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USING TESTS AS A MEDIUM FOR HEALTH EDUCATION [1]

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Health educators are constantly on the lookout for new and effective educational devices to use for disseminating scientific information on the prevention of disease and improvement of the health of the general public. They realize that as educators they succeed or fail in proportion to their ability to reach a large audience and stimulate it to an active interest in the subject matter. They further recognize variety in presentation as an important factor in attracting the attention and arousing the interest of the public. Since health educators need a number of techniques, this paper describes a new method developed as a byproduct of a research study [2] carried on cooperatively by the American Museum of Health and the United States Public Health Service in the Medicine and Public Health Building at the New York World's Fair, 1939.

One of the objectives of the study was to determine the extent of health information possessed by adult visitors to the fair. For this purpose data were collected at an exhibit booth (called "The Quiz Corner") in the Medicine and Public Health Building at which visitors were invited to take an objective health-information test. During the course of the Fair seven forms of tests containing in all 225 questions were given. The tests covered the following subjects: (*a*) Prevention and treatment of communicable and chronic diseases; (*b*) prevention and treatment of common minor ailments; (*c*) nutrition; (*d*) health superstitions; (*e*) patent medicines; and (*f*) vital statistics. The questions were of either the true-false or multiple-choice type and the visitor was asked to underline the correct answer in the space provided.[3]

[1] From the Division of Public Health Methods, National Institute of Health.

[2] The Visitor Reaction Study was undertaken as a means of obtaining objective data as a guide to the future planning of exhibits. It was supported by a grant from the Carnegie Corporation of New York. A detailed description of the Study will be given in the complete report which is now in preparation.

[3] For true-false questions, the instructions were, "Read each of the following statements. If you think a statement is true, blacken the space marked 'T' on the line on the answer sheet numbered the same as the statement; if you think the statement is false, blacken the space marked 'F.'"

For multiple-choice questions, the instructions were "In each question underline one answer which you think is best."

The following are typical questions constructed on the above subjects:

1. A child will not contract syphilis from a syphilitic mother if she has been given adequate treatment during her pregnancy ..... T F
2. Athlete's foot is a very common ailment which is highly contagious (catching) ..... T F
3. Feed a cold and starve a fever is a good rule to follow when one has a cold or fever ..... T F
4. Halitosis (bad breath) cannot be cured by mouth washes ..... T F
5. Surgery, radium, and X-rays are the three most effective methods of treating cancer ..... T F
6. Pellagra is caused by—
   unsanitary living conditions | eating no red meat or green vegetables | an unknown germ | eating too much rich food
7. The disease with the highest death rates in infancy and in old age is—
   pneumonia | tuberculosis | heart disease
8. A lump in any part of the body which begins to grow should be—
   examined by a doctor | let alone unless it becomes painful | treated with a salve and bandaged
9. Habitual constipation is frequently corrected by—
   taking cathartics | taking enemas habitually | proper diet
10. The most important single item in the treatment of tuberculosis is—
    medicine | diet | rest

The response of the public to the invitation to take these tests was most gratifying. Motivated by curiosity, competition, or the opportunity for participation 35,000 individuals took some form of the seven tests. Frequently "The Quiz Corner" was unable to accommodate the large number of persons wishing to be tested.

Each test form, after being marked by the visitor, was placed in a test-scoring machine provided through the courtesy of the International Business Machines Corporation. By pressing a button the operator could read the number of correct answers on a dial and give the visitor a numerical score, such as "39 correct out of 50 questions," or "16 correct out of 25."

Although this method of giving and scoring tests served the purposes of the study in that it provided a large number of responses to behavioral health questions from a heterogeneous sample of the general public,[4] it did not satisfy those who had taken the tests. They wanted to know more than numerical scores. Not only did they want all the correct answers, but frequently they insisted on finding out which of their answers was wrong and why. This demand for answers suggested educational possibilities in the technique. Accordingly, it was decided to prepare a set of answers for one of the tests and determine experimentally its usefulness.

The answers as prepared not only gave the correct response to each question, but also attempted to explain the answer and give some of

[4] Test results by age, sex, and residence of visitors will be given in subsequent paper.

its implications for individual health behavior. For example, the multiple-choice statement, "The most important single item in the treatment of tuberculosis is (*a*) medicine, (*b*) diet, (*c*) rest" was not considered "answered" by stating simply that rest is the most important single factor in tuberculosis therapy. From the standpoint of health education, such didactic information would be of little significance to the individual who took the test, unless there were also an adequate explanation of *why* "rest" is the correct choice. Even so, the visitor, it was felt, would soon forget an answer limited to spot information devoid of contextual meaning. Therefore, the following paragraph was given as the answer to the question.[5]

When tuberculosis germs enter the body, nature rushes to prevent the spread of the organisms. The germ has a waxy, protective coating which our body defenses cannot break down. Instead, the body tries to build a wall of hard, protective tissue around the germ so as to block it off. To build protective tissue, the body's first requirement is *rest*, just as an injured member must be put at complete rest when a bone is broken. Since breathing itself is strenuous exercise for a sick lung, *rest in bed is the most important step toward recovery* in tuberculosis of the lungs. When we are resting in bed, we breathe less deeply and less rapidly than when we are up and about. The lungs get more rest. To help the body carry on the healing process, a good nourishing *diet* is also needed. (So far, science has not discovered any medicine that will cure tuberculosis.) Doctors give medicines to tuberculous patients only to strengthen recuperative powers or relieve distressing symptoms. Patients should take medicine only under a doctor's orders. No patent medicines will cure tuberculosis. Many patent medicines contain drugs that are actually harmful to the tuberculous patient.

When answers had been prepared for one of the tests, they were mimeographed and each participant was given a set of answers after his test was scored.[6] Careful observation of the behavior of persons receiving the forms revealed that the answers were kept and read and not thrown away. As a result of this successful experiment, sets of answers were prepared for the remaining six test forms. These sets have been and are being mailed to the persons who took the tests and requested the answer sheets.

Since the method described has proved effective in a research situation focused on testing the public's information rather than on stimulating interest in health education, its usefulness could be improved by rephrasing questions to serve the latter objective. Furthermore, if tests are intended for educational rather than research purposes, the questions used need not be such as have only one unequivocally correct answer. Tests could be constructed containing statements which

[5] The Study gratefully acknowledges the assistance of Miss Mary Connolly, Director, Division of Health Education, Detroit Department of Health; Dr. Norman R. Goldsmith; and The Information Service, Division of Sanitary Reports and Statistics of the U. S. Public Health Service in preparing the paragraphs of information for the 225 questions used. The Study is also grateful to the New York World's Fair for duplicating the answers that had been prepared.

[6] The effect of this procedure on the research results was carefully checked. The visitors' scores were not materially higher on days when answers were given out than on other days.

are true, partly true, or false, depending on the factual situation to which they are applied. For example, the statement, "A successful vaccination produces immunity to smallpox" could be used even though its truth or falsity is a function of the additional factors of time and repetition of vaccination. Test questions might well be based upon statements about which there is widespread disagreement among health educators. For example, inclusion of such a highly debatable statement as, "If an expectant mother drinks alcohol her child will have poor health" would permit the answers to contain a discussion of the existing research information on the known effects of drinking alcohol even though science has not definitely proved the truth or falsity of the statement. Hence, in other than research situations, the procedure is quite flexible and can be adapted to many varieties of subject matter.

As a means of health education, the technique of testing and providing answers to test questions may be used in any exhibit situation in which the number of visitors is large enough to warrant having an attendant at a quiz booth. Elaborate designing and artistic construction of the booth are completely unnecessary, and the cost of tests and answer forms is relatively low. One health officer has already announced a plan to use the technique as part of a public-health exhibit in a State fair in 1940.

The test-answer technique has a number of features which tend to ensure its success.

(1) It utilizes the present very widespread interest in test situations. Significant evidence of this interest may be found in the former popularity of "Ask-Me-Another" publications and, more recently, of radio quiz programs, currently rated as appealing to the largest audiences on the air.

(2) The competition present in a test situation is a powerful incentive toward taking tests and reading the answers to compare results. Groups of individuals approach a test competitively; each person strives to show superiority over others in the group. A person, not part of a group, frequently competes against the unknown; tries to get the highest score or, if less confident, tries to exceed the average score.

(3) The test-answer technique permits active public participation in an interesting form of health education. It arouses curiosity which accelerates learning. There is only a slight difference of form between a pamphlet of information and a set of answers covering the same subject matter; but the latter is a much more effective educational instrument. Interest in the informational aspect of the test is stimulated by answering or attempting to answer the questions. An individual may pay little, if any, attention to a conventional presentation of factual material on cancer, syphilis, tuberculosis, nutrition,

or preventive health services, for example, but he is interested in the answers to a test he has taken. Furthermore, he is chiefly concerned with the answers he did not know or the answers about which he had some doubt. The motivation for learning is therefore directed to the subject matter in which learning is necessary.

SUMMARY

A technique for educating the public in health by means of testing and providing answers to test questions was developed as a byproduct of a study conducted cooperatively by the American Museum of Health and the Public Health Service at the Medicine and Public Health Building at the New York World's Fair. It is suggested as an effective, simple, and inexpensive procedure applicable to other mass health education situations.

SIPHONAPTERA: NOTES ON TWO CALIFORNIA SPECIES[1]

By Wm. L. Jellison, *Assistant Parasitologist, United States Public Health Service*

Carteretta carteri Fox 1927 was described from a single male and *Monopsyllus fornacis* Jordan 1937 was described from 2 females. A large series of fleas from the Hastings Natural History Reservation in Monterey County, Calif., received recently through the courtesy of Dr. J. M. Linsdale, Director of the Reservation, contained specimens of both sexes of these species.

Carteretta carteri Fox[2]

The male flea from which this species was described was collected on a wood rat, *Neotoma fuscipes*, at Los Angeles, Calif., in 1925.

Female.—The head is shown in figure 1. Characteristic of this genus is the genal ctenidia of 3 heavy spines of which the second nearly covers the first. Eyes well pigmented in both sexes in contrast to description by Fox. Antennal groove continuous across the dorsum of the head. Labial palpi 5-jointed, extending about two-thirds the length of anterior coxae. Pronotal ctenidia of about 16 spines. Fine bristles on lower two-thirds of inner coxal surface near the anterior edge. Five plantar bristles on all tarsi, first pair placed between second pair. Apical spinelets on tergites 1 to 5. Antepygidial bristles 3 on each side, inner one shortest. Length of style about 4 times its basal width, tapering, with single long terminal bristle. Three stout, straight, spine-like bristles near ventral angle of anal sternite. Sternite 7 is shown in figure 1. It bears no sinus, sclerifica-

[1] From the Rocky Mountain Laboratory, Hamilton, Mont., Division of Infectious Diseases, National Institute of Health.

[2] Transactions of the American Entomological Society, 53: 209-210 (1927).

tion, or prominent lobe on the posterior margin. Receptaculum seminis is figured.

Allotype female from *Peromyscus maniculatus*, Hastings Natural History Reservation, Monterey County, Calif., November 28, 1938, was deposited in the collection of the Rocky Mountain Laboratory.

The modified abdominal segments of the male were described by Fox but not illustrated. The clasper and sternite 9 are therefore figured (fig. 1).

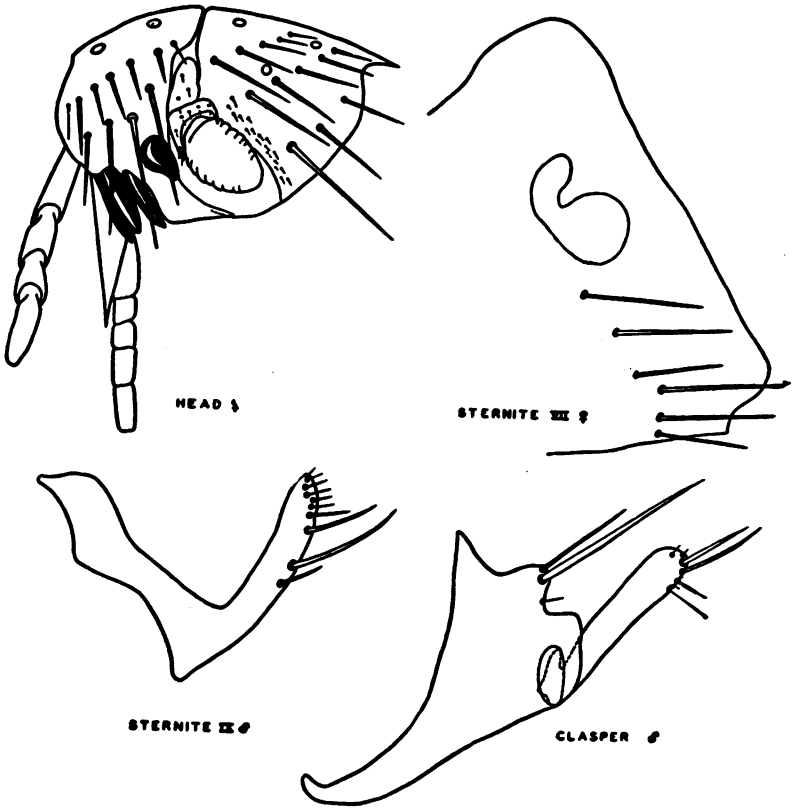

FIGURE 1.—*Carteretia carteri.*

The collection from the Hastings Reservation, received from Dr. J. M. Linsdale, contained the following specimens: Two males and 1 female (allotype) from *Peromyscus maniculatus*, 2 hosts, December 1938, November 1939; 1 male from *Peromyscus truei*, 1 host, January 1939; and 7 males, 10 females from *Perognathus californicus*, 9 hosts, October, November, and December 1938, April 1939.

