 is definitely higher than that of strain 639. A dose of 0.0000001 cc of strain 687 was fatal to the one rabbit inoculated with that dose. On the other hand, a dose 1,000 times as large failed to kill all of the inoculated animals. The irregularities in the susceptibility of rabbits to streptococcal infection must be considered in the interpretation of results of the immunity experiments.

TABLE 1.—*The virulence of strain 639 for rabbits*

Dose	Rabbit nos.	Results
0.1 cc	27, 79, 80, 81	All 4 died, on the third, fourth, fourth, and seventh days.[1]
0.01 cc	28, 29, 126, 127, 128	4 died, on the sixth, eighth, ninth and sixteenth days. 1 was ill with temperature of 41° C. or higher for 5 days and recovered.
0.001 cc	1, 30, 31, 36, 37, 38, 45, 47, 76, 129, 130, 131.	8 died, on the fifth, sixth, sixth, eighth, eighth, ninth, twelfth, and thirty-first days. 4 survived. A temperature of 41° C. or higher for one or more days was the only evidence of illness.
0.0001 cc	23, 25, 32, 77	All 4 died, on the fifth, eighth, tenth, and twelfth days.
0.00001 cc	26, 78	Both survived. There was no rise in temperature nor any other evidence of illness.
0.000001 cc	24	Survived. There was no evidence of illness.

[1] Streptococci were cultured from the heart blood of all rabbits whose death is recorded in this table excepting no. 30, which died on the thirty-first day. The severe illness with high temperature which resulted from the inoculation was followed by progressive emaciation.

TABLE 2.—*The virulence of strain 687 for rabbits*

Dose	Rabbit nos.	Results
0.01 cc	84, 85, 86	Died on the third, third, and fourth days.[1]
0.001 cc	82, 110	Died on the second and third days.
0.0001 cc	83, 111, 150, 190, 191, 192, 193	6 died; 3 on the second, 2 on the third, and 1 on the sixth days. 1 survived; there was a temperature of over 41° C. for 3 days.
0.00001 cc	112, 113, 117, 118, 123, 149, 179, 180, 181.	6 died; 2 on the second, 1 on the third, and 3 on the fourth days. 3 survived; none showed a rise of temperature.
0.000001 cc	114, 119, 121, 132, 133	1 died, on the fourth day. 4 survived; none showed a rise of temperature.
0.0000001 cc	115	Died on the seventh day.

[1] Streptococci were isolated from the heart blood of all the rabbits whose death is recorded in this table.

The following facts suggest that possibly the resistant animals encountered in the course of these experiments may have become immune through spontaneous infections. Among a large collection of hemolytic streptococci, the strains of the group to which strain 687 belongs were from infected material from a wide variety of animal species, including rabbits. Further, it was found that immunity produced in experimental animals by the injection of antigens derived from strain 687 protected against lethal doses of strain 639 as well as against lethal doses of strain 687, although, as already pointed out, the two strains belong to distinctly different groups of streptococci. The data for the cross-immunity tests will be given further on.

EXPERIMENT 1

Two lots of 10 rabbits each were immunized in the first experiment—one lot with lytic filtrate B/639 and the other with an equal volume of killed culture of streptococcus 639. Thus the two kinds of antigen contained bacterial substances derived from the same strain of streptococcus, but the amount of bacterial substances was greater in the heat-killed antigen.

For the preparation of the heat-killed antigen, broth cultures were incubated overnight, and then were heated in a 56° water bath for 1 hour.

For the preparation of the lysed antigen, broth was planted with bacterial culture, lytic filtrate was added, the culture was incubated overnight and then filtered. When streptococcus 639 and diluted phage B/639 are added to broth, and the culture is incubated, the bacteria multiply until the culture becomes turbid; then clearing occurs. The resulting titer of phage is always about 10^{-9} regardless of how many bacteria or how many phage particles were added, provided overwhelming bacterial inoculations were not made. In preparing the lysed antigen 1 drop of culture and 1 cc of undiluted phage were added to tubes containing 9 cc of broth. After incubation overnight, the lysate was filtered through a Berkefeld N filter and stored in the refrigerator for use.

Both lots of rabbits received 12 intravenous injections of antigen at 3- or 4-day intervals. The first 3 doses were with 0.5 cc, the next 3 were with 1.0 cc, and the last 6 doses were with 2 cc of antigen. Thus each rabbit received altogether 16.5 cc of antigen. A few rabbits died of snuffles during the period of immunization. Seven rabbits of the lot treated with killed culture and nine of the lot treated with lytic filtrate survived in good condition. The rabbits treated with killed culture made an average gain of 54 grams each during the period of immunization, whereas those treated with phage lost an average of 53 grams. Eight days after the last inoculation the animals of both lots and six untreated control rabbits were given an intravenous injection of living broth culture of streptococcus 639. The treated rabbits of each lot were divided into 3 groups, which received 0.1, 0.01, and 0.001 cc of culture, respectively.

The results of the protection tests are given in table 3. Considering the irregularity of the susceptibility of rabbits to infection with strain 639, as discussed in connection with table 1, the results recorded in table 3 are nevertheless definite. The data show that treatment with either type of antigen gave a certain degree of immunity, but that treatment with killed culture gave a greater degree of protection than treatment with lytic filtrate. The superiority of killed culture as an antigen is best shown in the group of rabbits which received a test dose of 0.1 cc of culture. Two of 3 rabbits treated with killed culture survived, whereas none of the 3 rabbits treated with lytic filtrate survived. That a certain degree of immunity resulted from treatment with phage is best shown in the group receiving a test dose of 0.001 cc of culture. All 3 of the phage-treated rabbits in that group survived, whereas, according to the data given in table 1, the test dose is lethal to about two-thirds of normal rabbits.

TABLE 3.—*Comparative immunity produced in rabbits by treatment with killed culture 639 or lytic filtrate B/639*

Test dose	Rabbit nos.	Treatment	Results
0.1 cc	4, 5, 6	Killed culture	2 survived. 1 died (fifth day).[1]
	13, 15, 16	Phage	All 3 died (fourth, fifth, and sixth days).
	27	Untreated	Died (fourth day).
0.01 cc	7, 8	Killed culture	Both survived.
	17, 18, 19	Phage	2 survived. 1 died (eighth day).
	28, 29	Untreated	1 died (tenth day). 1 survived.
0.001 cc	9, 10	Killed culture	Both survived.
	20, 21, 22	Phage	All 3 survived.
	30, 31	Untreated	Both died (sixth and thirty-first days).
0.0001 cc	32	do	Died (eighth day).

[1] Streptococci were cultivated from the heart blood of all rabbits whose death is recorded in this table, except no. 30, which died on the thirty-first day. (See footnote to table 1 for discussion.)

The results of experiment 1 may be briefly summarized as follows: Of the 6 control animals, 16⅔ percent survived; of the 9 phage treated animals, 56 percent survived; of the 7 animals treated with killed culture, 86 percent survived the test dose.

EXPERIMENT 2

It was demonstrated in the first experiment that a certain degree of protection may be obtained by treating rabbits with phage. The second experiment was planned to determine whether a higher percentage of animals could be protected by treating with larger doses of phage, over a longer immunization period.

Eight rabbits were treated at 3- or 4-day intervals with lytic filtrate, prepared as for experiment 1. During the course of the immunization, 1 rabbit was chloroformed on account of an injury and 2 rabbits died of undetermined causes. The 5 surviving rabbits each received altogether 61 cc of phage in 18 doses increasing from 1 to 8 cc. There was an average loss in weight of 25 g apiece. Ten days after the last injection the 5 treated animals and 3 untreated control rabbits were each given 0.1 cc of broth culture, intravenously. All of the control animals and 2 of the 5 treated rabbits died between the third and seventh days. Streptococci in pure culture were cultivated from the heart blood of all 3 control animals, and from 1 of the treated animals.

No growth was obtained in cultures planted with the heart blood of the other treated rabbit (no. 51), which died on the sixth day after inoculation. The autopsy findings in this animal, however (consolidation of the tips of the lobes of the lungs) were typical of animals which succumb to infection with streptococcus 639. In speculating whether the failure to obtain the streptococcus from this animal may have been due to the presence of bacteriophage, it is of interest to recall that 3 days after the injection of a normal rabbit with this phage, it could not be demonstrated in the blood but could be demonstrated in the spleen, as reported in an earlier publication (1933). It

seems probable that rabbit 51 died as the result of the experimental infection, and that the presence of bacteriophage may have prevented the cultivation of the streptococcus.

Experiment 2 may be summarized with the statement that 60 percent of animals were protected against approximately 1,000 lethal doses of streptococcus by prolonged treatment with large doses of phage. None of the three phage-treated animals of experiment 1 survived an equivalent test dose. Therefore a stronger immunity was obtained with the prolonged treatment with large doses of phage, but it was a slightly weaker immunity than was obtained by treatment with a much less quantity of killed culture in experiment 1, when 2 out of 3, or 66⅔ percent, of treated rabbits survived a similar test dose.

Since the animals of experiment 2 received almost four times as large a quantity of antigen as those of experiment 1, the data indicate that, in the case of strain 639, killed culture is a more efficient antigen than bacteriophage for the immunization of rabbits.

EXPERIMENT 3

This experiment, carried out with antigens prepared with the use of strain 687, was planned to compare the value as immunizing agents of heat-killed culture, active bacteriophage, or bacteriophage inactivated by heat. An effort was made to have approximately the same quantity of bacterial protein in the lysed antigens as in the killed culture. To prepare the antigens two series of test tubes containing 9 cc of broth each were planted with 0.5 cc of overnight culture. To each tube of one series was added 1 cc of lytic filtrate B/687 diluted 10^{-4}. The tubes were incubated and were examined every 15 minutes beginning with the third hour. Sometimes the turbidity would increase equally in both series of tubes until the fifth or sixth hour, when one by one the cultures of the series to which phage had been added would suddenly become clear. The tubes of both series were then removed to the refrigerator. If lysis was incomplete when the cultures were removed from the incubator, it proceeded to completion in the cold. Sometimes lysis occurred after 3 or 4 hours' incubation. At that time the cultures contained too little bacterial cell material to be satisfactory for antigens. The contents of one tube of growing pure culture were then added in equal amount to two tubes of clearing cultures. Turbidity again increased for a time, and clearing took place for the second time after about 2 hours. The cultures of both series were then removed to the refrigerator, the total period of incubation having been 5 or 6 hours. The lysed cultures always contained approximately 10^9 phage corpuscles per cc and they were estimated to contain a quantity of bacterial cell material approximately similar to that in the pure streptococcus cultures.

The lysed cultures were sterilized by passing through a Berkefeld N filter. For the inactivated phage antigen the lytic filtrate was heated an hour at 65° C. The streptococcus cultures were killed by heating at 56° C. for 1 hour.

Eighteen rabbits were treated with the various antigens, with 6 in each group. Each animal received 16.5 cc of antigen in 12 doses increasing from 0.5 to 2.0 cc. The treatments were given at 3- or 4-day intervals.

The gain in weight during the course of immunization was practically the same for the groups receiving killed culture and active phage—214 grams for the one, and 218 grams for the other. One animal receiving inactivated phage died during the course of immunization.

The surviving animals were tested for immunity 7 days after the last inoculation. Each received an intravenous injection of 1 cc of culture 687 diluted 1 to 10^5. According to the data presented in table 2, the inoculating dose was at least 100 times the dose lethal to some rabbits.

The results of experiment 3 are presented in table 4. The test dose killed 2 of the 3 control animals. The groups which had received treatments with killed culture and with active phage showed the same degree of protection, with 5 out of 6 animals surviving in each lot. The group which had received inactivated phage showed a lesser degree of protection, with 3 out of 5 rabbits surviving.

TABLE 4.—*Comparative immunity produced in rabbits by treatment with killed culture 687, active lytic filtrate B/687, or lytic filtrate inactivated by heat. The test dose was 0.00001 cc of culture 687*

Rabbit nos.	Treatment	Results	Percentage of survivals
92, 93, 94, 95, 96, 97	Active phage	5 survived; 1 died, tenth day [1]	83.3
104, 105, 107, 108, 109	Phage inactivated by heat.	3 survived; 2 died, on the second and third days.	60
98, 99, 100, 101, 102, 103	Killed culture	5 survived; 1 died, fourth day	83.3
117, 118, 123	None (controls)	1 survived; 2 died, both on fourth day	33.3

[1] Streptococci were cultivated from the heart blood of all the animals which died.

The 5 surviving rabbits of the lot which had been treated with killed 687 culture, and the 5 surviving rabbits of the lot which had been treated with active phage (see table 4) were all in good condition, none of them having shown any elevation in temperature following the first test dose. Twenty-three days after the first test dose of culture 687 the animals of each lot were divided into two groups and given a second test dose of 1 cc of a 1 to 10^2 or 1 to 10^3 dilution of culture 639. The results of this experiment are recorded in table 5. The data recorded in the table may be summarized as follows: 100 percent of the animals which had been immunized with heat-killed culture sur-

vived the second test dose, and 40 percent of the animals which had been treated with active phage survived the test dose, whereas only 16.6 percent of the control animals survived.[1]

It has already been stated that strains 639 and 687 belong to different groups of hemolytic streptococci according to phagological and serological reactions. Experiments 1 and 2 demonstrated that treatments with active lytic filtrate B/639 failed to develop as strong an immunity against experimental infection with strain 639 as could be produced by treatments with the homologous culture killed by heat. The data presented in table 5 demonstrate that immunization with antigen prepared with culture 687 protected against experimental infection with strain 639, but that the immunity produced by treatments with the active heterologous lytic filtrate was definitely lower than that produced by treatments with heterologous culture killed by heat. Thus the results obtained in experiments 1 and 2 were confirmed.

TABLE 5.—*Comparative immunity to a test dose of a heterologous streptococcus in rabbits treated with killed culture 687 or with lytic filtrate B/687*

Rabbit no.	Immunizing treatment	First test dose, with homologous streptococcus	Second test dose, with heterologous streptococcus	Results
92	12 doses (16.5 cc) of active lytic filtrate B/687.	1 cc of a 1 to 10^6 dilution of culture 687.	1 cc of a 1 to 10^2 dilution of culture 639.	Died, ninth day.[a]
93				Slightly elevated temperature for 5 days; survived.
94				Died, seventh day.
98	12 doses (16.5 cc) of culture 687 killed by heat.			High temperature lasted 11 days; survived.
99				Do.
126	None (controls)	None		Died, eighth day.
127				Died, sixteenth day.
128				Died, sixth day.
95	12 doses (16.5 cc) of active lytic filtrate B/687.	1 cc of a 1 to 10^6 dilution of culture 687.	1 cc of a 1 to 10^3 dilution of culture 639.	No rise in temperature; survived.
96				Died, twelfth day.
100				No rise in temperature; survived
101	12 doses (16.5 cc) of culture 687 killed by heat.			Do.
102				High temperature for 3 days; survived.
129	None (controls)	None		Died, eighth day.
130				Do.
131				High temperature for 6 days; survived.

[a] Streptococci were cultivated from the heart blood of all the rabbits which died.

The results of experiment 3 indicate that strains 687 and 639 are further unlike in that treatments with active lytic filtrate protect against 687 as well as treatments with killed culture, whereas lytic filtrate is inferior as an antigen for protection against strain 639,

[1] Further experiments to show cross immunity between hemolytic streptococci of different groups will be the subject of another publication. It may be stated here briefly, however, that the reverse of the cross experiment recorded above showed definite cross immunity. Rabbits immunized with antigens prepared with streptococcus 639 were protected against lethal doses of streptococcus 687.

whether the antigen be homologous or heterologous to the infecting dose.

The next experiment, with white mice as the experimental animals, confirmed the data of experiment 3 in showing that protection against strain 687 may be produced as readily with the homologous active lytic filtrate as with the homologous killed culture for antigen.

EXPERIMENT 4

Two groups of 12 mice each were given 3 treatments, 1 group with killed culture 687 and the other with active lytic filtrate B/687. The same lots of antigen which were prepared for experiment 3 served for this experiment also. The treatments were with 0.3, 0.5, and 1.0 cc of antigen injected intraperitoneally at weekly intervals. Three mice of the group receiving killed culture, and two of the group receiving phage died during the course of immunization. The surviving mice and 10 untreated control mice each received a test dose of 1 cc of culture 687 diluted 1 to 10^7, one week after the last immunizing dose.

The results of the experiment are given in table 6.

TABLE 6.—*Comparative values of killed culture 687 and active lytic filtrate B/687 for the production of immunity in mice*

Number of mice	Treatment	Test dose	Results	Percentage of survivals
10	Lytic filtrate	1 cc culture 687 diluted 1 to 10^7	6 died [1]; 4 survived	40
9	Killed culture	do	5 died; 4 survived	44.4
10	None (controls)	do	8 died; 2 survived	20

[1] Streptococci were cultured from the heart blood of all.

The protection afforded by the treatments was slight, with 40 and 44.4 percent of mice surviving in the treated groups, compared with 20 percent surviving in the control group. The percentage of surviving mice in the two groups treated with the different types of antigen was as nearly alike as was possible with the limited number of animals in the experiment.

THE ANTIGENIC VALUE OF PHAGE INACTIVATED WITH MERTHIOLATE

Basing their conclusions on a study of staphylococcus bacteriophage, Powell, Jamieson, and Jones reported that bacteriophage titers do not show critical decreases when preserved with merthiolate in a dilution of 1 to 5,000 and kept at about 5°. Contrary to their conclusions, however, an examination of commercial samples of phage-lysed streptococcus products preserved with merthiolate revealed that some samples contained no active lytic agent. Further, the writer

found that streptococcus phage is sensitive to merthiolate. (See the previous publication for details.) Since the inactivated products are sold for use as vaccines it seemed important to determine whether phage inactivated by merthiolate would compare favorably with active phage as an antigen.

EXPERIMENT 5

Lytic filtrate B/687 with a titer of 10^{-9} was prepared in the same manner as for experiments 3 and 4. It was divided into 2 portions, 1 of which was placed in the refrigerator where no deterioration occurred. The other portion was distributed in a thin layer in cotton-stoppered Erlenmeyer flasks, merthiolate was added in the proportion of 1 to 10,000, and the flasks were placed in an incubator at 37° C. Under those conditions the lytic agent was much deteriorated or completely inactivated within a week.

One group of 7 rabbits was treated with the active phage, and another group of 8 rabbits was treated with phage containing merthiolate which had been held at 37° C. for a week or more.