Monopsyllus fornacis Jordan [3]

Two females collected on *Sciurus griseus*, Seven Oaks, San Bernardino County, Calif., formed the type series of this species. The holotype female is deposited at the Rocky Mountain Laboratory.

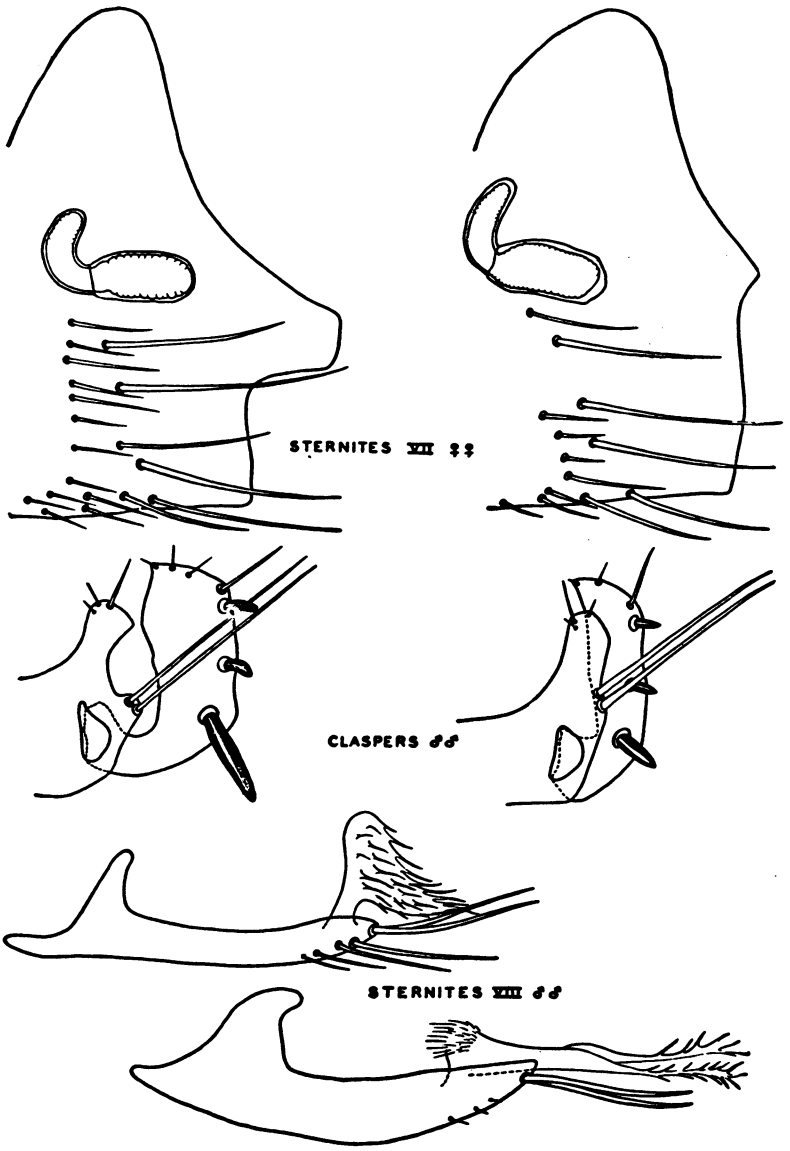

FIGURE 2.—*Monopsyllus eumolpi* (left). *Monopsyllus fornacis* (right).

Male.—The male, like the female, shows very close relationship to *M. eumolpi* (Rothschild) 1905, but the differences are considered

[3] Novitates Zoologicae, 40: 263 (1937), text figure 45.

sufficient to warrant its retention as a valid species, especially when compared with specimens of *M. eumolpi* from California. In males of both species the first segment of the mid tarsus is elongate and bears on its posterior side a very characteristic fringe of long thin bristles. *M. fornacis* differs from *M. eumolpi* mainly in the modified abdominal segments which are figured for both species (fig. 2). In *M. fornacis* the immovable process of the clasper is longer and broader. The movable process is narrower. The spines on the latter are shorter, heavier, and straight, in contrast to slightly curved spines in *M. eumolpi*. Sternite 8 is broader, shorter, and has fewer ventral bristles. It bears a pair of posteriorly projecting filamentous plumes.

The seventh sternite of the female is also refigured for *M. fornacis* and *M. eumolpi* (fig. 2).

Allotype male from *Eutamias merriami*, Hastings Natural History Reservation, Monterey County, Calif., July 18, 1939, was deposited in the collection of the Rocky Mountain Laboratory. The collection from Hastings Reservation also contained 5 males and 24 females collected in April, June, and July 1939 from 12 chipmunks, *E. merriami*, which appeared to be the normal hosts.

SPECIMENS FIGURED

Carteretta carteri, male from *Peromyscus truei*, female (allotype) from *Peromyscus maniculatus*, Hastings Natural History Reservation, Monterey County, Calif.

Monopsyllus eumolpi, male and female from *Eutamias* sp., Alpine County, Calif.

Monopsyllus fornacis, male (allotype) and female from *Eutamias merriami*, Hastings Natural History Reservation, Monterey County, Calif.

ORNITHODORUS HERMSI: FEEDING AND MOLTING HABITS IN RELATION TO THE ACQUISITION AND TRANSMISSION OF RELAPSING FEVER SPIROCHETES [1]

By GORDON E. DAVIS, *Bacteriologist*, and MARY E. WALKER, *Laboratory Assistant*, *United States Public Health Service*

Two species of *Ornithodorus* with which we have worked extensively, viz, *O. turicata* and *O. parkeri*, feed only once between molts. However, we have found that during the winter months the immature stages of *O. hermsi* may feed several times without molting and that incident to these multiple intermolting feedings this tick may acquire and transmit spirochetes.

[1] From the Rocky Mountain Laboratory, Hamilton, Mont., Division of Infectious Diseases, National Institute of Health.

In January 1937, 30 *O. hermsi* first stage nymphs engorged on a normal white rat. The nymphs failed to molt within the usual period and were given further opportunities to feed. Ten died without molting or further feeding. Of the remaining 20, 16 engorged from 2 to 4 times before molting. Seven engorged from 2 to 3 times in the second nymphal stage, and 4 engorged from 2 to 3 times in the third stage. These findings suggested a study of spirochete transmission in conjunction with this multiple feeding habit between molts.

In June 1938, two series of observations were started, one by the junior author (experiment 1) in the Hamilton, Mont., laboratory and the other by the senior author (experiment 2) in a temporary laboratory at Laramie, Wyo. The Hamilton laboratory is located at an elevation of approximately 3,500 feet and the Wyoming laboratory at about 7,000 feet. The latter is well within the usual elevation range of *O. hermsi*.

Immediately after feeding all larvae were placed in individual shell vials, numbered serially, and stored in humidity jars at room temperature. Daily observations were made for molts.

EXPERIMENT 1 (FIGURE 1)

On June 22 and 24, 1938, 45 larvae engorged on a white rat infected with a *hermsi* strain of spirochetes. Eighteen died at the time of molting. Of the remaining 27, 23, as first nymphs, were allowed to feed again on a white rat infected with the same strain. Only 20 ticks, 13 females and 7 males, survived to the adult stage.

Multiple feeding between molts began in October when the ticks were in the second and third nymphal stages. In the second stage, 3 engorged 3 times and one 4 times. The remaining 15 fed only once as second stage nymphs but each engorged 3 times in the third stage. These feeding periods covered the months of October, November, and December, and ended in January. The ticks were then placed in a room at a daytime temperature of approximately 80° F. Molting, at this temperature, began in late January and February.

Transmission.—Thirteen (65 percent) of the 20 ticks that survived to the adult stage transmitted spirochetes 1 or more times, while 7 (35 percent) failed in transmission. Of the 13 females, 61 percent were positive, and of the 7 males, 71 percent. Six (46 percent) of the "positive" ticks transmitted spirochetes one or more times during the multiple feeding period.

EXPERIMENT 2 (FIGURES 2 AND 3)

One hundred and six larvae from 3 successive lots of eggs deposited (June, July, and August) by the same female were used. Thirty-eight died at the larval or first nymphal molt and 3 additional deaths

TICK NO.	1	T	4	T	5	T	6	T	7	T	10	T	11	T	12	T	14	T	16	T
LARVAL FEEDING	6-22-38 C		6-22-38C		6-22-38C		6-22-38C		6-22-38C		6-22-38C		6-22-38C		6-22-38C		6-22-38C		6-22-38C	
MOLT	24		26		20		22		21		20		20		21		26		22	
1-ST NYMPHAL FEEDING	7-19-38C		7-21-38C		7-19-38C		7-25-38C		7-19-38C		7-19-38C		7-21-38C		7-19-38C		7-25-38C		7-19-38C	
MOLT	14		16		13		14		11		20		13		15		27		16	
2-ND NYMPHAL FEEDING	8-11-38	+	8-12-38	-	8-12-38	-	8-15-38	+	8-11-38	-	8-12-38	+	8-13-38	-	8-12-38	+	9-29-38 11-16-38 1-11-39	- - -	8-12-38	+
MOLT	18		15		17		17		18		20		16		17		27		19	
3-RD NYMPHAL FEEDING	9-27-38 11-9-38 12-29-38	+ + -	9-28-38 11-12-38 12-30-38	+ + -	9-29-38 11-16-38 1-11-39	- - -	9-29-38 11-16-38 1-5-39	+ + -	9-29-38 11-16-38 1-11-39	- - -	9-29-38 11-9-38 1-6-39	+ - -	9-29-38	-	9-29-38 11-16-38 12-20-38	+ - -	2-10-39	-	9-28-38 11-12-38 12-16-38	+ + +
MOLT	28♀		26 ♂		27♀		24♀		29♀		24♀		34♀		37♂		24♀		38 ♂	
4-TH NYMPHAL FEEDING																				
MOLT																				
ADULT FEEDING	2-2-39	+	2-2-39	+	2-10-39	-	2-2-39	+	2-15-39	+	2-3-39	+	11-30-38	-	2-10-39	-	3-8-39	+	1-25-39 2-15-39	+ +

C = ENGORGED ON WHITE RATS INFECTED WITH CALIFORNIA (HERMSI) STRAIN OF SPIROCHETES.
T = TRANSMISSION
NUMBERS IN MOLT (HORIZONTAL) COLUMN = NUMBER OF DAYS AFTER LAST FEEDING.
♂ OR ♀ INDICATE THE SEX OF THE TICK FOLLOWING THIS MOLT.

FIGURE 1.—Infective blood meals in larval and first nymphal stages, multiple feedings in second and third nymphal stages.