Both lots of rabbits received the same quantities of antigen, on the same dates, injected at intervals of 3 or 4 days. The first 3 doses were with 1 cc of antigen, followed by doses of 2 cc until a total of 23 cc had been injected. During the immunization the animals of the lot receiving the active phage gained, on the average, 793.6 grams. Those of the lot receiving the phage with preservative gained, on the average, 639.4 grams. Seven days after the last treatment, a test dose of 1 cc of culture 687 diluted 1 to 10^5 was inoculated into the ear vein of each of the treated animals and 6 untreated control rabbits. Three days later 1 of the control rabbits was dead, but none of the others showed any evidence of infection. (A drop of the inoculum spread on blood agar plate had shown that the culture used for the inoculum had not grown as profusely as usual.) The animals were again inoculated with a dose of 1 cc of culture 687 diluted 1 to 10^5. Two days later, since the temperature records suggested that there might be several survivals among the control animals, a third test dose of 1 cc of the same culture diluted 1 to 10^4 was given.

The results of the experiment are presented in table 7. Of the control animals, 16⅔ percent survived; of those treated with active phage, 71.4 percent survived; and of those treated with phage containing merthiolate, 100 percent survived. These data confirm those of the previous experiments in showing that lytic filtrate B/687 is an effective immunizing agent under the conditions of these experiments; and they show that inactivation with merthiolate does not injure its antigenic property.

TABLE 7.—*Comparative immunity produced in rabbits by treatment with active lytic filtrate B/687 or phage inactivated with merthiolate. The test dose was streptococcus 687 in 5 successive treatments.* (*See the text.*)

Rabbit nos.	Treatment	Results	Percentage of survivals
134, 135, 136, 137, 138, 139, 140	Active phage	5 survived, 2 died, on the ninth and sixteenth days.[1]	71.4
141, 142, 143, 144, 145, 146, 147, 148	Phage inactivated with merthiolate.	All survived (1 had a high temperature for 6 days).	100
149, 150, 151, 152, 153, 154	None (controls)	1 survived, 5 died; 1 on the third, 2 on the eighth, 2 on the ninth days.	16.6

[1] The dates of death are calculated from the date of the first test dose. Streptococci were cultivated from the heart blood of all rabbits which died.

IMMUNIZATION VALUE OF A SINGLE DOSE OF LYTIC FILTRATE

D'Herelle reported that steers could be immunized against hemorrhagic septicemia (barbone) of the buffalo by a single injection of bacteriophage, and that this immunity was maintained for as long as 14 months. In one of the experiments which he reported, steers were protected against 1,000 surely fatal doses by a single injection of 0.25 cc of bacteriophage. Our next experiment was carried out to show whether immunity against experimental streptococcal infection in rabbits could be established with a single dose of bacteriophage.

EXPERIMENT 6

Seven rabbits were treated with a single injection of lytic filtrate B/639. The doses for the animals in each of two groups varied from 0.01 to 2 cc. For one group of 3 rabbits the interval between phage treatment and test dose of streptococcus was 1 month; for the other group of 4 rabbits the interval was 2 months. The 7 treated animals and 3 untreated control animals (the same 3 which served for controls for experiment 2) were inoculated with 0.1 cc of broth culture of streptococcus 639. The results of the experiment are given in table 8. The controls and 6 of the treated animals died between the third and tenth days. One treated rabbit which had received 2 cc of phage survived. Although none of four control animals which have been inoculated with as much as 0.1 cc of broth culture of strain 639 have survived (see table 1), the natural resistance of some rabbits to experimental infection with this strain must be considered in interpreting the significance of the one surviving animal.

TABLE 8.—*Lack of immunity resulting from treatment with a single dose of phage B/639. Test dose was 0.1 cc of streptococcus 639*

Rabbit no.	Quantity of phage in single treatment	Interval between treatment and test dose	Result
	Cc	*Days*	
67	2.0	63	High temperature for 9 days; recovered.
69	0.1	63	Died, third day.[1]
70	0.01	63	Died, fifth day.[2]
71	2.0	31	Died, tenth day.[2]
72	1.0	31	Died, fifth day.[1]
73	0.1	31	Died, fourth day.[1]
74	0.01	31	Do.[2]
79, 80, 81	None (controls).		All died, 2 on the third, 1 on the seventh day.[1]

[1] Streptococci were cultivated from the heart blood.
[2] No growth from heart blood.
[3] No growth from heart blood, but streptococci were cultivated from the spleen.

Streptococci failed to grow in cultures planted with the heart blood of 2 of the rabbits (nos. 70 and 71). They were cultivated from the spleen of no. 71, but plantings were not made from the organs of no. 70. A high temperature developed in rabbit 70 the day following inoculation, and the autopsy did not reveal any other cause for disease. Hence it appears that this animal died of streptococcus infection, and that in the case of both rabbits nos. 70 and 71 the presence of phage may have caused the streptococci to disappear from the blood. A similar observation was discussed in connection with experiment 2.

EXPERIMENT 7

An experiment similar to no. 6 was carried out to show whether a single dose of B/687 phage would protect against streptococcus 687. Four rabbits were treated with 2, 1, 0.1, and 0.01 cc of phage, respectively, 65 days previous to giving the test dose; and four more rabbits were treated with the same quantities of phage 24 days previous to giving the test dose. Four untreated control rabbits and the eight treated animals received a test dose of 0.0001 cc of streptococcus 687. There were no survivals. Streptococci were cultivated from the heart blood of all of them.

The results of experiments 6 and 7 may be summarized with the statement that treatment with a single dose of phage failed to protect rabbits against either streptococcus 639 or 687 under the conditions of the experiments.

THE PRODUCTION OF AGGLUTININS

Incidentally to the protection experiments, observations were made on the comparative response of agglutinating antibody in rabbits treated with lytic filtrate or with whole streptococcus cultures killed by heat. No report was found in the literature of similar com-

parative observations on the production of streptococcal agglutinins. Kendrick's review of the literature on the agglutinin response to injections with phage lysates of various other bacterial species points out that some investigators have reported that the antigenic value of bacterial substance dissolved by the action of phage is superior to the antigenic value of normal whole bacteria, whereas other investigators have reported the opposite results. Kendrick found that the agglutinin response to treatment with killed whole culture of *Salmonella suipestifer* was uniformly higher than the response to treatment with the corresponding phage lysates. The observations reported here are in agreement with those of Kendrick.

Samples of about 5 cc of blood were taken from the ear vein of the immunized rabbits on the day before the test dose was given (about a week after the last immunizing dose). The agglutinin content of the serum from these samples was determined, using samples of serum obtained from the same rabbits previous to the first immunizing dose as controls.

The agglutinating suspensions were prepared as follows: Cultures grown overnight in glucose broth were killed by heating at 56° C. for 1 hour. They were then centrifugated, washed with saline, and suspended in buffered saline of pH 7.0, so that the final turbidity was equivalent to 1,000 parts per million of the silica standard. One-half cc of bacterial suspension was added to a similar quantity of serum in falling dilutions. Readings were made after 4 hours in a water bath at 55° C. Any clumping visible through a hand lens was regarded as positive.

The serum from the animals of experiment 1 (see table 3), which received 16.5 cc of killed whole culture 639, contained agglutinins in titers varying from 1:400 to 1:3200. On the other hand, no agglutinins could be demonstrated in the serum of the animals of experiment 1, which received 16.5 cc of lytic filtrate B/639, although some of them were found to be immune to at least 100 lethal doses (see table 3). The serum of the animals of experiment 2, which received 61 cc of lytic filtrate B/639, contained agglutinins in low titers varying from 1:10 to 1:100.

The serum from the animals of experiment 3 (see table 4), which received 16.5 cc of killed whole culture 687, contained agglutinins in a titer of about 1:80, whereas those which received a similar quantity of bacterial substance dissolved by phage contained agglutinins only in the very low dilutions of 1:10 or 1:20, although they were immune to many times a lethal dose of streptococci.

D'Herelle warns against the repeated injection of phage for fear of developing a state of hypersensitivity against the specific organism, which he designates as "antiphylaxis." He quotes other authors

who have also observed this phenomenon. He states, however, that not all races of phage possess the property of causing antiphylaxis.

This hypersensitive state was never observed in the course of the experiments recorded here, neither in animals which received a course of treatment with streptococcus lytic filtrate nor in animals to which a single dose of lytic filtrate was given 1 or 2 months before the test dose. On the other hand, there was some evidence of a hypersensitive state in animals which received a single dose of lytic filtrate simultaneously with the test dose or 3 days previously. The data were given in the earlier publication (1933).

SUMMARY AND CONCLUSIONS

The following conclusions are based on the results obtained in immunity experiments with 2 strains of hemolytic streptococci and 1 race of bacteriophage. There were 63 treated rabbits and 19 treated mice used in the experiments, with adequate controls.

A higher percentage of rabbits were protected against lethal doses of streptococcus 639 by treatments with heat-killed culture than by treatments with culture lysed by phage.

The two kinds of vaccine proved to be equally efficacious in producing immunity against streptococcus 687 in both rabbits and mice.

Inactivation with merthiolate did not injure the antigenic property of streptococcus lytic filtrate.

There was no immunity produced in rabbits by a single treatment with phage given 1 or 2 months previous to the test dose.

The serum of rabbits immunized with phage showed agglutinins only in the very low dilutions of 1:10 or 1:20.