TICK NO.	18	T	19	T	20	T	21	T	22	T	23	T	25	T	26	T	29	T	30	T
LARVAL FEEDING	6 - 22 - 38C		6 - 22 - 38C		6 - 22 - 38C		6 - 22 - 38C		6 - 22 - 38C		6 - 22 - 38C		6 - 24 - 38C		6 - 24 - 38C		6 - 24 - 38C		6 - 24 - 38C	
MOLT	20		22		21		21		25		26		29		19		29		24	
1ST NYMPHAL FEEDING	7 - 19 - 38C		7 - 25 - 38C		7 - 25 - 38C		7 - 19 - 38C		7 - 19 - 38C		7 - 25 - 38	−	6 - 12 - 38	+	7 - 19 - 38C		6 - 12 - 38	+	6 - 15 - 38	−
MOLT	17		16		18		11		15		13		14		11		14		17	
2ND NYMPHAL FEEDING	6 - 12 - 38	+	6 - 15 - 38	−	6 - 15 - 38	−	6 - 12 - 38	−	6 - 12 - 38	−	6 - 15 - 38	−	9 - 26 - 38 11 - 16 - 38 12 - 30 - 38 1 - 26 - 39	− − − −	6 - 11 - 38	−	9 - 26 - 38 10 - 16 - 38 1 - 6 - 39	+ − −	9 - 29 - 38 11 - 16 - 38 1 - 12 - 39	− − −
MOLT	17		18		17		19		19		18		21 ♀		18		22		22	
3RD NYMPHAL FEEDING	9 - 29 - 38 11 - 9 - 38 12 - 30 - 38	+ − +	9 - 29 - 38 11 - 16 - 38 12 - 30 - 38	+ + −	9 - 29 - 38 11 - 12 - 38 1 - 8 - 39	+ − −	9 - 26 - 38 11 - 16 - 38 1 - 11 - 39	− − −	9 - 6 - 38 11 - 16 - 38 1 - 11 - 39	− − −	9 - 29 - 38 11 - 16 - 38 1 - 11 - 39	− − −			9 - 29 - 38 10 - 16 - 38 1 - 12 - 39	− − −	2 - 1 - 39	−	2 - 10 - 39	−
MOLT	29 ♂		31 ♂		25 ♀		28 ♀		29 ♀		29 ♂				23 ♀		22 ♀		19 ♂	
4TH NYMPHAL FEEDING																				
MOLT																				
ADULT FEEDING	2 - 1 - 39	+	2 - 15 - 39	+	2 - 2 - 39	−	2 - 10 - 39	−	2 - 15 - 39	+	2 - 15 - 39	−	2 - 23 - 39	+	2 - 15 - 39	−	3 - 1 - 39	+	3 - 9 - 39	−

FIGURE 1.—Concluded. (See notes following first section of figure).

TICK NO.	2	T	3	T	5	T	6	T	7	T	8	T	10	T	11	T	12	T	14	T
LARVAL FEEDING	5-31-38C	–	6-1-38C	–	6-9-38C	–	6-9-38C	–	6-9-38C	–	6-9-38C	–	6-4-38C	–	6-9-38C	–	6-4-38C	–	6-9-38C	–
MOLT	18		21		14		14		14		14		14		15		15		15	
1ST NYMPHAL FEEDING	7-4-38C		7-27-38C		8-20-38C		7-8-38C		8-27-38C		7-12-38C		7-2-38C		7-16-38C		7-5-38C		7-5-38C	
MOLT	12		14		16		11		19		13		12		14		14		10	
2-ND NYMPHAL FEEDING	7-19-38C		8-15-38C	–	7-16-38C		7-19-38C		7-16-38C		7-16-38C		7-16-38C		8-15-38	+	8-15-38	+	7-27-38C	
MOLT	20				25		28		20		21		22		17		17		13	
3-RD NYMPHAL FEEDING	8-12-38	+	9-27-38 11-16-38 1-12-39	– – –	8-16-38	–	9-28-38 11-16-38 1-11-39	– + –	8-10-38	–	9-28-38 11-12-38 1-5-39	+ – +	8-12-38	+	9-28-38	+	9-29-38	+	8-16-38	–
MOLT	9 ♂		26		18 ♂		30 ♂		24 ♀		20 ♂		20 ♀		25		25		18 ♀	
4-TH NYMPHAL FEEDING			2-10-39	–											11-12-38 1-5-39	– –	11-12-38 1-5-39	– –		
MOLT			24 ♀												20 ♂		20 ♂			
ADULT FEEDING	9-28-38 11-9-38 1-6-39	+ + +	3-8-39	–	9-27-38 10-21-38 11-16-38 1-11-39	– + + +	2-15-39	+	9-27-38 11-16-38 1-12-39	– – –	2-1-39	+	9-28-38 10-19-38 11-16-38 12-30-38	+ + + –	2-2-39	+	2-2-39	+	9-27-38	–

C = ENGORGED ON WHITE RATS INFECTED WITH CALIFORNIA (HERMSI) STRAIN OF SPIROCHETES

T = TRANSMISSION

NUMBERS IN MOLT (HORIZONTAL) COLUMN = NUMBER OF DAYS AFTER LAST FEEDING
♂ OR ♀ INDICATE THE SEX OF THE TICK FOLLOWING THIS MOLT.

FIGURE 2.—Infective blood meals in larval and first nymphal stages or in first and second nymphal stages, multiple feedings in third and fourth nymphal stages.

TICK NO.	18	T	22	T	23	T	24	T	25	T	26	T	27	T	28	T	29	T	30	T
LARVAL FEEDING	8-9-38	–	7-2-38C		7-2-38C		7-2-38C		7-2-38C		7-2-38C		7-2-38C		7-2-38C		7-2-38C		7-2-38C	
MOLT	17		13		18		13		12		13		18		13		11		13	
1ST NYMPHAL FEEDING	7-4-38C		7-17-38C		7-27-38C		7-19-38C		7-17-38C		7-17-38C		7-27-38C		7-19-38C		7-19-38C		7-17-38C	
MOLT	13		15		13		19		14		15		14		17		15		15	
2-ND NYMPHAL FEEDING	7-19-38C		8-10-38		8-11-38	–	8-16-38	+	8-15-38	+	8-10-38	+	8-11-38	+	8-10-38	–	8-10-38	–	8-10-38	+
MOLT	21		19		16		16		19		17		21		16		19		19	
3 RD NYMPHAL FEEDING	8-16-38	+	9-26-38 11-16-38 1-12-39	– – +	9-26-38 11-16-38 2-10-39	– – –	9-26-38 11-16-38 1-12-39	– – –	9-27-38 11-16-38	+ +	9-26-38 11-12-38 12-16-38	+ + +	9-26-38 11-16-38 1-6-39	+ + +	9-26-38 11-12-38 12-29-38	+ + +	9-26-38	–	9-26-38 11-12-38 1-5-39	+ – –
MOLT	21♂		23♀		30		23♀		27♀		41♂		22♂		31♀		30♀		24♂	
4-TH NYMPHAL FEEDING					3-15-39															
MOLT					16♂															
ADULT FEEDING	9-27-38 11-16-38 1-5-39	+ – –	2-10-39	+	4-5-39	–	2-15-39	–	1-5-39	+	2-1-39	+	2-1-39	+	2-2-39	+	11-30-38	–	2-2-39	+

FIGURE 2.—Continued. (See notes following first section of figure.)

TICK NO.	31	T	33	T	36	T	38	T	43	T	48	T	50	T	51	T	52	T	53	T
LARVAL FEEDING	7-8-38C		7-2-38C		7-2-38C		7-2-38C		7-2-38C		7-4-38C		7-4-38C		7-4-38C		7-4-38C		7-4-38C	
MOLT	13		14		17		16		14		12		15		15		18		13	
1-ST NYMPHAL FEEDING	7-19-38C		7-19-38C		7-27-38C		7-19-38C		7-19-38C		7-27-38C		7-27-38C		7-27-38C		7-27-38C		7-27-38C	
MOLT	16		17		13		17		19		13		13		13		13		13	
2-ND NYMPHAL FEEDING	8-10-38	-	8-10-38	-	8-12-38	-	8-15-38	-	8-12-38	+	8-11-38	-	8-11-38	-	8-11-38	-	8-11-38	-	8-11-38	-
MOLT	24		17		17		17		17		18		20		18		16		21	
3-RD NYMPHAL FEEDING	9-27-38 10-21-38 11-16-38 1-8-39	- + - +	9-28-38 11-16-38 1-11-39	- - -	9-28-38 11-12-38 1-5-39	+ - -	9-28-38 11-16-38 1-5-39	+ + +	9-28-38 11-16-38 1-5-39	- + -	9-28-38	-	9-26-38 11-16-38 1-11-39	- - -	9-28-38 11-12-38 12-30-38	+ - -	9-28-38 11-16-38 1-11-39	- - -	9-28-38	-
MOLT	27 ♂		26 ♀		28 ♀		29 ♀		27 ♂		26 ♀		21 ♀		23 ♂		29 ♂		26	
4-TH NYMPHAL FEEDING																			11-30-38	-
MOLT																			30 ♂	
ADULT FEEDING	2-23-39	+	2-10-39	-	2-10-39	-	2-10-39	+	2-15-39	-	11-30-38	-	2-10-39	-	2-3-39	+	2-15-39	-	1-27-39	-

FIGURE 2.—Continued. (See notes following first section of figure.)

TICK NO.	54	T	55	T	57	T	58	T	59	T	60	T	61	T	68	T				
LARVAL FEEDING	7-4-38C		7-4-38C		7-4-38C		7-4-38C		7-4-38C		7-4-38C		7-4-38C		7-8-38C					
MOLT	13		19		15		15		15		15		15		14					
1ST NYMPHAL FEEDING	7-27-38C		7-27-38C		7-27-38C		7-27-38C		7-27-38C		7-27-38C		7-27-38C		7-27-38C					
MOLT	13		13		16		13		13		13		14		13					
2ND NYMPHAL FEEDING	8-11-38	−	8-15-38	+	8-15-38	−	8-11-38		8-15-38	+	8-17-38	−	8-16-38	−	8-11-38	−				
MOLT	21		19		19		23		22		20		18		20					
3RD NYMPHAL FEEDING	9-28-38	−	9-27-38	+	9-27-38	+	9-27-38	−	9-27-38	+	9-27-38	+	9-27-38	−	9-26-38	−				
	11-16-38	−	11-16-38	+	11-9-38	−	11-16-38	−	11-16-38	+	11-9-38	−	11-16-38	−	11-16-38	−				
	1-11-38	−	12-30-38	−	12-29-38	+	1-12-38	−	12-12-38	+	12-30-38	−	1-11-39	−	1-11-39	−				
MOLT	24♂		29♂		21♂		24♀		40♂		30♀		24♀		32♀					
4TH NYMPHAL FEEDING																				
MOLT																				
ADULT FEEDING	2-10-39	−	2-1-39	+	1-28-39	+	2-10-39	+	2-1-39	−	2-2-39	+	2-15-39	−	2-17-39	−				

FIGURE 2.—Concluded. (See notes following first section of figure.)

TICK NO.	69	T	70	T	71	T	72	T	75	T	76	T	77	T	78	T	80	T	81	T
LARVAL FEEDING	8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38	
MOLT	15		14		15		16		16		15		15		16		18		18	
1-ST NYMPHAL FEEDING	9 - 26 - 38	-	9 - 27 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-	9 - 26 - 38 11 - 16 - 38	- -	9 - 26 - 38	-	9 - 26 - 38	-
MOLT	16		16		17		16		16		16		16		69		16		17	
2-ND NYMPHAL FEEDING	10 - 19 - 38 11 - 14 - 38C 12 - 30 - 38	- - -	10 - 19 - 38 11 - 14 - 38C 12 - 30 - 38	- - -	10 - 20 - 38 11 - 14 - 38C 12 - 30 - 38	- - -	10 - 19 - 38 11 - 14 - 38C 12 - 30 - 38	- - -	10 - 20 - 38 11 - 14 - 38C 12 - 29 - 38	- - -	10 - 19 - 38 11 - 14 - 38C 12 - 22 - 38	- - -	10 - 20 - 38 11 - 14 - 38C 12 - 30 - 38	- - -	1 - 11 - 39	-	10 - 19 - 38 11 - 14 - 38C 12 - 16 - 38	- - -	10 - 19 - 38 11 - 14 - 38C 12 - 30 - 38	- - -
MOLT	23		25		23		25		28♂		33♂		23		22		37		27♀	
3-RD NYMPHAL FEEDING	1 - 25 - 39	-	2 - 3 - 39	+	1 - 25 - 39	-	1 - 26 - 39	-					1 - 25 - 39	-	2 - 2 - 39	-	1 - 25 - 39	-		
MOLT	21♀		20♀		21♀		21♂						25♀		22♂		23♀			
4-TH NYMPHAL FEEDING *																				
MOLT																				
ADULT FEEDING	2 - 23 - 39	-	3 - 1 - 39	+	2 - 23 - 39	-	2 - 23 - 39	-	2 - 1 - 39 2 - 23 - 39	- -	2 - 1 - 39	-	2 - 23 - 39	+	3 - 1 - 39	-	2 - 23 - 39	-	1 - 27 - 39	-

C = ENGORGED ON WHITE RATS INFECTED WITH CALIFORNIA (HERMSI) STRAIN OF SPIROCHETES.
T = TRANSMISSION
NUMBERS IN MOLT (HORIZONTAL) COLUMN = NUMBER OF DAYS AFTER LAST FEEDING
♂ OR ♀ INDICATE THE SEX OF THE TICK FOLLOWING THIS MOLT.
* NO FOURTH NYMPHAL STAGE IN THIS SERIES.

FIGURE 3.—Infective blood meal during the multiple feeding period in second nymphal stage.

TICK NO.	82	T	84	T	86	T	87	T	88	T	89	T	90	T	91	T	92	T	94	T
LARVAL FEEDING	8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38		8 - 13 - 38	
MOLT	15		15		16		15		14		15		16		15		19		15	
1ST NYMPHAL FEEDING	9 - 26 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-	9 - 27 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-	9 - 26 - 38	-
MOLT	16		17		17		17		16		16		16		16		16		16	
2ND NYMPHAL FEEDING	10 - 19 - 38 11 - 14 - 38C 1 - 6 - 39	- -	10 - 19 - 38 11 - 14 - 38C 12 - 30 - 39	- +	10 - 19 - 38 11 - 14 - 38C 12 - 30 - 38	- -	10 - 20 - 38 11 - 14 - 38C 12 - 16 - 38	- -	10 - 19 - 38 11 - 14 - 38C 12 - 30 - 38	- -	10 - 18 - 38 11 - 14 - 38C 12 - 22 - 38	- -	10 - 19 - 38 11 - 14 - 38C 12 - 30 - 38	- -	10 - 19 - 38 11 - 14 - 38C 12 - 22 - 38	- -	10 - 19 - 38 11 - 14 - 38C 12 - 22 - 38	- -	10 - 19 - 38 11 - 14 - 38C 1 - 27 - 38	- -
MOLT	27♂		20		19		34♂		21		28♀		28♀		33♂		25		21	
3RD NYMPHAL FEEDING			1 - 26 - 39	-	1 - 26 - 39	-			1 - 26 - 38	-							1 - 19 - 39	-	2 - 23 - 39	+
MOLT			21♀		19♀				19♀								19♂		22♀	
4TH NYMPHAL FEEDING																				
MOLT																				
ADULT FEEDING	2 - 10 - 39 2 - 23 - 39	- -	2 - 23 - 39	-	2 - 27 - 39	-	1 - 26 - 39 2 - 23 - 39	- -	2 - 23 - 39	-	2 - 15 - 39	-	2 - 1 - 39	+	2 - 1 - 39	-	2 - 10 - 39	-	3 - 29 - 39	+

FIGURE 3.—Continued. (See notes following first section of figure.)

TICK NO.	97	T	98	T	99	T	100	T	102	T	103	T	105	T
LARVAL FEEDING	8-13-38		8-13-38		8-13-38		8-13-38		8-13-38		8-13-38		8-13-38	
MOLT	14		16		19		18		16		18		16	
1-ST NYMPHAL FEEDING	9-27-38	-	9-26-38	-	9-26-38	-	9-26-38	-	9-26-38	-	9-26-38	-	9-26-38	-
MOLT	16		17		16		16		16		15		16	
2-ND NYMPHAL FEEDING	10-20-38 11-14-38C 1-6-39	- - -	10-19-38 11-14-38C 12-22-38	- - -	10-19-38 11-14-38C 1-6-39	- - -	10-19-38 11-14-38C 10-27-39	- - -	10-20-38 11-14-38C 11-27-39	- - -	10-19-38 11-14-38C 12-14-38	- - -	10-19-38 11-14-38C 1-6-39	- - -
MOLT	32 ♀		51 ♀		20 ♂		20 ♂		23 ♂		21		19 ♀	
3-RD NYMPHAL FEEDING											1-26-39	-		
MOLT											19 ♀			
4-TH NYMPHAL FEEDING														
MOLT														
ADULT FEEDING	2-10-39	+	2 23 39	-	1-21-39	-	2-23-39	-	2-23-39	-	2-23-39	-	2-2-39	-

FIGURE 3.—Concluded. (See notes following first section of figure.)

occurred before the adult stage was reached. Only the remaining 65 ticks are considered.

Infective feedings.—The infective feedings were as follows: 27 as larvae and first nymphs, 11 as first and second nymphs (fig. 2), and 26 at the second feeding in the second nymphal stage (fig. 3). One tick (No. 78) was not given an infective feeding but is included since it showed multiple feedings in the first nymphal stage and an unusually long premolting period.

Although it cannot be stated that all ticks were given equal opportunities for feeding, frequent occasions were afforded. Multiple feedings occurred in the first nymphal stage in one tick, in the second nymphal stage in 27 ticks, in the third nymphal stage in 26 ticks and in the fourth nymphal stage in 2 ticks. The period of multiple feedings between molts was approximately the same as in experiment 1, i. e., from October to January. Only 9 ticks molted regularly. In contrast, during the summer of 1939, April to August, 142 ticks were reared to adults and all molted regularly. The months of October to January were obviously a rest period in relation to molting, but not in relation to feeding.

Transmission.—Of the 65 ticks reared through to the adult stage, 34 were females and 31 males. Of the 38 ticks given 2 infective feedings, 18 were females and 20 males. Nine (50 percent) of the females were positive at one or more feedings, while 17 (81 percent) of the males showed successful transmission.

Of the total positives, 9 males and 5 females (53 percent) showed successful transmission during the multiple feeding period.

In the 2 experiments, of a total of 85 ticks reared to adults, 15 (8 males, 7 females) required only 2 nymphal stages; 65 (27 males, 38 females) required 3; and 5 (4 males, 1 female) required 4.

SUMMARY

During the period October to January, 75 of 85 *Ornithodorus hermsi* (88 percent) engorged more than once in one of the nymphal stages.

Of 58 ticks given 1 or more infective blood meals in the larval or first and second nymphal stages 38 (65 percent) later transmitted spirochetes. Nineteen (50 percent) of the "positive" ticks transmitted spirochetes during the multiple feeding period.

Of 26 ticks that received their infective blood meal during the multiple feeding period 6 (23 percent) subsequently transmitted spirochetes.

CONCLUSIONS

1. As observed under experimental conditions *O. hermsi* passes through a molting rest period during the fall and winter months, but may continue to ingest blood.

2. Ticks may acquire and transmit spirochetes during multiple feedings between molts.

RELAPSING FEVER: DATA IMPLICATING *ORNITHODORUS HERMSI* AS A VECTOR IN NORTHERN IDAHO[1]

By CORNELIUS B. PHILIP, *Medical Entomologist*, and GORDON E. DAVIS, *Bacteriologist, United States Public Health Service*

In August 1937, two persons of a group of six staying in a summer cabin on Moscow Mountain, 6 miles northeast of Moscow, Idaho, developed proved cases of relapsing fever, while two others had illnesses characteristic of this disease. Moreover the histories of illnesses of at least two other persons that visited the same premises in previous years are suggestive of relapsing fever. A few ticks, which were later identified by Entomologist R. A. Cooley as *Ornithodorus hermsi*, were recovered from the cabin as early as 1931 by Dr. C. L. von Ende, of the University of Idaho.

This was the first record of this tick outside of California, where it is an accepted vector. More recently, however, it has been shown to be a transmitting agent in Colorado (Davis, 1939).

PREVIOUS HISTORY

The summer cabin involved was built about 1920 on a secluded, heavily timbered knoll of Moscow Mountain with open farm land on all sides. The two-storied cabin is constructed of rough pine lumber (but unusually tight), on a close-fitting rock and mortar foundation. It has double-boarded floors and building paper is tacked to the studding inside. The only animals seen or captured in the building have been occasional mice (*Microtus*). There are pack rats and chipmunks in the vicinity but neither appeared to have ingress. The owners were very fastidious about possible rodent infestation, even before knowledge of the presence of ticks.

Following correspondence with Professor Claude Wakeland, of the University of Idaho, regarding complaints by the owners and their friends of possible tick bites during overnight stops at the cabin, first noticed in 1931, one of us (C. B. P.) visited the cabin, first in company with the owner in June 1932, then in the same month in 1934 and also in 1936, and finally in September 1938. During the first visit, a live bait of white rats and a guinea pig in cages over wood shavings and building paper on the bedroom floor resulted in the capture of four adult ticks, two nymphs, and two larvae. The early stage ticks were engorged, having apparently fed on the white

[1] From the Rocky Mountain Laboratory, Hamilton, Mont., Division of Infectious Diseases, National Institute of Health.

rats. None was captured during a brief visit in 1934. The above procedure also failed during a 10-day stop in 1936; however, one nymph was recovered from the bedding after biting one of us spending the night there. At this time nearby rodent habitations, particularly ground squirrel and pine squirrel nests, were examined and numbers of mice were trapped without finding any outside source of ticks.

Following the 1932 visit, the cabin was sealed as tightly as possible and fumigated heavily with cyanide gas. Except briefly in 1936, overnight stays by visitors were not resumed until 1938. In May and June of that year, week-end guests slept both upstairs and down without noticing any annoyance. During August, however, the cabin was occupied more or less continuously by the six people previously mentioned and by two of them for the entire month.

During a 4-day visit in September 1938, following the reported illnesses, a thorough recheck of the building, including the eaves, attic, subflooring, and the foundation, failed to reveal evidence of rodents, and only three nymphal ticks were taken by animal bait. One of us slept in the cabin for 3 nights and made several examinations by flashlight each night.

CASE HISTORIES

R. C. L., his wife and child, aged 29, 31, and 3 years, respectively, stayed at the cabin for 2 weeks beginning August 1, 1938, and during the first week skin reactions due to bites were noticed on all three. The parents slept in a double cot touching the wall at the head; the child slept separately in a bed not touching the wall, and had no subsequent illness. On August 18, both husband and wife became ill with chills, headache, and some vomiting and muscle soreness. The wife, being a graduate nurse, observed temperatures, hers reaching 103.6° on August 19, and her husband's 106° on August 20, on which date both returned home for treatment.

Each had three subsequent relapses, dates of onset of the husband's being August 26, September 2, and September 24, respectively, and of the wife's, August 30, September 11, and October 1. The latter was also somewhat indisposed about September 23. Blood films made by Drs. Bird and Myhre of Spokane on September 2, during the husband's third relapse, showed spirochetes. Mapharsen was administered to both at the onset of the third relapse. No further illness was experienced by either.

Also beginning August 1, R. W. H., aged 29, and his wife slept at the cabin in an adjoining room for about 2 weeks before bites were noticed. However, during the last week, Mr. H., on arising one morning, found one tick in the bedding and another attached between his shoulder blades. Unfortunately both specimens were destroyed.

Up to this time, all bites had been attributed by these people to bedbugs.

M. C., aged 13½ years, spent only 2 nights at the cabin, the first on August 11, the second on August 20, to take care of the L. child. She slept in the bed previously occupied by the L's but was not conscious of bites either night. Her first period of illness began August 26 with chills; maximum temperature was 104.5°. Relapses occurred on September 4, 10, 17, and 27 with fever, muscle soreness, headache, some nausea, and drenching sweats as the fever "broke"; maximum temperature observed was 106°F. during the third relapse. Spirochetes were found in the patient's blood by Drs. Loehr and Klaaren during the last two relapses and the diagnosis was confirmed by animal inoculation. Mapharsen was given on September 30 and no further relapses occurred.

Mrs. A. L. S., aged 75 years, had a presumed infection in August 1936, following week-end visits to the same cabin. About August 2, she felt weak and unable to do customary work. Several days were spent in bed with reported high fever, muscle soreness, chills, and a terminal drenching sweat. She remembered an unusual and persistently itching "mosquito bite" on the neck which was called to the attention of others of the family. A physician was subsequently consulted on August 11 and again on August 26 for "shingles and gall trouble." Both illnesses were accompanied by chills, low fever, and heavy sweating. There was also loss of weight. These illnesses may have been relapses due to a spirochete infection.

The owner of the cabin, a man 61 years of age, also had possible relapsing fever in late July and August 1931. He had five sudden onsets of fever and headache about a "week apart" followed by sweats that drenched the bedding. This illness was attributed to "summer flu."

In view of the fact that there are many other summer dwellings in the same area, the localization of both observed cases and the ticks to a single cabin is puzzling. The nearest known cases have been several near Trail, British Columbia (Palmer and Crawford, 1933), and one presumably infected near Walla Walla, Wash. (Tollefsen, 1935).

EXPERIMENTAL OBSERVATIONS

Daily blood examinations were made of the animals used as live bait (eight white rats and one guinea pig), with the results indicated below. The ticks taken were also tested by feeding on white rats, and part of them by subsequent injection into other rats.