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PRINCIPLES OF SANITATION AND HYGIENE FOR A CORRECTIONAL INSTITUTION [1]

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Sanitation and hygiene in correctional institutions embrace, in general, all measures incident to the prevention of disease. They involve the application, under conditions peculiar to prison life, of all the principles relating to the preservation of health commonly described in the field of hygiene. They constitute a protective agency and in this sense differ from the practice of surgery or medicine, which aim to correct physical defects. Individual or personal hygiene usually includes such subjects as cleanliness of the body, exercise, and habits, while group hygiene refers to more extensive measures directed toward the welfare and protection of the population as a whole. Preventive medicine is regarded by some as a more comprehensive term applicable to all possible protective health measures, including immunization. Prevention of disease and protection of health of prison populations necessarily must include all measures pertaining to hygiene, sanitation, and preventive medicine. For our purposes the terms are synonymous.

It is impossible to describe in the present paper all the technical details and problems with which the prison health official is concerned. For instance, occasional health problems, such as managing an epidemic of meningitis or procedures incident to detecting carriers of communicable diseases, cannot be included. The present paper is more directly concerned with sanitation in the restricted sense as relating to environment. It deals with the removal or correction of obvious elements detrimental to the health of the prison community. It embraces routine health problems in which prison officials, medical officers, and inmates are daily and mutually concerned. In this

[1] Presented at the Conference on Medical and Psychiatric Services of the Federal Penal and Correctional System, held at Springfield, Mo., Sept. 13–15, 1934.

respect it resembles, to some extent, a treatise on municipal housekeeping.

The prison health officer is largely responsible for the development of sanitary measures. He is an agent who offers the prison community something of value in the form of health protection in return for a minimum expenditure of energy and work. The members of the prison population, like civilian communities, generally consider sanitation and public health good assets but frequently expect to get it free and are unwilling to work for it. It is well known that the removal of collections of filth, the development of pure water supplies, and the construction of extensive sewer systems have almost eradicated cholera from the cities of the United States and reduced typhoid fever to one-tenth of its former prevalence. Federal penal and correctional institutions are now equipped with satisfactory sewerage systems and pure water supplies. It remains for those concerned with the custody and health of these institutions to see that the water remains pure, that the sewerage systems function properly, and that filth and dirt do not accumulate.

A few examples of early prison construction still exist in the United States. The cells are small and contain no plumbing. There is little ventilation except that which comes through the heavily grated doors. Buckets with lids are used for toilet purposes, and a pail and cup provided for water. Largely due to poor sanitary conditions, severe outbreaks of typhoid, typhus or jail fever, cholera, and dysentery were frequent in early prison history. The cells of our Federal prisons are equipped with running water, toilet, and wash bowls. Only abouth one-fourth the time is required to keep them in a sanitary condition as compared with the bucket brigades of the older type of institutions. It is not only just and reasonable but one of the primary principles of prison sanitation that the modern cell should be free from objectionable odors and kept spotlessly clean.

The success of prison sanitary procedures is dependent on the united efforts of custodial and medical officers. The officials concerned with the enforcement of such measures naturally should have some conception of the reasons for them. The medical officer should endeavor to educate the prison community by taking pains to explain in nontechnical language what he wants done in each case and the reasons for doing it. Each inspection affords him an opportunity to instruct a number of persons. There is a tendency for them to pass the advice to others until eventually all know what is expected. Whenever possible, he will avoid dealing in personalities. The ideal reaction on the part of inmates, or others, with whom he deals, is achieved when there is left a state of mind which considers only the unsanitary condition while the medical officer and other officials are forgotten. The sanitary officer should be considered a friend rather

than a trouble maker or an enemy. The greatest source of his power is derived through favorable sentiment of the prison community. Such power and influence cannot be secured through threats or curt orders but rather through persistent effort and constructive work.

Various sanitary codes and regulations have been promulgated by municipalities and military and other organizations as guides in protective health practice. Such codes give reasons for health protective measures and the manner in which they should be carried out. They are designed for the health officer, the enforcement officer, and the layman. Every correctional institution needs similar regulations for the guidance of the prison sanitary officer, the administrative officers, and the prison population. The text of the code should be precise, yet complete, and couched in untechnical language which can be readily understood by all concerned. The clearer and simpler its form, the more useful it becomes. Revisions and additions are always in order when indicated. An outline of such a code, embracing the more important sanitary factors peculiar to prison life, follows.

SANITARY RULES AND REGULATIONS

All medical officers, guards, foremen, and others concerned are expected to familarize themselves with the following regulations and to see they are duly observed and enforced in their respective departments. A constant and high standard of sanitation and health can be maintained only when every employee charged with the care of inmates understands what is expected and is willing to do his part. When possible, sanitary irregularities or any existing condition detrimental to the health of the individual inmate or the population as a whole should be corrected, or reported at once. (Suggestions whereby further improvement may be achieved are always welcome.)

SANITARY INSPECTION

The chief sanitary officer, or his representative, will conduct formal tours of inspection at monthly intervals. He will be accompanied by the lieutenant of the day watch or other officer designated by the deputy warden. Inspection will include the living, eating, and working quarters of the inmate population as well as the grounds, buildings, and other parts of the institution. Special attention will be given to the storage, preparation, and handling of food, the waste disposal facilities, and the water supply.

The chief sanitary officer will act in an advisory capacity, making verbal recommendations concerning irregularities to the lieutenant of the day watch who is especially concerned with the enforcement of sanitary rules and regulations. When marked unhygienic conditions

are found which may affect the health of the prison population as a whole, or which are of such a nature as to require changes in plumbing or architecture, or other alterations involving expense, the matter will be presented to the warden in form of a special written report by the chief sanitary officer.

The guards in the cell-wings, kitchen, and elsewhere will be advised in advance of the time of formal inspection in order that lockers, boxes, and storerooms may be opened without delay. However, informal inspections may be held at any time and without notice, but will be conducted in such a manner as not to disturb or interfere with the duties of personnel unless conditions found warrant such action.

HEALTH PRECAUTIONS ON ADMISSION OF NEW INMATES

New inmates are immediately conducted to the dressing room in the cell-block, where they are divested of all clothing. The old clothing is to be kept entirely separate from the prison clothing and is either destroyed by burning or returned to the inmate's home without delay. A medical officer will inspect each new inmate, regardless of the hour, for the purpose of segregating men afflicted with communicable diseases and admitting those to the hospital who are ill. He will also supervise the bathing of new inmates and the application of mercurial ointment or other preventive measures against the spread of vermin. Due precautions will be observed in preventing contact between new inmates and the resident population. Any information relating to the exposure of new inmates to contagious diseases, while in jails or during transfer, obtained by guards or others should be immediately reported to the chief sanitary officer.

HEALTH PRECAUTIONS DURING PERIOD OF QUARANTINE

Inmates free from demonstrable disease will be held in admission quarantine, a section of the cell-house segregated from the remainder of the population, for a period of 30 days. During this period they will not be permitted to come in contact or mingle with the general population. However, they are permitted to visit the hospital, social service, educational and other agencies when necessary for study and classification purposes.

The physical and mental condition of new prisoners are usually poor, due to arrest, trial, commitment, deprivation of drugs or other stresses which they have recently experienced. Many of them are ignorant of the rudimentary principles of sanitation and hygiene even if they are able and willing to follow such measures. For this reason unusual patience and diligence must be exercised by guards and others in the observation, instruction, and discipline of new inmates. Unusual conduct on the part of new prisoners suggesting evidence of

mental disorder or any evidence indicating the development of disease of any kind must be reported without delay.

The quarantine quarters will be inspected at frequent intervals by a medical officer for evidence of the development of disease among new arrivals. The sanitation of quarantine cells is to be carried out in a manner similar to the methods described below under "cell-sanitation." It is obvious that the proper start of the new inmate, while confined in quarantine, has a favorable influence not only in connection with his reaction toward sanitary and health matters but on his general adjustment when assigned elsewhere in the institution.

THE CARE OF LIVING QUARTERS OR SANITATION OF CELLS

Inmates spend more than half their time in their cells. It is obvious that such living quarters should always be kept as clean and inviting as possible. The condition and color of the walls have an intangible but definite affect upon many of the occupants. The paint should be of a subdued tone and kept in good condition. Pictures, clippings, or other articles must not be nailed or pasted on the cell walls. Such practice not only defaces the surface of the walls but provides unnecessary collecting points for dust and vermin. Authorized pictures may be suspended from a string stretched along the wall between two nails in the upper corners of the cell. The cell walls must not be defaced with drawings, writing, or dirt.

The lighting must be kept as uniform as possible throughout the various cells. Daylight illumination must not be obstructed by hanging shelves, calendars, mirrors, or pictures on the bars. Poor illumination at night is frequently due to the collection of dust and dirt on the electric-light bulb. It must be kept clean at all times.

Mattresses and bedding will be routinely removed from each cell once weekly and hung over the railing for a period of one half day. This measure insures proper airing and drying of bedding and is very helpful in eliminating obnoxious odors. All linen must be changed at weekly intervals. During winter months the temperature should be kept between 65° and 75° F. The ventilator must be kept free from dust, dirt, and obstructions. It should never be covered with pictures, shelves, or other objects. The wash and toilet bowls must be kept scrupulously clean. For this purpose each cell should be furnished with one bar of cleansing compound each month. The collection of old newspapers, magazines, books, extra clothing, bottles, and other objects which tend to decrease air space and collect dust and vermin is prohibited.