1932.—Two rats and one guinea pig were exposed in the cabin for 3 days and nights; three other rats were bitten, respectively, by one, two, and three of the captured ticks; and two rats were injected with

three and four ticks each (including two each of those fed above). The blood films from six rats remained negative during an observation period of 3 weeks. One of the tick-injected rats died on the sixth day of unknown cause, but the films made up to that time were negative.

1938.—Six rats were exposed in two places in the cabin for 4 nights; three others were later bitten by the three nymphal ticks taken in the traps. All remained negative.

Blood films from two rats injected with blood from M. C., taken during the fourth relapse, showed nothing, but the brain of one and the spleen of the other, removed on the thirteenth and sixth days, respectively, each produced infection in one of three transfer rats.

One of two rats injected with blood from the same patient taken during the fifth relapse remained negative; the other showed spirochetes on the ninth day. This strain, after passage through other rats, was successfully transferred by the feeding of third-stage *O. hermsi* nymphs that fed on an infected rat in the preceding stage. The ticks used were from a proved noninfected stock from California.

Five other rats received, respectively, brain tissue from one field mouse (*Microtus*), two chipmunks, and two pine squirrels taken near the cabin. These brains had been preserved in 50 percent buffered glycerin. All test animals remained negative.

SUMMARY

The occurrence in a cabin on Moscow Mountain, Idaho, of relapsing fever cases in association with a known vector, *Ornithodorus hermsi*, is reported. Diagnosis was confirmed by laboratory procedure and one of the strains recovered was successfully passed between white rats by a previously noninfected California strain of *O. hermsi*.

ACKNOWLEDGMENT

It is a pleasure to acknowledge the cordial cooperation of the Moscow physicians concerned, particularly Drs. Loehr and Klaaren in whose laboratory some of the studies were performed. Drs. W. E. Shull and G. C. Holm, of the University of Idaho, also provided useful information and facilities.

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PROVISIONAL NATALITY AND MORTALITY FIGURES FOR 1939

According to provisional figures recently issued by the Bureau of the Census,[1] favorable health conditions, as interpreted by the general mortality rate, continued to prevail in the United States in 1939.

The provisional crude death rate for 1939 is given as 10.7 per 1,000 population, as compared with the same provisional rate in 1938 and a final rate of 10.6. A significant further reduction is shown in infant mortality, with a provisional rate of 48.2 per 1,000 live births as compared with a similar rate of 50.5 in 1938 and a final rate of 51.0 for that year. This is the first time that the infant mortality rate for the country as a whole has been below 50.

The provisional birth rate of 17.5 per 1,000 population in 1939 indicates a slight decline from the preliminary and final rates of 17.7 and 17.6, respectively, for 1938.

The following table gives the provisional figures for 1939 and 1938 and the final, complete figures for 1938. The birth and death rates are computed on the basis of the estimated population of the United States as of July 1, 1937. The population factor is not involved in the infant mortality rates, which are based on the number of live births.

	1939 provisional		1938			
			Provisional		Final	
	Number	Rate	Number	Rate	Number	Rate
Births [1]	2,083,475	17.5	2,140,000	17.7	2,286,962	17.6
Deaths [1]	1,287,278	10.7	1,287,046	10.7	1,381,391	10.6
Infant mortality [2]	88,651	48.2	96,944	50.5	116,702	51.0

[1] Rates per 1,000 estimated population as of July 1, 1937.
[2] Rates per 1,000 live births.

The provisional figures and rates for 1938 and 1939 are computed from monthly reports to the Bureau of the Census and for some States do not include the entire year. While the figures will not agree with the final, complete tabulations, there are certain compensatory factors which make them closely approximate the final figures, as may be seen by a comparison of the provisional and final figures for 1938.

If approximately the same proportionate difference between the preliminary and final figures obtains in 1939 as in 1938, a very slight increase in the number of deaths may be expected in 1939 as compared with the preceding year, but it appears unlikely that the death

[1] Monthly Vital Statistics Bulletin, vol. 2, No. 13 (February 7, 1940). Bureau of the Census, Department of Commerce.

rate will be more than 10.7 per 1,000 population. The final rate for 1939 may even be as low as the minimum (10.6) in 1938, especially if the estimated population as of July 1, 1937, is an underestimate for 1939.

BIRTHS IN NEW YORK STATE

According to a recent issue of Health News,[1] published by the New York State Department of Health, the birth rate for New York State during 1939 was 13.7, with one exception the lowest rate ever recorded. The rate for 1938 was 14.0, and the annual average for the years 1934–38 was 13.9. In connection with the decreasing birth rate, Dr. Joseph V. DePorte, Director of the Division of Vital Statistics, made the following interesting comment:

> The reduction so far recorded in the birth rate seems to represent mainly the intentional limitation of size of family and not the attenuation of the natural instinct of parenthood. It may not be generally known that there has been little, if any, decrease in the number of first births, and that this has been true, only to slightly lesser degree, of second births. Here are some interesting figures drawn from the experience in our own State: In 1928 the total number of births in upstate New York was, in round numbers, 97,000; the number of first births, 29,000. Ten years later the number of all births was 88,000, a decrease of 9,000; while the number of first births (34,000) showed an increase of 5,000. The total birth rate has decreased from 17.5 to 14.4, but the corresponding number of first births in every 1,000 population has increased from 5.3 to 5.6. In the same decade there has been, also, a slight increase in the number of second births, from 22,000 to 23,000. The decrease in the total number of births has been due entirely to fewer births of the third and higher orders.

COURT DECISION ON PUBLIC HEALTH

County tax for promotion of public health.—(Mississippi Supreme Court, Division B; *Yazoo and M. V. R. Co.* v. *Bolivar County et al.*, 191 So. 426; decided October 16, 1939.) A 1932 law of Mississippi, as it applied to the defendant county, empowered the board of supervisors to levy an annual tax of not exceeding 5 mills for all general county purposes, exclusive only of levies for roads and bridges and schools. There was a proviso that counties having an assessed valuation of less than $8,000,000 and having no bonded indebtedness could levy an additional mill to maintain a full-time health unit. A 1938 statute authorized county boards of supervisors, in their discretion, to levy annually a special tax of not exceeding 1 mill for the treatment of the indigent sick and the promotion of the public health, and, further, provided that all revenue derived from the tax should be covered into the county public health fund and be subject to the appropriation of

[1] Health News, vol. 17, No. 9, February 26, 1940.

the boards of supervisors as the statutes provided for the purposes mentioned.

The defendant county, for the fiscal year 1938–39, levied a 5-mill general county tax and a 1-mill public health tax. Such county, having more than an $8,000,000 assessed valuation and a bonded indebtedness, did not come within the proviso of the 1932 law referred to above. In a suit to recover taxes paid under protest the plaintiff contended that, since the defendant county had levied the maximum 5 mills for all general county purposes, the additional 1-mill levy was excessive under the 1932 statute. In other words the contention was that the 1-mill levy provided for in the 1938 act should have been included in the 5 mills limitation for general county purposes under the 1932 act.

The supreme court affirmed the judgment of the lower court in favor of the county. The court said that the 1938 law had the effect of removing the proviso from the 1932 law. "It is clear," said the court, "that any county, under this chapter, is authorized to levy the 1 mill as a special tax, and that it was not intended to be included in the general county taxes."

NOTIFIABLE DISEASES IN THE UNITED STATES, 1938—A CORRECTION

In the morbidity and mortality summary for 1938, which appeared in the Public Health Reports for March 8, 1940, the figure for smallpox on page 426 should have been 14,939 instead of 49,319. The correct figure is given in the table on page 428 of the same issue of the Public Health Reports.

DEATHS DURING WEEK ENDED MARCH 2, 1940

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

	Week ended Mar. 2, 1940	Corresponding week, 1939
Data from 88 large cities of the United States:		
Total deaths	9,346	10,021
Average for 3 prior years	9,500	
Total deaths, first 9 weeks of year	86,696	85,558
Deaths under 1 year of age	498	570
Average for 3 prior years	584	
Deaths under 1 year of age, first 9 weeks of year	4,831	5,004
Data from industrial insurance companies:		
Policies in force	66,104,679	67,876,040
Number of death claims	15,157	16,095
Death claims per 1,000 policies in force, annual rate	12.0	12.4
Death claims per 1,000 policies, first 9 weeks of year, annual rate	10.5	10.8

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

REPORTS FROM STATES FOR WEEK ENDED MARCH 16, 1940

Summary

The incidence of all of the 9 important communicable diseases reported weekly by telegraph to the United States Public Health Service was below the median expectancy for the week ended March 16, based on the figures for the median week of the years 1935–39.

As compared with the preceding week, the number of cases of influenza dropped from 9,590 to 6,740, and all of the other diseases registered a decline except poliomyelitis, scarlet fever, and typhoid fever. The number of cases of poliomyelitis increased from 12 to 19, with 3 cases, the largest number reported from any one State, being recorded for Texas.

For the first 11 weeks of the current year, the accumulated totals for all of these 9 diseases, except influenza and poliomyelitis, have remained below the medians for the corresponding period of the years 1935–39. This favorable condition applies to most of the geographic areas. The incidence of diphtheria has been about 65 percent of the median expectancy, of measles about 40, of meningococcus meningitis about 30, of scarlet fever about 70, of typhoid fever about 60, and of smallpox about 25 percent.

For the current week, 27 cases of smallpox were reported in Oklahoma (42 cases for the preceding week), 1 case of Rocky Mountain spotted fever was reported in Virginia, 1 case of undulant fever and 1 case of tularaemia were reported in Maryland, and a total of 14 cases of endemic typhus fever was reported, of which 7 cases occured in Texas and 4 cases in Georgia.

Telegraphic morbidity reports from State health officers for the week ended March 16, 1940, and comparison with corresponding week of 1939 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median, 1935–39	Week ended		Median, 1935–39	Week ended		Median, 1935–39	Week ended		Median, 1935–39
	Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939	
NEW ENG.												
Maine	2	0	1	12	30	15	356	28	28	1	0	0
New Hampshire	0	0	0	------	40	------	30	0	18	0	0	0
Vermont	0	0	0	------	------	------	4	46	46	0	0	0
Massachusetts	2	2	3	------	------	------	311	905	864	0	2	2
Rhode Island	0	0	0	------	------	------	138	6	64	1	0	0
Connecticut	1	1	2	7	20	18	156	522	522	1	1	0
MID. ATL.												
New York	15	28	34	[1] 33	[1] 38	[1] 38	383	1,408	2,293	2	1	14
New Jersey	4	5	14	23	13	25	280	48	1,106	0	1	2
Pennsylvania	11	55	42	------	------	------	40	216	865	[2] 7	6	6
E. NO. CEN.												
Ohio	12	37	26	217	------	48	17	27	389	2	3	11
Indiana	6	11	12	61	210	36	8	14	60	0	2	2
Illinois	21	44	44	35	541	70	113	22	70	3	0	8
Michigan [3]	9	11	11	23	220	5	178	248	248	5	0	0
Wisconsin	2	2	2	224	1,484	67	267	1,073	1,073	1	1	1
W. NO. CEN.												
Minnesota	14	3	3	1	22	------	179	831	384	0	0	0
Iowa	2	5	5	28	643	8	196	172	133	0	0	1
Missouri	20	9	16	16	452	253	9	22	22	0	0	2
North Dakota	6	1	2	44	254	4	6	78	28	0	0	0
South Dakota	1	0	0	2	22	------	1	134	5	0	0	0
Nebraska	0	3	3	------	22	4	107	53	46	1	1	1
Kansas	11	3	7	31	205	40	533	20	20	0	0	2
SO. ATL.												
Delaware	0	1	0	------	------	------	4	0	32	0	0	0
Maryland [3]	5	3	4	57	79	45	3	798	199	1	2	4
Dist. of Col	6	8	7	------	3	3	5	39	49	0	0	2
Virginia [4]	10	20	24	552	2,443	------	44	376	376	3	2	6
West Virginia [3]	4	7	10	610	218	218	17	4	20	1	2	7
North Carolina	16	13	13	8	172	172	141	1,286	699	0	1	1
South Carolina [5]	2	6	5	774	872	872	7	12	41	0	0	1
Georgia [5]	11	8	9	144	286	286	254	205	0	1	0	2
Florida	1	6	8	9	5	14	92	119	100	0	0	3
E. SO. CEN.												
Kentucky	3	7	12	69	560	93	25	89	190	0	2	6
Tennessee	6	9	12	238	420	416	95	165	165	0	5	5
Alabama [5]	14	6	8	335	1,862	1,862	124	190	190	3	7	7
Mississippi [3]	3	8	4	------	------	------	------	------	------	0	1	1
W. SO. CEN.												
Arkansas	7	7	6	334	577	211	36	39	37	0	0	0
Louisiana	1	12	16	62	27	27	26	154	68	1	1	0
Oklahoma	3	3	6	491	682	287	7	194	126	1	0	5
Texas [5]	36	50	44	1,761	1,718	880	811	277	277	1	4	4
MOUNTAIN												
Montana	0	0	3	11	145	32	31	304	18	0	0	0
Idaho	0	0	0	2	4	4	39	71	13	0	1	0
Wyoming	0	0	1	5	------	------	19	62	29	0	0	0
Colorado	6	11	8	29	73	------	30	253	253	0	0	0
New Mexico	1	4	5	7	670	26	37	25	35	0	1	1
Arizona	2	5	2	224	476	130	95	19	38	0	5	1
Utah [3]	2	2	0	8	86	------	315	105	23	0	0	0

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 16, 1940, and comparison with corresponding week of 1939 and 5-year median—Con.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median, 1935–39	Week ended		Median, 1935–39	Week ended		Median, 1935–39	Week ended		Median, 1935–39
	Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939	
PACIFIC												
Washington	1	2	2	11		1	653	421	221	0	1	1
Oregon	10	4	0	31	118	83	421	45	45	0	0	1
California	26	36	35	211	209	215	533	4,248	885	3	1	4
Total	315	458	470	6,740	15,921	8,852	7,176	15,373	15,373	39	54	159
11 weeks	4,379	5,828	6,797	140,504	85,103	85,103	59,774	136,721	136,721	[2] 428	587	1,320

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median, 1935–39	Week ended		Median, 1935–39	Week ended		Median, 1935–39	Week ended		Median, 1935–39
	Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939	
NEW ENG.												
Maine	0	0	0	11	17	17	0	0	0	0	0	0
New Hampshire	0	0	0	0	2	11	0	0	0	0	0	0
Vermont	0	0	0	8	6	10	0	0	0	0	0	0
Massachusetts	1	0	0	102	169	287	0	0	0	2	2	2
Rhode Island	0	0	0	18	11	22	0	0	0	0	0	0
Connecticut	0	0	0	89	91	130	0	0	0	0	1	0
MID. ATL.												
New York	1	0	1	1,049	673	1,052	0	0	0	3	6	6
New Jersey	0	0	0	358	160	190	0	0	0	3	4	1
Pennsylvania	2	0	0	257	436	533	0	0	0	6	8	6
E. NO. CEN.												
Ohio	1	1	1	343	558	445	0	21	1	4	2	2
Indiana	0	1	0	275	207	212	1	42	5	1	1	1
Illinois	0	0	1	870	446	874	2	10	13	2	4	3
Michigan [3]	2	0	0	383	442	442	0	17	2	3	1	3
Wisconsin	1	1	0	153	186	407	3	5	7	0	1	1
W. NO. CEN.												
Minnesota	0	0	0	88	105	160	1	11	11	1	1	1
Iowa	0	0	0	62	157	233	4	23	23	1	1	1
Missouri	0	1	1	102	77	216	2	8	8	5	2	2
North Dakota	0	0	0	14	28	30	6	3	3	0	0	0
South Dakota	0	0	0	5	12	16	1	4	4	0	0	0
Nebraska	0	0	0	20	30	57	1	15	15	0	0	0
Kansas	1	0	0	67	130	189	0	5	14	0	0	1
SO. ATL.												
Delaware	0	0	0	17	5	6	0	0	0	0	0	0
Maryland [3]	0	0	0	42	47	87	0	0	0	2	1	1
Dist. of Col.	0	0	0	18	20	20	0	0	0	0	0	0
Virginia [4]	0	0	0	36	33	50	0	0	0	2	3	3
West Virginia [3]	0	0	0	50	58	68	0	0	0	0	3	3
North Carolina	1	0	0	26	47	41	0	1	1	0	0	1
South Carolina [5]	0	0	0	3	4	4	0	0	0	2	0	0
Georgia [3]	0	0	0	17	5	11	5	0	0	3	3	2
Florida	0	1	0	5	10	10	0	0	0	1	3	3

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 16, 1940, and comparison with corresponding week of 1939 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median, 1935–39	Week ended		Median, 1935–39	Week ended		Median, 1935–39	Week ended		Median, 1935–39
	Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939	
E. SO. CEN.												
Kentucky	1	0	0	94	68	50	0	7	0	1	4	3
Tennessee	0	0	0	81	59	50	1	0	0	2	2	2
Alabama [3]	0	0	0	23	14	14	0	0	0	2	2	1
Mississippi [3]	0	1	0	5	5	6	1	0	0	2	2	2
W. SO. CEN.												
Arkansas	1	0	0	2	11	10	3	1	2	2	4	2
Louisiana	1	0	0	14	7	13	1	2	3	9	17	9
Oklahoma	0	0	0	15	62	25	27	55	14	5	0	2
Texas [4]	3	1	1	39	71	94	2	27	7	3	14	14
MOUNTAIN												
Montana	0	0	0	26	28	28	0	2	9	0	0	0
Idaho	0	0	0	10	21	22	0	3	3	1	1	1
Wyoming	0	0	0	6	9	10	0	0	0	0	0	0
Colorado	0	0	0	29	51	67	10	0	6	0	0	1
New Mexico	0	0	0	13	30	30	2	2	0	8	0	2
Arizona	0	1	0	10	7	16	0	0	1	0	1	1
Utah [3]	0	0	0	27	29	47	1	0	1	1	0	0
PACIFIC												
Washington	0	0	0	53	46	47	0	6	25	3	0	2
Oregon	1	0	0	24	49	49	0	18	18	3	1	1
California	2	1	4	193	290	269	2	39	18	5	1	4
Total	19	9	21	5,152	5,029	7,900	76	327	327	88	101	101
11 weeks	306	170	228	51,089	58,995	73,363	810	4,250	3,297	827	1,296	1,296

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended March 16, 1940, and comparison with corresponding week of 1939 and 5-year median—Con.

Division and State	Whooping cough		Division and State	Whooping cough	
	Week ended—			Week ended—	
	Mar. 16, 1940	Mar. 18, 1939		Mar. 16, 1940	Mar. 18, 1939
NEW ENG.			SO. ATL.—continued		
Maine	32	33	South Carolina [6]	14	76
New Hampshire	5	1	Georgia [6]	9	51
Vermont	35	68	Florida	5	28
Massachusetts	171	161	E. SO. CEN.		
Rhode Island	6	28			
Connecticut	29	116	Kentucky	51	19
MID. ATL.			Tennessee	40	35
			Alabama [6]	31	30
New York	319	560	Mississippi [3]		
New Jersey	86	410	W. SO. CEN.		
Pennsylvania	225	361			
E. NO. CEN.			Arkansas	2	18
			Louisiana	30	2
Ohio	235	199	Oklahoma	3	1
Indiana	47	39	Texas [5]	208	114
Illinois	92	265	MOUNTAIN		
Michigan [3]	188	148			
Wisconsin	102	232	Montana	5	5
W. NO. CEN.			Idaho	28	3
			Wyoming	3	5
Minnesota	23	41	Colorado	6	71
Iowa	5	7	New Mexico	53	12
Missouri	31	40	Arizona	14	25
North Dakota	3	4	Utah [3]	123	36
South Dakota	0	0	PACIFIC		
Nebraska	3	0			
Kansas	57	17	Washington	61	27
SO. ATL.			Oregon	30	13
			California	241	155
Delaware	5	4			
Maryland [3]	210	33	Total	3,103	4,024
Dist. of Col	15	20			
Virginia [4]	52	122	11 weeks	31,804	46,440
West Virginia [3]	62	43			
North Carolina	108	346			

[1] New York City only.
[2] According to later information 5 cases of meningococcus meningitis were reported in Pennsylvania for the week ended March 9, instead of 6 as reported in Public Health Reports of March 15, 1940, p. 476.
[3] Period ended earlier than Saturday.
[4] Rocky Mountain spotted fever, week ended March 16, 1940, Virginia, 1 case.
[5] Typhus fever, week ended March 16, 1940, 14 cases as follows: South Carolina, 1; Georgia, 4; Alabama 2; Texas, 7.

SUMMARY OF MONTHLY REPORTS FROM STATES

[The following tables complete the summarization of the monthly State reports for 1939]

Division and State	Actinomycosis	Anthrax	Beriberi	Chickenpox	Conjunctivitis	Dengue	Diarrhea	Diphtheria	Dysentery, amoebic	Dysentery, bacillary	Dysentery, unspecified	Encephalitis, epidemic or lethargic	Food poisoning	German measles	Granuloma, coccidioidal
October 1939															
Massachusetts				333				24		164		1		40	
Puerto Rico				8				51			27				
November 1939															
Massachusetts		1		947				27		135				34	
Rhode Island				100				2		17				4	
Indiana				315				91		2					
Illinois	2			1,559				142	5	19		2		25	
Wisconsin				2,529				6				5		32	
District of Columbia				61				16	2						
Virginia				92				290	1	84					
North Carolina				290				476		4				7	
South Carolina				46			292	290						10	
Florida				32				34	7			1			
Arizona				65				25			66	1		3	
Utah				355				3		2	2	2		17	
Nevada				30											
Washington				657	7			13	1			3	1	19	
Oregon				245				3	2						
Alaska				11				1							
Hawaii Territory				33	24			10	2						
Puerto Rico				9				48			15				
December 1939															
NEW ENG.															
Maine				362				9				1		10	
New Hampshire				83				2							
Vermont				309				1						14	
Massachusetts				1,511				20		26		1		26	
Rhode Island				132				3				1		2	
Connecticut				617	2			2		65				5	
MID. ATL.															
New York		1		3,274				72	6	73		6		79	
New Jersey		1		1,755				53				3		33	
Pennsylvania		5		4,803				151	1	2		2		37	

E. NO. CEN.													
Ohio				1,729				114		1			14	
Indiana				393				102		3				
Illinois				2,240				184	8	24		2	25	
Michigan	1			2,277				32	2	5			42	
Wisconsin				3,548										
W. NO. CEN.														
Minnesota				1,344				6						
Iowa				452				35				1	4	
Missouri				181				67		1				
North Dakota	1			132	2			4					3	
South Dakota				206				15				1		
Nebraska				104				8						
Kansas				654				29		1	1	7	14	
SO. ATL.														
Delaware				75				3						
Maryland				401			14	41					8	
District of Columbia				145				11	3	16				
Virginia				305				181						
West Virginia				210				66	1	167		11		
North Carolina				428				269					13	
South Carolina				199		1	337	167				2	14	
Georgia				288	7			92	4	15	1			
Florida				79				29	4					
E. SO. CEN.														
Kentucky				431				67		6		1	2	
Tennessee				282				73	1	8		1	8	
Alabama				143				143	2			1		
Mississippi				514		5		57	88	201				
W. SO. CEN.														
Arkansas				110				73	1	8			1	
Louisiana				46				51	4	3		2		
Oklahoma				149				73	3	11				
Texas				721				280	9	51		1		
MOUNTAIN														
Montana				251				4				11	4	
Idaho				108	1								7	
Wyoming				135				4					5	
Colorado				235				37				1		
New Mexico				123			5	14	4	15			1	1
Arizona				124				33			48			
Utah				374				5	1		3		12	
Nevada				24										

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Summary of monthly reports from States—Continued

Division and State	Actinomycosis	Anthrax	Beriberi	Chickenpox	Conjunctivitis	Dengue	Diarrhea	Diphtheria	Dysentery, amoebic	Dysentery, bacillary	Dysentery, unspecified	Encephalitis, epidemic or lethargic	Food poisoning	German measles	Granuloma, coccidioidal
PACIFIC															
Washington				711				6				1	20	26	
Oregon				329				15	2						
California	2		1	1,756				119	10	52		2	97	48	3
Total (December)	4	7	1	34,812	12	6	356	2,822	154	754	53	59	118	457	3
Alaska				13											
Hawaii Territory				58	2			5							
Puerto Rico				15				55			15				

Division and State	Hookworm disease	Impetigo contagiosa	Influenza	Jaundice, infectious	Lead poisoning	Leprosy	Malaria	Measles	Meningitis, meningococcus	Mumps	Ophthalmia neonatorum	Pellagra	Plague, human	Poliomyelitis	Psittacosis	Puerperal septicemia
October 1939																
Massachusetts								291	5	91	65	1		21		
Puerto Rico			51			1	2,518	83		3	7					5
November 1939																
Massachusetts							1	857	2	248	32	1		6		
Rhode Island								268		210						
Indiana			22					55	2	257				10		
Illinois			62				22	90	4	159	3	2		12		
Wisconsin			77					160	1	793				18		
District of Columbia			3					7	2					3		
Virginia			387				15	29	5			9		4		
North Carolina			14				33	523	2			11		6		
South Carolina	62		1,640				716	15	3	15	3	68		7		
Florida	555		14				42	25	2	6		3		2		
Arizona			272				3	12	2	69				1		
Utah			136	1				294		164				24		
Nevada								6								