The cell must be properly swept, bowls cleaned, and bed made each morning before the occupant leaves. Defects in plumbing, especially leaking pipes or obstruction to the water supply, must be reported and corrected without delay. The use of insecticide sprays and blow

torches as measures for the eradication of vermin should be used weekly unless other means are prescribed by the chief sanitary officer.

SANITATION OF THE BARBER SHOP AND BATH HOUSE

Shaving cups and brushes, razors, and hair brushes may collect bacteria from a person on whom they are used. An instrument may pick up pus germs from minute pimples on the face and transfer them to another person. The organisms of ringworm and barbers itch may be thus transferred. For this reason all cups, lather brushes, and tools, except steel tools which might be injured thereby, must be thoroughly cleansed in hot water in each instance before using. Hair brushes and all other brushes and tools which might be injured by cleansing in hot water must be kept clean and in a sanitary condition at all times.

After serving a person who has eruptions on the face or scalp, the barber shall thoroughly sterilize all metal tools, brushes, and combs that have been used on such person in a 2 percent lysol solution for 15 minutes before using such articles again. Every barber shall thoroughly cleanse his hands with soap and water before serving each person. No barber shall be assigned to the barber shop for duty who is afflicted with an infectious or communicable disease which, in the judgment of the prison health officials, renders him unfit for such duty. A steam towel may be used for more than one person, provided it is folded and reversed in such a manner that only an unexposed portion of the towel comes in contact with the face of each person, except that a towel used on a person with a skin eruption on the face must not be used on another person before being laundered.

The barber shop must be supplied with running hot and cold water, be adequately drained, and kept in a clean and sanitary condition. Sanitary inspections will usually be made during working hours.

The bath room is more extensively used than the barber shop. The majority of inmates are permitted to have safety razors and shave themselves. Practically all inmates patronize the common bath room. Each inmate is required to bathe once weekly. Exceptions are made in the case of kitchen workers, certain labor gangs, and shop workers who are permitted to bathe more frequently.

The facilities provided for the ventilation and drainage of the bath room must be kept in good condition and placed in constant operation on bathing days. All plumbing and bathing fixtures must be kept in working order. Following the use of the bath room, the floors, seats, and walls must be thoroughly scrubbed. The floors and seats shall be sprinkled with 12 percent sodium thiosulphate solution twice weekly during the summer months and once weekly during the winter months as a preventive measure against the spread of ringworm

infection. Ordinary sprinkling cans such as used for plants may be used for this purpose.

The stimulating effect of a good bath and clean clothing under sanitary conditions on the inmates moral sense cannot be over-estimated.

FOOD, DINING ROOM, AND KITCHEN

The nutritive requirement for inmates has been carefully calculated and compiled by authorities on diet in the Bureau of Prisons. The sanitary officer will do his utmost to cooperate with the steward and prison administration in regard to the preparation and serving of the "standard ration" in an inviting and sanitary manner. Food supplies will be inspected at intervals at the time of receipt, storage, and preparation. Special attention will be given to the cleanliness of storerooms, bakeries, refrigerating rooms, kitchen, and dining room.

The sanitary officer will be guided by the "Regulations Governing the Meat Inspection of the United States Department of Agriculture" in connection with the sanitation of premises used for storing meat and the acceptance or rejection of meat received for prison use. Raw milk must conform to the requirements described in "The Standard Milk Ordinance and Code recommended by the United States Public Health Service for Adoption by Cities." Fortunately most contractors who bid on milk abide by this code and there is usually but little cause to worry about the condition of milk when delivered. Due precautions must be observed in the handling and storage of milk supplies after they are received.

No inmates shall be permitted to work in the dining room or kitchen or handle food who, in the judgment of the health officials, are so afflicted with disease as to constitute a menace to the prison population.

Other matters which fall within the province of sanitation of the kitchen and eating quarters of inmates are the methods employed in washing and sterilizing dishes and tableware, the cleanliness of floors, walls, and tables, the methods in force for the eradication of ants, cockroaches, flies, and other pests, and the proper management and disposal of garbage and waste.

INDUSTRIAL HYGIENE AND SANITATION

The physical welfare of inmates assigned to work in the factories and shops is to be safeguarded. Some of the most important points which have a bearing on this matter are as follows:

1. The protection of workers from harmful dust, fumes, and poisonous chemicals and gases.
2. The construction of guards for dangerous machinery.
3. The installation of devices for stopping machinery quickly or automatically in case of accident.

4. Many inmate workers have but little knowledge of trade dangers, take no precautions, and are careless or indifferent.

The chief sanitary officer shall be an active member of the safety council committee, which is guided by the recommendations of the National Safety Council, of which the Bureau of Prisons is a member. The sanitary officer will be especially concerned with the records and reporting of injuries and illness due to occupation.

MENTAL HYGIENE

All concerned with the custody and care of inmates encounter certain mental health problems which have a definite bearing on such tangible matters as suicide, injury to others, or destruction to property. The detection and disposition of obvious mental defects such as feeblemindedness, epilepsy, or active hallucinations is clear. They are entirely medical problems. On the other hand, there is a large group of inmates in every correctional institution afflicted with border-line mental defects or abnormal personalities.

If at the time of examination such characteristic symptoms as irritability, inability to control the passions, suspicion, resentfulness, depression, and general egocentric tendencies can be demonstrated, there can be but little doubt concerning the type of inmate at hand. Such symptoms, although slight in themselves, gain additional significance when found associated. A few afflicted inmates at the time of primary examination, or even throughout the period of quarantine, are on their guard and give no history or evidence of mental instability. They are occasionally passed as normal and take their place in the general prison population. Under conditions peculiar to prison life such inmates frequently react with more or less characteristic behavior which is inconsistent with efficiency. They are usually persons who are unable to render proper service when assigned to duty. They constitute a source of trouble, and no system yet devised will make them adequate. They are especially prone to episodes during periods of disappointment or trouble, such, for example, as bad news from the outside or denial of parole. Occasionally they show suicidal, antagonistic, or destructive tendencies. It is important, therefore, that they be properly classified as soon as possible and admitted to the psychopathic ward or assigned to living quarters and positions as nearly in keeping with their mental fitness as possible. With this end in view all medical officers, guards, foremen, and others should report the following types of cases:

1. Inmates showing unusual difficulty in learning their work or general instructions, when not clearly due to unfamiliarity with the English language.
2. Persistently delinquent, irresponsible, obtuse inmates.
3. Inmates who are unusually eccentric, seclusive, or taciturn.

4. Those showing marked emotional instability, i. e., too easily moved to tears, anger, or noisy elation.

5. Those indulging in or suspected of abnormal sexual practices.

6. Those having fainting spells.

7. Persistent bed wetters.

8. Chronic ailers showing no evidence of organic disease, neurotic individuals, or suspected malingerers.

9. Apathetic, negligent, untidy, or otherwise seemingly objectionable individuals.

10. Those showing undue excitement, depression, shyness, timidity, stupidity, sleeplessness, tendency to sleep walking or other characteristics which may gain for them the title of "boob", "crank", "nut", and the like.

It is desirable that the report be in written form and in terms of the observed facts. It is important that observations be made quietly and unobtrusively so that the inmate shall not know his mental condition is under question and that the matter be kept from becoming a subject of gossip. Guards and foremen often appreciate the value of psychiatric examinations as much as medical officers. This is because they rate the men under their charge in terms of conduct, behavior, and efficiency, which involves a standard equivalent to that of the psychiatrist, who estimates and predicts conduct from the mental make-up of the inmate.

Some officers are reluctant to submit written reports on the conduct and behavior of men under their charge. The sanitary officer, during tours of inspection, has an opportunity to inquire about the progress and mental health of inmates in the various parts of the institution. Officers should be impressed with the importance of the detection of mental abnormalities in the early stage. All reports should be treated seriously even if poorly founded. Failure to act on a given case, even though it proves to be unimportant, may discourage the officer from further effort.

MISCELLANEOUS

There are numerous other health protective measures with which the prison health officer and others are concerned. Reference will be made to only a few of them, as follows:

Ventilation, heating, and lighting of shops, school rooms, and buildings.

Sanitation of shop lavatories.

Proper drainage of grounds.

Prevention of collections of refuse on the institution grounds.

Provisions for and care of receptacles for cigarette stubs and other refuse.

Abatement of nuisances, such as unnecessary odors, smoke, and noise.

Discouraging of the taming and maintaining of pets such as rats, mice, and birds.

Collection and disposal of institutional waste and garbage according to accepted sanitary practice.

Seasonal campaigns against flies, mosquitoes, and other pests.

COURT DECISION ON PUBLIC HEALTH.

City held liable for sewage pollution of stream.—(Oklahoma Supreme Court; *City of Edmond* v. *Billen et al.*, 38 P.(2d) 564; decided Dec. 11, 1934.) In an action against a city in which the plaintiffs complained of the action of the city in dumping sewage into a natural watercourse running through the farm of the plaintiffs, one paragraph of the syllabi by the supreme court reads as follows:

Where a municipal corporation discharges sewage into a river or creek, polluting the water of the stream, causing it to become foul and impregnated with noxious and poisonous substances, rendering it unfit for domestic or other uses, and thereby creating and maintaining a nuisance, which is detrimental to the health, comfort, and repose of a lower riparian owner and diminishes the value or destroys an established business of such riparian owner, such municipal corporation is liable for damages arising from the maintenance of such nuisance.

The judgment of the trial court in favor of the plaintiffs was affirmed.

DEATHS DURING WEEK ENDED JAN. 19, 1935

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

	Week ended Jan. 19, 1935	Corresponding week, 1934
Data from 86 large cities of the United States:		
Total deaths	9,334	8,860
Deaths per 1,000 population, annual basis	13.0	12.3
Deaths under 1 year of age	629	578
Deaths under 1 year of age per 1,000 estimated live births	58	53
Deaths per 1,000 population, annual basis, 3 weeks of year	13.5	12.7
Data from industrial insurance companies:		
Policies in force	67,102,924	67,487,068
Number of death claims	16,247	16,515
Death claims per 1,000 policies in force, annual rate	12.6	12.8
Death claims per 1,000 policies, 3 weeks of year, annual rate	10.9	10.9

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

Reports for Weeks Ended Jan. 26, 1935, and Jan. 27, 1934

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 26, 1935, and Jan. 27, 1934

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934
New England States:								
Maine	2	2	7	2	191	1	0	0
New Hampshire	1			1	6	67	0	0
Vermont					1	35	0	0
Massachusetts	6	18			271	1,521	0	0
Rhode Island	4	3	3	1	31	2	0	0
Connecticut	3	6	42	40	419	14	0	1
Middle Atlantic States:								
New York	60	59	[1] 17	[1] 25	823	629	6	1
New Jersey	23	25	54	30	139	135	0	1
Pennsylvania	61	81			1,697	1,667	4	3
East North Central States:								
Ohio	66	44	205	8	428	263	15	0
Indiana	29	36	164	55	626	220	0	4
Illinois	45	38	125	56	1,925	214	5	11
Michigan	18	11	39	1	270	47	0	2
Wisconsin	3	13	140	46	765	299	2	0
West North Central States:								
Minnesota	5	7	2	3	1,207	137	0	1
Iowa	4	7	48	18	1,066	80	2	0
Missouri	59	63	423	39	441	785	7	1
North Dakota	7	5	11	3	67	166	2	1
South Dakota	3				59	317	1	0
Nebraska	8	11	6		232	78	1	0
Kansas	11	13	40	6	735	61	3	0
South Atlantic States:								
Delaware		5	6			87	0	0
Maryland [2]	5	7	339	33	64	48	1	1
District of Columbia	7	11	32	5	23	156	3	0
Virginia	16	26			582	570	5	2
West Virginia	34	19	233	63	372	27	1	0
North Carolina	35	41	374	109	728	2,423	1	1
South Carolina	5	13	1,226	744	28	336	0	0
Georgia [3] [4]	14	19	1,324	134		1,271	2	1
Florida	6	15	52		25	43	1	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 26, 1935, and Jan. 27, 1934—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934
East South Central States:								
Kentucky	14	18	156	7	621	68	4	0
Tennessee	21	16	805	141	96	772	9	3
Alabama [4]	21	42	1,196	161	162	240	2	1
Mississippi [3]	2	9					0	0
West South Central States:								
Arkansas	10	7	69	25	18	461	2	1
Louisiana	29	26	12	20	81	41	0	0
Oklahoma [5]	8	34	187	89	82	580	5	2
Texas [4]	75	179	697	234	154	741	2	5
Mountain States:								
Montana	6	2	787	4	56	11	0	0
Idaho			7	1	29	45	0	0
Wyoming		1			69	79	0	0
Colorado	8	5		10	695	14	0	0
New Mexico	5	7	72		61	133	4	0
Arizona	4	3	147	15	14	11	0	2
Utah [3]					10	777	0	0
Pacific States:								
Washington					94	425	2	0
Oregon	3	1	219	40	80	35	0	0
California	51	32	407	32	239	763	4	3
Total	797	980	9,673	2,201	15,782	16,895	96	49

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934
New England States:								
Maine	0	0	2	19	0	0	0	0
New Hampshire	0	0	11	26	0	0	0	0
Vermont	0	0	29	10	0	0	0	2
Massachusetts	1	1	153	265	0	0	1	0
Rhode Island	0	0	13	17	0	0	0	1
Connecticut	0	1	46	53	0	0	2	1
Middle Atlantic States:								
New York	0	2	666	715	0	0	3	5
New Jersey	1	0	129	201	0	0	0	8
Pennsylvania	1	1	602	775	0	0	6	15
East North Central States:								
Ohio	3	1	642	461	1	0	1	5
Indiana	0	0	211	181	2	3	6	0
Illinois	0	1	812	552	3	1	3	7
Michigan	0	0	343	463	1	0	3	4
Wisconsin	1	1	640	206	12	31	2	0
West North Central States:								
Minnesota	2	1	88	63	0	3	1	6
Iowa	0	0	73	102	1	4	2	2
Missouri	0	0	77	144	2	17	0	2
North Dakota	0	0	36	39	0	0	0	0
South Dakota	0	1	44	29	4	1	0	0
Nebraska	0	1	57	32	38	1	2	1
Kansas	1	0	78	156	7	1	2	4
South Atlantic States:								
Delaware	0	0	22	13	0	0	0	0
Maryland [3]	0	0	100	98	0	0	1	2
District of Columbia	1	0	29	18	0	0	0	0
Virginia	1	0	53	99	1	1	5	13
West Virginia	0	0	134	79	1	0	2	7
North Carolina	0	2	49	89	0	1	0	2
South Carolina	0	0	4	17	0	1	2	4
Georgia [3] [4]	0	0	19	16	0	5	2	6
Florida	0	0	10	9	0	0	0	3

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Jan. 26, 1935, and Jan. 27, 1934—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934	Week ended Jan. 26, 1935	Week ended Jan. 27, 1934
East South Central States:								
Kentucky	0	1	51	74	0	0	1	3
Tennessee	0	1	41	55	0	0	1	9
Alabama [4]	2	1	16	24	3	0	2	11
Mississippi [3]	0	0	15	18	0	0	1	3
West South Central States:								
Arkansas	0	0	10	15	2	22	4	0
Louisiana	0	0	36	37	1	3	4	7
Oklahoma [5]	1	0	53	23	6	2	5	2
Texas [4]	1	0	110	104	2	14	14	11
Mountain States.								
Montana	0	0	28	25	2	0	1	2
Idaho	0	0	5	4	1	7	0	0
Wyoming	0	0	12	7	12	0	0	0
Colorado	0	0	240	38	2	1	1	0
New Mexico	0	0	23	71	0	0	3	13
Arizona	0	1	20	17	0	1	1	0
Utah [2]	0	0	72	13	0	0	0	0
Pacific States:								
Washington	1	2	59	52	49	4	1	2
Oregon	0	0	70	56	0	5	1	1
California	11	4	216	292	3	11	12	7
Total	28	23	6,249	5,872	156	140	98	171

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Dengue, week ended January 26, 1935, 8 cases in Georgia.
[4] Typhus fever, week ended January 26, 1935, 7 cases, as follows: Georgia, 3; Alabama, 2; Texas, 2.
[5] Exclusive of Oklahoma City and Tulsa.

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	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
December 1934										
Alabama	8	135	738	290	475	58	1	109	7	32
Arizona	2	12	152	2	137	-------	1	153	0	20
Colorado	5	34	-------	-------	1,423	-------	0	866	3	1
Idaho	1	1	44	-------	27	-------	0	14	2	5
Iowa	4	36	66	-------	3,081	-------	2	246	9	14
Kansas	8	45	22	-------	1,314	-------	2	379	9	8
Louisiana	3	123	38	106	67	8	4	83	5	53
Maryland	-------	71	302	-------	317	3	1	448	0	17
Mississippi	-------	44	5,203	1,446	166	202	-------	78	4	20
Montana	12	32	51	-------	272	-------	2	99	2	3
New York	16	205	-------	3	2,896	-------	9	1,929	0	45
Oklahoma [1]	3	70	553	34	11	14	2	205	3	49
Oregon	2	4	214	-------	84	-------	6	278	6	6
Pennsylvania	14	506	-------	-------	4,600	-------	7	2,461	0	99
Puerto Rico	-------	53	102	2,093	42	-------	2	1	0	11
Virginia	8	238	734	3	836	11	2	487	16	44
Washington	4	16	192	-------	290	-------	16	194	170	7

[1] Exclusive of Oklahoma City and Tulsa.

December 1934

	Cases
Anthrax:	
Pennsylvania	1
Botulism:	
New York	3
Washington	1
Chicken pox:	
Alabama	248
Arizona	114
Colorado	371
Idaho	55
Iowa	476
Kansas	723
Louisiana	71
Maryland	610
Mississippi	616
Montana	164
New York	3,241
Oklahoma [1]	91
Oregon	293
Pennsylvania	5,469
Puerto Rico	43
Virginia	359
Washington	528
Conjunctivitis:	
Arizona	3
Dengue:	
Alabama	23
Mississippi	1
Dysentery:	
Alabama (amoebic)	1
Arizona	7
Kansas (amoebic)	1
Louisiana (amoebic)	7
Louisiana (bacillary)	3
Maryland	6
Mississippi (amoebic)	58
New York (amoebic)	7
New York (bacillary)	39
Oklahoma [1]	18
Pennsylvania	2
Puerto Rico	21
Washington	2
Dysentery and diarrhea:	
Virginia	45
Epidemic encephalitis:	
Iowa	2
Kansas	3
Louisiana	2
Oklahoma [1]	1
Oregon	2
Pennsylvania	2
Virginia	3
Washington	1
Filariasis:	
Puerto Rico	3
Food poisoning:	
Kansas	1
German measles:	
Arizona	11
Iowa	55
Kansas	177
Maryland	11
Montana	653
New York	466
Pennsylvania	136
Washington	133
Hookworm disease:	
Louisiana	3
Mississippi	219
Impetigo contagiosa:	
Colorado	10
Idaho	1

December 1934—Con.