Washington		3	6					1,376	1	45				5		
Oregon		99	69					84	4	114				8		
Alaska		1						172								
Territory of Hawaii	16	32	2	1		3		2		33	2			4		
Puerto Rico			168				2,797	13		4	3					4
December 1939																
NEW ENG.																
Maine			14					210	2	5				1		
New Hampshire								17		22				0		
Vermont								115		50				0		
Massachusetts							4	1,032	1	346	130	2		6		
Rhode Island								314	2	147				0		
Connecticut			12				1	205	1	210				1		
MID. ATL.																
New York							13	1,753	5		3			23		
New Jersey			52				1	65	1	753	13			2		
Pennsylvania							2	229	34	904	3			9		
E. NO. CEN.																
Ohio		32	125		4		1	93	9	430				4		1
Indiana			73					30	5	214				2		
Illinois		14	63				8	81	8	332	5	1		6		
Michigan			19	5			10	1,372	3					10		
Wisconsin			147					379		862				10		
W. NO. CEN.																
Minnesota			10					342						14		
Iowa			36					214		379				32		
Missouri			10					28	1	53		1		3		
North Dakota			173					29		138				1		
South Dakota			3					20		15				3		
Nebraska								13	1	165				4		
Kansas		10	421		1			478	7	182				3		
SO. ATL.																
Delaware								8	1	1				2		
Maryland		9	57	1				16	2	11		1		3		
District of Columbia			8					8								
Virginia			652				2	83	1	59		2		3		
West Virginia			67					27	9	5				10		
North Carolina			204				34	734	4			3		2		
South Carolina	79		8,779				402	21	4	38	1	101		4		
Georgia	2,224		3,005				142	76	2	95		10		1		
Florida	804		56				26	6	1	13		4				

Summary of monthly reports from States—Continued

Division and State	Hookworm disease	Impetigo contagiosa	Influenza	Jaundice, infectious	Lead poisoning	Leprosy	Malaria	Measles	Meningitis, meningococcus	Mumps	Ophthalmia neonatorum	Pellagra	Plague, human	Poliomyelitis	Psittacosis	Puerperal septicemia
E. SO. CEN.																
Kentucky			23					23	7	75		3		14		
Tennessee	1	8	252				36	215	6	33	1	9		1		1
Alabama			2,911				145	56	6	44		12		3		
Mississippi			9,445				1,099	279	6	184	9	198		1		23
W. SO. CEN.																
Arkansas	18		365				66	3		18		18		4		1
Louisiana	28		24			1	20	9		3	1	6		1		
Oklahoma			479				29	14	3	24		6		7		
Texas			2,074			1	252	259	5	134	2	116		12		
MOUNTAIN																
Montana		10	1,742					44	1	181						
Idaho			23					175	1	45				6		
Wyoming			709					36		143				1		
Colorado			611					93	5	218				9		
New Mexico			18					10	1	76		2		6		
Arizona			102				1	20		101		4		5	3	
Utah			2,558					282		142			1	15		
Nevada			6					2								
PACIFIC																
Washington			15					2,234	2	48				3		
Oregon		28	715					199	3	167				2		
California			245	5			8	808	5	908	1	3		37		
Total (December)	3,154	111	36,303	11	5	2	2,302	12,889	155	8,059	169	502	1	286	3	26
Alaska		10						140								
Hawaii Territory	4	20	11	1		1		5		46	1		1	12		
Puerto Rico			187				2,581	36	1	1	1			1		7

Division and State	Rabies in animals	Rabies in man	Rat bite fever	Rocky Mountain spotted fever	Scarlet fever	Septic sore throat	Smallpox	Tetanus	Trachoma	Trichinosis	Tularaemia	Typhoid and paratyphoid fever	Typhus fever	Undulant fever	Vincent's infection	Whooping cough
October 1939																
Massachusetts	3				179	10		2		2		7		4		347
Puerto Rico					1			13				28				141
November 1939																
Massachusetts	13				264	10						3		5		508
Rhode Island	2				25	8						1			1	96
Indiana	41	1			540	20	8				6	18		8		162
Illinois	15				1,188	2	2	4	13	2	90	35		15	29	696
Wisconsin					514	7	16				11			4		541
Dist. of Col					52						1	7		1		56
Virginia					227	99		1			8	23	1			116
North Carolina		1			464	15	1				2	9	4	6	1	275
South Carolina	14				92						1	40	20			33
Florida	3				42	8		3			14	8	5	7	4	37
Arizona					34				36			6		1		45
Utah				2	96	2	2		13		2	5		4		385
Nevada					36							1				6
Washington	9				162	3	4					18		2	4	90
Oregon	5				93	1	1		2			13			11	101
Alaska						5						1				8
Hawaii Territory								2	3	2		6	9			186
Puerto Rico								7				39				139
December 1939																
NEW ENG.																
Maine					68	3						5		2	6	229
New Hampshire					5							1		2		25
Vermont					21							3		6		166
Massachusetts	3				412	22		2		1		7		2		510
Rhode Island	4				40	17								1		86
Connecticut					244	20		1		9		4		7		324
MID. ATL.																
New York	18				1,447	128		2		13	1	258	1	26	43	1,822
New Jersey	26				763	20		2		1	2	13		7		498
Pennsylvania					1,346					1	16	32		12		1,236

Summary of monthly reports from States—Continued

Division and State	Rabies in animals	Rabies in man	Rat bite fever	Rocky Mountain spotted fever	Scarlet fever	Septic sore throat	Smallpox	Tetanus	Trachoma	Trichinosis	Tularaemia	Typhoid and paratyphoid fever	Typhus fever	Undulant fever	Vincent's infection	Whooping cough
E. NO. CEN.																
Ohio					1,336	14	6		3		59	32		11		547
Indiana	22				654	5	16				40	4		9		196
Illinois	17				1,462	5	7	1	11		252	24		16	20	456
Michigan	3				1,364	73	2		1	2	5	16		7	16	564
Wisconsin					588	19	18				23	7		14		543
W. NO. CEN.																
Minnesota					541	16	72				2	5		7		217
Iowa					417	27	43				79	1		23	4	107
Missouri					376	12	14	2	10		98	19		3		72
North Dakota					155		1		2		1				3	59
South Dakota					95	1	24		1			1				4
Nebraska					93		5					2				22
Kansas					499	27			45		48	2		4	8	71
SO. ATL.																
Delaware					69							1				32
Maryland					226	20		1			36	18	2	5	14	236
District of Columbia					34						2	4				50
Virginia				3	230	162					17	23		1		132
West Virginia		1			374	8	2				9	15				75
North Carolina					366	6	2				3	10	19	1		254
South Carolina	6				91			4			5	8	12	2		80
Georgia					190	145	1				8	22	98	10		47
Florida					38	2	1	2			7	9	11		4	
E. SO. CEN.																
Kentucky					256	34			13		45	6		2	10	217
Tennessee			1		367	20	1	1			27	14	31	2	10	157
Alabama	17	1			218		2	3			1	4	32	7		76
Mississippi	5				58				7			6	7	2		623
W. SO. CEN.																
Arkansas	17				72	36	16		38		13	17				22
Louisiana	26				78	4	1	6	3		8	24	17	4		68
Oklahoma	21	1			115	42	22				28	20		28	20	13
Texas	2				281		15		15		2	76	32	34		345

MOUNTAIN																
Montana					142	10	5		5			1				30
Idaho	1				40							2		1		2
Wyoming					56	1					2	2			2	52
Colorado					171	2	96				3	2		1		53
New Mexico	1				100	10	5				1	17				148
Arizona					30		2		34			3		1		31
Utah					66	14	5		2		2	6				252
Nevada					8											1
PACIFIC																
Washington	8			1	197	6	4	1				10		5	1	65
Oregon	2				108	3	3		1			5		1	6	146
California	12				697	3	17	7	6	3	2	26	3	17		522
Total (December)	211	3	1	4	16,604	937	408	35	197	30	847	787	265	283	167	11,483
Alaska														6	1	10
Hawaii Territory					1			2				2	7			95
Puerto Rico								10				42				138

WEEKLY REPORTS FROM CITIES

City reports for week ended March 2, 1940

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

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	167	912	140	7,036	969	2,305	32	400	20	1,172	----
Current week [1]	75	773	98	1,563	617	1,703	5	387	14	901	----
Maine:											
Portland	1	----	0	69	5	1	0	0	0	9	25
New Hampshire:											
Concord	0	----	0	0	0	0	0	0	0	0	7
Manchester	0	----	0	7	1	3	0	0	0	0	14
Nashua	0	----	0	96	0	0	0	0	0	0	7
Vermont:											
Barre	0	----	0	0	0	0	0	1	0	0	2
Burlington	0	----	0	0	0	0	0	0	0	1	9
Rutland	0	----	0	0	1	0	0	1	0	0	7
Massachusetts:											
Boston	1	----	2	16	23	37	0	9	1	37	223
Fall River	0	----	0	13	1	0	0	0	0	3	35
Springfield	0	----	0	0	2	14	0	0	0	0	43
Worcester	0	----	0	2	4	5	0	2	0	0	62
Rhode Island:											
Pawtucket	0	----	0	1	0	1	0	0	0	0	17
Providence	0	----	1	153	3	11	0	3	0	8	80
Connecticut:											
Bridgeport	0	1	1	0	1	1	0	1	0	0	29
Hartford	1	----	0	1	2	1	0	0	0	4	40
New Haven	1	2	1	0	2	0	0	0	0	15	50
New York:											
Buffalo	0	----	0	1	14	9	0	2	0	12	132
New York	18	68	11	61	105	533	0	75	0	108	1,581
Rochester	0	2	0	0	4	18	0	2	0	14	70
Syracuse	0	----	0	0	2	6	0	1	1	21	39
New Jersey:											
Camden	3	1	1	0	2	9	0	2	0	0	42
Newark	1	1	0	29	3	24	0	9	0	29	114
Trenton	0	----	0	0	1	3	0	6	0	0	44
Pennsylvania:											
Philadelphia	3	5	1	41	39	67	0	28	2	49	556
Pittsburgh	2	9	7	1	15	33	0	9	0	19	161
Reading	0	----	1	1	0	0	0	1	0	22	24
Scranton	0	----	----	0	----	4	0	----	0	0	----
Ohio:											
Cincinnati	0	9	1	0	10	14	0	8	0	18	153
Cleveland	0	106	3	2	13	29	0	14	0	31	213
Columbus	2	4	4	0	12	11	0	4	0	11	121
Toledo	0	----	0	2	4	21	0	4	0	16	64
Indiana:											
Anderson	0	----	0	0	1	3	0	0	0	6	9
Fort Wayne	0	----	0	0	1	3	0	3	0	1	28
Indianapolis	1	----	3	4	14	20	0	3	0	13	124
Muncie	0	----	0	1	1	4	0	0	0	1	12
South Bend	0	----	0	0	2	0	0	0	0	0	17
Terre Haute	1	----	1	0	1	2	0	0	0	0	12
Illinois:											
Alton	0	1	1	0	0	2	0	0	0	0	9
Chicago	2	26	7	20	37	412	0	46	1	40	767
Elgin	0	1	0	0	1	1	0	0	0	0	9
Moline	0	----	0	1	0	1	0	0	0	0	5
Springfield	0	1	0	0	4	3	0	0	0	8	28
Michigan:											
Detroit	1	6	0	41	15	86	0	16	0	17	269
Flint	0	----	0	0	5	7	0	0	0	11	29
Grand Rapids	0	----	0	2	2	27	0	0	0	5	38
Wisconsin:											
Kenosha	0	----	0	2	1	3	0	0	0	1	11
Madison	0	----	0	1	1	2	0	1	0	5	28
Milwaukee	0	----	0	9	3	39	0	3	0	10	120
Racine	0	----	0	2	0	3	0	0	1	1	12
Superior	1	----	0	58	0	2	0	0	0	0	5