	Cases
Impetigo contagiosa—Con.	
Iowa	1
Kansas	7
Maryland	60
Montana	8
Oklahoma [1]	1
Oregon	46
Leprosy:	
Louisiana	1
Mumps:	
Alabama	77
Arizona	21
Colorado	53
Idaho	3
Iowa	342
Kansas	201
Louisiana	2
Maryland	46
Mississippi	206
Montana	173
Oklahoma [1]	25
Oregon	314
Pennsylvania	2,108
Puerto Rico	49
Virginia	83
Washington	153
Ophthalmia neonatorum:	
Alabama	2
Maryland	1
New York	10
Oklahoma [1]	1
Pennsylvania	15
Puerto Rico	1
Virginia	1
Washington	1
Paratyphoid fever:	
Idaho	4
New York	1
Oregon	1
Virginia	2
Washington	2
Puerperal septicemia:	
Mississippi	16
Puerto Rico	3
Rabies in animals:	
Alabama	64
Kansas	1
Louisiana	10
Maryland	5
New York [2]	1
Washington	11
Rabies in man:	
Louisiana	1
Pennsylvania	1
Relapsing fever:	
Arizona	1
Scabies:	
Kansas	1
Montana	9
Oklahoma [1]	2
Oregon	37
Septic sore throat:	
Colorado	1
Idaho	1
Iowa	1
Kansas	12
Louisiana	8
Maryland	11
Montana	22
New York	26
Oklahoma [1]	29
Virginia	6

December 1934—Con.

	Cases
Tetanus:	
Alabama	3
Kansas	1
Louisiana	4
New York	3
Oklahoma [1]	1
Puerto Rico	5
Virginia	3
Tetanus, infantile:	
Puerto Rico	4
Trachoma:	
Alabama	2
Arizona	43
Mississippi	3
Oklahoma [1]	3
Puerto Rico	3
Trichinosis:	
New York	29
Tularaemia:	
Iowa	1
Kansas	12
Louisiana	5
Maryland	25
Oklahoma [1]	1
Pennsylvania	1
Virginia	19
Typhus fever:	
Alabama	22
Louisiana	3
Maryland	1
New York	1
Undulant fever:	
Alabama	3
Arizona	1
Idaho	1
Iowa	7
Kansas	5
Louisiana	3
Maryland	3
New York	30
Pennsylvania	9
Virginia	4
Vincent's infection:	
Colorado	1
Idaho	1
Iowa	1
Kansas	1
Maryland	11
Montana	2
New York [2]	62
Oklahoma [1]	2
Oregon	27
Whooping cough:	
Alabama	207
Arizona	102
Colorado	46
Idaho	12
Iowa	59
Kansas	194
Louisiana	22
Maryland	174
Mississippi	561
Montana	42
New York	2,875
Oklahoma [1]	25
Oregon	83
Pennsylvania	2,359
Puerto Rico	319
Virginia	445
Washington	47

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended Jan. 19, 1935

[This table summarizes the reports received regularly from a selected list of 121 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference]

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								
Maine:											
Portland	0		0	1	5	1	0	0	0	11	30
New Hampshire:											
Concord	0		0	0	0	1	0	1	0	0	13
Nashua	4			0		2	0			3	
Vermont:											
Barre											
Burlington	0		0	0	0	9	0	0	0	0	7
Massachusetts:											
Boston	5		4	5	32	33	0	8	1	44	230
Fall River	1		0	205	3	3	0	0	0	3	22
Springfield	0		0	13	3	7	0	0	0	6	38
Worcester	0		0	3	11	10	0	1	0	7	57
Rhode Island:											
Pawtucket	0		0	0	0	2	0	0	0	0	14
Providence	4		0	1	7	12	0	4	0	5	63
Connecticut:											
Bridgeport	0		2	0	4	5	0	2	0	0	41
Hartford	2		0	136	4	9	0	5	0	11	35
New Haven	0	6	1	34	6	1	0	1	0	0	57
New York:											
Buffalo	0		1	53	26	75	0	0	0	30	140
New York	31	29	13	122	174	266	0	90	5	274	1,607
Rochester	0		1	91	4	18	0	1	0	25	65
Syracuse	0		0	0	4	5	0	0	0	27	51
New Jersey:											
Camden	3		3	0	4	6	0	3	0	1	41
Newark	1	18	0	7	13	8	0	4	1	38	100
Trenton	0	4	2	20	2	17	0	3	0	8	46
Pennsylvania:											
Philadelphia	6	19	12	8	52	95	0	23	0	155	555
Pittsburgh	4	17	5	83	26	31	0	3	0	23	177
Reading	0		0	2	1	17	0	3	0	5	29
Scranton	1			54		2	0		0	5	
Ohio:											
Cincinnati	5		7	2	29	32	0	10	0	3	172
Cleveland	10	149	10	37	39	41	0	12	0	36	241
Columbus	4	6	6	53	11	39	0	6	0	5	99
Toledo	0	2	2	27	10	12	0	3	0	25	79
Indiana:											
Fort Wayne	1		2	3	2	6	0	2	0	0	29
Indianapolis	5		5	2	14	17	0	2	0	3	
South Bend	0		0	42	7	0	0	0	0	2	21
Terre Haute	0		0	0	0	0	0	0	0	0	17
Illinois:											
Chicago	4	20	10	156	88	355	0	33	2	57	737
Springfield											
Michigan:											
Detroit	4	37	4	67	49	87	0	21	0	32	318
Flint	4		1	33	8	14	0	1	0	3	26
Grand Rapids	0		0	19	3	13	0	1	0	10	50
Wisconsin:											
Kenosha	0		0	47	0	20	0	0	0	21	11
Madison	0			9		1	0		0	0	6
Milwaukee	0	6	1	137	12	346	0	2	0	65	109
Racine	0	1	1	0	0	7	0	0	0	1	13
Superior	0		2	17	0	0	0	0	1	0	10
Minnesota:											
Duluth	0		0	170	3	0	0	0	0	0	24
Minneapolis	4		0	871	12	27	0	2	0	11	104
St. Paul	1	1	1	18	16	12	1	4	0	14	87
Iowa:											
Davenport	0			16		2	0		0	0	
Des Moines	0			14		10	0		0	0	47
Sioux City	1			7		0	0		0	3	
Waterloo	2			39		4	0		0	2	

City reports for week ended Jan. 19, 1935—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								
Missouri:											
Kansas City	1		0	7	19	12	0	5	0	0	119
St. Joseph	6		1	0	6	1	0	3	1	0	32
St. Louis	18	4	1	9	29	12	0	11	0	8	250
North Dakota:											
Fargo	0		0		2	5	0	0	0	6	11
Grand Forks	0			5		3	0		0	0	
South Dakota:											
Aberdeen	0			7		0	0		0	0	
Sioux Falls	1		0	4	3	4	0	1	0	2	27
Nebraska:											
Omaha	0		1	2	13	13	0	0	0	0	50
Kansas:											
Topeka	0		0	4	7	5	1	0	0	9	17
Wichita	1		0	17	6	1	0	0	1	0	23
Delaware:											
Wilmington	0		0	1	3	1	0	0	0	0	22
Maryland:											
Baltimore	2	49	12	5	41	36	0	18	0	27	290
Cumberland	0		0	12	1	3	0	1	0	0	10
Frederick	0		0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	12	14	4	4	33	25	0	18	2	4	177
Virginia:											
Lynchburg	1		1	132	2	4	0	1	0	2	9
Norfolk	1		0	4	3	4	0	1	0	2	27
Richmond	0		3	67	15	4	0	5	2	0	68
Roanoke	2		2	6	2	4	0	0	0	2	27
West Virginia:											
Charleston	1	2	1	29	3	3	0	1	0	1	18
Huntington	3			3		3	0		0	0	
Wheeling	0	1	1	5	3	19	0.	1	0	0	21
North Carolina:											
Raleigh	1		0	7	1	2	0	1	0	0	18
Wilmington	0		0	2	1	0	0	0	0	1	7
Winston-Salem	6	1	0	0	5	4	0	1	0	24	20
South Carolina:											
Charleston	0	126	2	1	4	0	0	0	0	1	19
Columbia	0	0		0	10	0	0	0	0	0	44
Greenville	0		0	0	6	0	0	1	0	0	28
Georgia:											
Atlanta	2	144	9	0	17	4	0	5	0	8	111
Brunswick	0		0	0	2	0	0	0	0	0	2
Savannah	0	202	10	0	6	4	0	4	0	0	37
Florida:											
Miami	0	1	0	1	1	1	0	1	0	4	
Tampa	3	1	1	0	2	0	0	0	0	0	30
Kentucky:											
Ashland	0			1		0	0		0	3	
Lexington	2		0	0	1	2	0	2	0	3	23
Louisville	3	8	3	16	12	10	0	2	0	5	70
Tennessee:											
Memphis	2		3	1	22	8	0	4	0	1	104
Nashville	3		3	0	8	1	0	2	0	8	42
Alabama:											
Birmingham	1	69	2	3	11	7	0	6	0	1	66
Mobile	1		2	0	3	0	0	1	0	0	33
Montgomery	0			7		0	0		0	0	
Arkansas:											
Fort Smith	1			0		1	0		0	3	
Little Rock	3		1	1	7	0	0	2	0	0	10
Louisiana:											
New Orleans	25	1	1	2	18	9	0	11	2	0	155
Shreveport	1		0	25	4	0	0	3	0	0	28
Oklahoma:											
Oklahoma City	1		0	0	10	0	0	0	1	0	47
Tulsa	1			0		3	0		0	5	
Texas:											
Dallas	14	2	2	1	11	2	0	3	1	0	67
Fort Worth	4		0	0	2	2	0	4	0	0	31
Galveston	1		0	0	3	1	0	1	0	0	20
Houston	16		1	0	11	7	0	5	0	0	78
San Antonio	0		5	0	3	1	0	4	0	0	51