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

City reports for week ended March 2, 1940—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0	-----	1	160	1	4	0	0	0	5	20
Minneapolis	0	-----	1	1	14	25	0	1	0	9	115
St. Paul	0	1	1	0	4	6	0	1	0	11	60
Iowa:											
Cedar Rapids	0	-----	-----	6	-----	1	0	-----	0	0	-----
Davenport	2	-----	-----	-----	1	-----	3	0	-----	0	0
Des Moines	1	-----	0	6	0	9	0	0	0	0	40
Sioux City	0	-----	-----	2	-----	1	0	-----	0	0	-----
Waterloo	0	-----	-----	1	-----	2	0	-----	0	0	-----
Missouri:											
Kansas City	0	1	4	1	15	21	0	6	1	0	131
St. Joseph	1	-----	1	0	6	1	0	0	0	1	34
St. Louis	4	2	0	1	14	14	1	5	2	15	216
North Dakota:											
Fargo	0	-----	1	2	0	2	0	0	0	0	8
Grand Forks	0	-----	-----	0	-----	0	0	-----	0	1	-----
Minot	0	-----	0	0	0	1	0	0	0	0	7
South Dakota:											
Aberdeen	0	-----	-----	1	-----	0	0	-----	0	0	-----
Sioux Falls	0	-----	0	0	0	1	0	0	0	0	8
Nebraska:											
Lincoln	0	-----	-----	0	-----	3	0	-----	0	0	-----
Omaha	0	-----	0	6	8	1	0	0	0	3	62
Kansas:											
Lawrence	0	12	0	0	0	0	0	0	0	0	4
Topeka	0	-----	0	1	3	0	0	8	0	0	32
Wichita	5	-----	0	337	4	1	0	2	0	0	42
Delaware:											
Wilmington	0	-----	0	0	2	4	0	0	0	4	32
Maryland:											
Baltimore	2	12	1	1	18	10	0	13	0	181	248
Cumberland	0	-----	0	0	0	1	0	1	0	0	24
Frederick	1	-----	0	0	0	0	0	0	0	0	2
Dist. of Col.:											
Washington	4	6	2	2	9	26	0	7	0	6	155
Virginia:											
Lynchburg	0	-----	0	0	2	2	0	0	0	2	10
Norfolk	1	36	0	4	5	1	0	0	0	3	29
Richmond	0	-----	2	0	7	2	0	0	1	1	47
Roanoke	0	-----	0	0	3	2	0	1	0	5	21
West Virginia:											
Charleston	0	3	0	0	3	0	0	2	0	0	35
Huntington	0	-----	-----	0	-----	3	0	-----	0	0	-----
Wheeling	0	-----	0	0	3	0	0	1	0	0	21
North Carolina:											
Gastonia	0	-----	-----	2	-----	0	0	-----	0	0	-----
Raleigh	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Wilmington	0	-----	0	1	0	0	0	1	0	0	11
Winston-Salem	0	-----	0	0	3	2	0	1	0	0	21
South Carolina:											
Charleston	0	96	0	0	4	0	0	1	0	0	29
Florence	0	10	0	0	0	0	0	0	0	0	5
Greenville	0	-----	0	0	2	1	0	0	0	1	16
Georgia:											
Atlanta	0	17	3	10	9	8	0	7	0	1	102
Brunswick	0	-----	0	1	2	0	0	1	0	0	8
Savannah	0	106	0	2	2	2	0	1	0	1	37
Florida:											
Miami	0	1	3	0	2	0	0	2	0	0	41
Tampa	3	3	3	62	0	0	0	1	0	0	25
Kentucky:											
Ashland	1	-----	0	0	2	3	0	0	0	2	6
Covington	1	-----	0	0	1	4	0	0	0	0	13
Lexington	1	-----	1	0	5	3	0	1	0	0	18
Louisville	0	33	1	2	2	20	0	1	0	26	64
Tennessee:											
Knoxville	0	-----	3	1	5	15	0	1	0	0	42
Memphis	1	11	6	5	4	20	4	1	3	6	96
Nashville	0	-----	3	15	7	4	0	2	0	5	67
Alabama:											
Birmingham	0	16	0	0	6	5	0	4	0	4	64
Mobile	0	12	3	0	4	3	0	0	0	0	29
Montgomery	1	13	-----	7	-----	1	0	-----	0	1	-----
Arkansas:											
Fort Smith	0	12	-----	0	-----	1	0	-----	0	0	-----
Little Rock	0	48	1	0	6	1	0	0	0	0	-----

City reports for week ended March 2, 1940—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Louisiana:											
Lake Charles	0	------	0	2	0	0	0	1	1	0	6
New Orleans	1	23	3	5	15	8	0	17	0	26	166
Shreveport	0	------	0	0	15	2	0	2	1	1	74
Oklahoma:											
Oklahoma City	0	------	0	2	4	4	0	2	0	0	44
Tulsa	0	------	------	0	------	2	0	------	0	15	------
Texas											
Dallas	2	17	4	12	7	2	0	2	0	11	77
Fort Worth	0	------	0	0	5	0	0	0	0	18	42
Galveston	1	------	0	13	2	2	0	1	0	0	21
Houston	2	10	3	8	10	1	0	8	0	2	112
San Antonio	0	40	1	42	15	2	0	7	0	2	82
Montana:											
Billings	0	------	0	0	0	1	0	1	0	0	12
Great Falls	0	------	0	0	1	4	0	0	0	0	14
Helena	0	------	0	2	0	1	0	0	0	0	5
Missoula	0	------	0	0	1	0	0	0	0	4	7
Idaho:											
Boise	------	------	------	------	------	------	------	------	------	------	------
Colorado:											
Colorado Springs	0	------	0	0	1	1	0	1	0	4	14
Denver	5	------	1	9	9	3	0	0	0	2	88
Pueblo	0	------	0	0	3	3	0	0	0	1	10
New Mexico:											
Albuquerque	0	------	0	0	0	2	0	3	0	6	12
Utah:											
Salt Lake City	0	------	1	73	1	5	0	0	0	49	36
Washington:											
Seattle	0	------	3	185	2	9	0	5	0	5	110
Spokane	0	------	0	2	3	6	0	1	0	1	31
Tacoma	------	------	------	------	------	------	------	------	------	------	------
Oregon:											
Portland	5	5	0	210	3	5	1	4	0	6	89
Salem	0	------	------	13	------	2	0	------	0	2	------
California:											
Los Angeles	1	100	3	18	7	38	0	17	0	10	421
Sacramento	0	3	0	3	0	1	0	2	0	5	24
San Francisco	3	5	1	3	7	9	0	8	0	5	203

State and city	Meningitis, meningococcus		Poliomyelitis cases	State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				**West Virginia:**			
Boston	1	1	0	Wheeling	1	0	0
New York:				**South Carolina:**			
Buffalo	1	0	0	Florence	0	1	0
New York	3	0	0	**Tennessee:**			
Illinois:				Memphis	1	1	0
Chicago	2	0	0	**Louisiana:**			
Michigan:				New Orleans	2	0	0
Detroit	1	0	0	Shreveport	0	1	0
Maryland:				**California:**			
Baltimore	1	0	0	Los Angeles	1	0	0

Encephalitis, epidemic or lethargic.—Cases: Great Falls, 1.
Pellagra.—Cases: Topeka, 2; Savannah, 6; Montgomery, 1; New Orleans, 1; Los Angeles, 2.
Typhus fever—Cases: New York, 3

FOREIGN REPORTS

BELGIUM

Vital statistics—1938.—Following are vital statistics for Belgium for the year 1938:

Marriages	61,402
Births	130,604
Deaths	108,682
Deaths under 1 year of age	9,575
Deaths under 1 year of age per 100 live births	7.23
Deaths from:	
Appendicitis	608
Cancer and other malignant tumors	10,325
Cerebral hemorrhage	8,786
Diabetes mellitus	1,711
Diarrhea and enteritis (under 2 years of age)	834
Diarrhea and enteritis (over 2 years of age)	325
Diphtheria	499
Deaths from—Continued.	
Influenza	1,789
Malaria	9
Measles	231
Nephritis	2,765
Pneumonia	7,535
Poliomyelitis	21
Scarlet fever	127
Senility	11,034
Syphilis	51
Tuberculosis (all forms)	5,744
Typhoid and paratyphoid fever	117
Violence	4,459
Whooping cough	380

BERMUDA

Vital statistics—1939.—The following are vital statistics for Bermuda for the year 1939:

Estimated total population	32,853
Marriages	257
Live births	729
Live births per 1,000 population	23.02
Stillbirths	23
Total deaths	321
Deaths per 1,000 population	10.1
Deaths under 1 year of age	47
Deaths under 1 year of age per 1,000 live births	64.4
Deaths from:	
Appendicitis	2
Cancer and other malignant tumors	24
Congenital malformations	49
Deaths from—Continued.	
Diabetes mellitus	5
Diarrhea and enteritis (under 2 years of age	1
Diarrhea and enteritis (over 2 years of age)	1
Heart disease	74
Nephritis	20
Pneumonia	23
Senility	2
Suicide	2
Syphilis	7
Tetanus	1
Tuberculosis (respiratory system)	6

CANADA

Provinces—Communicable diseases—Weeks ended January 6 and 13, 1940.—During the weeks ended January 6 and 13, 1940, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Week ended January 6, 1940

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	1			2		4
Chickenpox		14	10	163	421	36	23	22	50	739
Diphtheria		1		24	2	15	1	1	2	46
Influenza		101			126				6	233
Measles		4		50	415	20	1	3	16	509
Mumps			1	10	166	5		4	15	201
Pneumonia	3	10			58				9	80
Poliomyelitis					1			1		2
Scarlet fever	8	15	17	101	181	12	13	33	17	397
Trachoma								1		1
Tuberculosis		13	13	40	43	2	4	2		117
Typhoid and paratyphoid fever				18	2			1		21
Whooping cough		25	1	79	97	29	11	14	24	280

Week ended January 13, 1940

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis					1		2			3
Chickenpox		25	1	292	597	76	22	18	101	1,132
Diphtheria		1	1	34	3	12	4	1		56
Dysentery					2					2
Influenza		55			37	5			4	101
Measles		3		115	371	22	17	15	21	564
Mumps		2		41	263	14	25	1	2	348
Pneumonia		9			39	1	1		11	61
Poliomyelitis				1	2	1				4
Scarlet fever	2	21	12	110	169	29	10	47	15	415
Trachoma									2	2
Tuberculosis		13	19	25	66	2	1	4		130
Typhoid and paratyphoid fever				7	6			1		14
Whooping cough		16		153	149	72	27	9	24	450

EGYPT

Vital statistics—First and second quarters 1939.—The following table shows the numbers of births and deaths for the first and second quarters of 1939 in all places in Egypt having a health bureau:

	First quarter	Second quarter		First quarter	Second quarter
Number of live births	61,438	52,970	Deaths from—Continued.		
Live births per 1,000 population	49.1	42.3	Dysentery	50	87
Stillbirths	1,124	1,046	Heart disease	1,121	933
Deaths	28,667	42,097	Homicide	235	265
Deaths per 1,000 population	22.9	33.6	Influenza	29	21
Deaths under 2 years of age	6,781	14,596	Malaria	7	5
Deaths under 2 years of age per 1,000 live births	110	276	Measles	95	702
Deaths from:			Nephritis	993	991
Appendicitis	45	54	Plague	2	1
Cancer	254	312	Pneumonia	3,986	4,342
Cerebral hemorrhage, embolism, and cerebral thrombosis	663	683	Scarlet fever	1	----
Diabetes	215	191	Suicide	25	29
Diarrhea and enteritis (under 2 years of age)	4,312	12,966	Syphilis	88	132
Diphtheria	127	94	Tuberculosis (all forms)	629	693
			Typhoid fever	142	199
			Typhus fever	68	147
			Whooping cough	5	14

Estimated population, 1938, 5,006,800.

SWITZERLAND

Communicable diseases—November 1939.—During the month of November 1939, cases of certain communicable diseases were reported in Switzerland as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	6	Paratyphoid fever	3
Chickenpox	127	Poliomyelitis	46
Diphtheria	93	Scarlet fever	538
German measles	5	Tuberculosis	225
Influenza	33	Typhoid fever	14
Measles	415	Undulant fever	9
Mumps	97	Whooping cough	299

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

NOTE.—A cumulative table giving current information regarding the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS of February 23, 1940, pages 342-345. A similar table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

Thailand—Noangkhay Province.—During the week ended February 24, 1940, 49 cases of cholera were reported in Noangkhay Province, Thailand.

Plague

Northern Rhodesia—Barotseland.—During the week ended February 24, 1940, 1 fatal case of plague was reported in Barotseland, Northern Rhodesia.

Yellow Fever

French Equatorial Africa—Madingo Kayes.—On March 4, 1940, 1 fatal suspected case of yellow fever was reported in Madingo Kayes, French Equatorial Africa.

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