City reports for week ended Jan. 19, 1935—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								
Montana:											
Billings	2			6		1	0		0	0	10
Great Falls	0		0		3	1	0	0	0	2	13
Helena	0		0	34	0	0	0	0	0	0	6
Missoula	0	10	0		1	0	0	0	0	1	1
Idaho:											
Boise											
Colorado:											
Denver	4	51	6	330	14	154	1	6	0	1	95
Pueblo	0		1	6	1	4	0	0	0	2	7
New Mexico:											
Albuquerque	1		4	3	5	2	0	5	0	3	23
Utah:											
Salt Lake City	0		3	6	3	69	0	2	0	40	38
Nevada:											
Reno	0	1	1	0	1	1	0	0	0	0	7
Washington:											
Seattle	0		1	6	8	5	3	4	0	3	83
Spokane	0	3	3	50	7	3	0	1	1	0	40
Tacoma	0		0	1	0	3	15	1	0	0	25
Oregon:											
Salem	0	2		0		0	5		0	0	
California:											
Los Angeles	21	161	2	10	28	64	9	16	0	11	382
Sacramento	1	1	0	0	5	3	0	2	1	0	27
San Francisco	1	2	2	1	17	25	0	9	1	18	188

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Kansas:			
Boston	1	0	0	Wichita	0	1	0
Connecticut:				Maryland:			
Bridgeport	1	1	0	Baltimore	3	0	0
New York:				District of Columbia:			
New York	5	3	0	Washington	1	0	0
Pennsylvania:				South Carolina:			
Philadelphia	3	1	0	Greenville	0	1	0
Ohio:				Kentucky:			
Cincinnati	9	3	0	Louisville	0	1	0
Cleveland	0	0	1	Tennessee:			
Indiana:				Memphis	5	1	0
Indianapolis	3	0	0	Arkansas:			
Illinois:				Little Rock	2	0	0
Chicago	5	2	0	Louisiana:			
Wisconsin:				New Orleans	1	0	1
Milwaukee	2	0	0	Oklahoma:			
Minnesota:				Oklahoma City	2	1	0
St. Paul	0	0	1	Texas:			
Iowa:				San Antonio	0	1	0
Des Moines	1	0	0	Washington:			
Missouri:				Seattle	1	0	2
St. Joseph	3	1	0	California:			
St. Louis	1	1	0	Los Angeles	0	0	2
				Sacramento	0	0	1

Dengue.—Cases: Miami, 2.
Epidemic encephalitis.—Cases: Springfield, Mass., 1; Bridgeport, 1; New York, 2; Columbus, 1; Chicago, 1; Memphis, 1; St. Louis, 2; Birmingham, 1; New Orleans, 2; Albuquerque, 2.
Pellagra.—Cases: Savannah, 1; Dallas, 1.
Typhus fever.—Cases: Baltimore, 1; Charleston, S. C., 2; Atlanta, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended January 12, 1935.—During the 2 weeks ended January 12, 1935, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1		2		1			1	5
Chicken pox				425	597	126	100	31	140	1,419
Diphtheria	1	11	3	43	16	20	12	4		110
Dysentery				1	2					3
Erysipelas				19	4	5	2	1	5	36
Influenza		10		7	48	7			91	163
Lethargic encephalitis								1		1
Measles		90	5	615	550	1,208	841	9	75	3,393
Mumps					285	24		5	42	356
Paratyphoid fever					1					1
Pneumonia		3			10		5		34	52
Poliomyelitis					2			1	1	4
Scarlet fever	1	13	8	294	184	63	32	28	57	680
Tuberculosis		2	12	104	54	27	48	2	26	275
Typhoid fever		2		38	3	16		1		60
Undulant fever					3		2			5
Whooping cough		5		223	170	16	23	2	51	490

CUBA

Habana—Communicable diseases—4 weeks ended January 19, 1935.—During the 4 weeks ended January 19, 1935, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	4	3	Scarlet fever	1	
Malaria	[1] 31	7	Tuberculosis	20	4
Poliomyelitis	1	1	Typhoid fever	[1] 14	5

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended January 12, 1935.—During the 4 weeks ended January 12, 1935, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1		1	7	1		10
Chicken pox		5			1	2	8
Diphtheria		3	2	1			6
Hookworm disease				1			1
Leprosy				1		3	4
Malaria	419	50	526	1,576	748	1,846	5,165
Measles		29		8		3	40
Poliomyelitis	4		1			2	7
Scarlet fever		1					1
Tuberculosis	5	9	28	45	9	22	118
Typhoid fever	2	4	6	25	15	10	62

CZECHOSLOVAKIA

Communicable diseases—November 1934.—During the month of November 1934, certain communicable diseases were reported in Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	2	1	Paratyphoid fever	11	1
Cerebrospinal meningitis	1		Poliomyelitis	3	
Chicken pox	431		Puerperal fever	38	13
Diphtheria	5,220	306	Scarlet fever	3,504	23
Dysentery	199	55	Trachoma	129	
Influenza	42	4	Typhoid fever	810	68
Malaria	36				

ITALY

Communicable diseases—4 weeks ended June 24, 1934.—During the 4 weeks ended June 24, 1934, certain communicable diseases were reported in Italy as follows:

Disease	May 28–June 3		June 4–10		June 11–17		June 18–24	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	8	8	23	23	22	19	16	15
Cerebrospinal meningitis	12	11	12	11	5	3	9	8
Chicken pox	323	126	245	117	232	109	233	108
Diphtheria and croup	353	197	387	208	349	177	323	169
Dysentery	18	9	19	16	14	12	19	15
Lethargic encephalitis	4	4	1	1	1	1		
Measles	2,416	370	2,359	400	2,046	410	2,035	387
Poliomyelitis	16	15	25	22	37	26	22	16
Scarlet fever	230	103	251	99	213	85	193	84
Typhoid fever	248	166	344	220	367	229	443	264

VIRGIN ISLANDS

Notifiable diseases—October–December 1934.—During the months of October, November, and December 1934, cases of certain notifiable diseases were reported in the Virgin Islands, as follows:

Disease	October	November	December	Disease	October	November	December
Chicken pox		1		Pellagra		1	
Filariasis	4	3	4	Sprue		1	
Gonorrhea	8	5	3	Syphilis	7	12	4
Leprosy	2		10	Tetanus	1	2	
Malaria		14	6	Tuberculosis	3	1	2

YUGOSLAVIA

Communicable diseases—December 1934.—During the month of December 1934, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	38	2	Poliomyelitis		1
Cerebrospinal meningitis	7	1	Scarlet fever	425	4
Diphtheria and croup	1,337	148	Sepsis	11	6
Dysentery	38	6	Tetanus	18	4
Erysipelas	207	9	Typhoid fever	786	88
Measles	3,210	92	Typhus fever	17	
Paratyphoid fever	15	1			

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

(NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for Jan. 25, 1935, pp. 115-129. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued Feb. 22, 1935, and thereafter, at least for the time being, in the issue published on the last Friday of each month.)

Cholera

India.—Cholera has been reported in India as follows: On December 17, 1934, cholera was reported present in Porto Novo, Madras Presidency. On January 19, 1935, one case of cholera was reported in Tuticorin, India.

Plague

Ecuador—Loja Province—Amaluza—Correction.—The Ecuador authorities have withdrawn the diagnosis of plague in the case reported in Amaluza, Province of Loja, as published on page 93 of the PUBLIC HEALTH REPORTS for January 18, 1935, and on page 117 of the PUBLIC HEALTH REPORTS for January 25, 1935.

India—Bombay.—During the week ended January 19, 1935, one case of plague was reported in Bombay, India.

Smallpox

Brazil—Recife.—During the week ended December 15, 1934, one case of smallpox was reported at Recife, Brazil.

Formosa—Keelung.—On January 10, 1935, an outbreak of smallpox was reported at Keelung, Formosa.

Somaliland (French)—Djibouti.—During the week ended January 19, 1935, five cases of smallpox were reported at Djibouti, French Somaliland.

Typhus fever

Chile.—According to a report dated January 8, 1935, typhus-fever control work has been abandoned in Chile because of lack of funds with which to continue the campaign. It was stated that practically no decrease had been noted recently in the number of cases of typhus fever in Santiago, the chief focal point of the epidemic.

Yellow fever

Gold Coast—Aperadi.—During the week ended January 19, 1935, one case of yellow fever was reported at Aperadi, Gold Coast.

Nigeria—Kano.—On December 31, 1934, one case of yellow fever was reported at Kano, Nigeria.

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