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THE INCIDENCE AND FUTURE EXPECTANCY OF MENTAL DISEASE[1]

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It is commonly believed that the proportion of the population suffering from mental disease is increasing. An impressive array of statistics supports this belief. Quite aside from future trends, the present problem occasioned by mental disorders is one of major proportions. It is estimated that the annual cost of hospitalized patients alone is between $150,000,000 and $200,000,000 and that these patients occupy 47 percent of the total number of hospital beds.

For the country as a whole the number of persons hospitalized for mental disease increased more than 40 percent from 1926 to 1936 (table 1). In New York State, where fairly adequate hospital facilities are available, the number of first admissions per 100,000 population has consistently increased for the past 30 years, although similar data for Massachusetts show no perceptible upward trend (fig. 1).

One of the most common explanations of the apparent increase in the incidence of mental disease is the complexity and strain of modern life. According to this theory, the human race developed in a simple rural environment, and the physical and mental characteristics of the race evolved as an adaptation to that environment. However, the development of modern civilization has led to the concentration of an increasing proportion of the population in cities. It is thought that, biologically, man is not adapted to modern city life, with its attendant stresses and strains, and that the multiplicity of stimuli, which constantly affect each person, hastens mental maladjustment.

It is important to investigate carefully the truth of this theory; for, if true, the situation is a severe indictment of our culture and is a harbinger of eventual racial decay. Even though the achievements of a culture be great, if they are accomplished at the expense of the biological heritage of the race, eventual doom is almost certain.

Owing to the fact that there is no sharp line of demarcation between normality and abnormality, it is practically impossible to decide

[1] Revision of a paper presented at the Round Table of the American Psychopathological Association, Atlantic City, May 4, 1938.

TABLE 1.—*Number of patients present at the beginning of each year and number of first admissions per 100,000 population—State hospitals, United States, 1926–36*

Year	Patients present on January 1		First admissions		Year	Patients present on January 1		First admissions	
	Number	Rate per 100,000	Number	Rate per 100,000		Number	Rate per 100,000	Number	Rate per 100,000
1926	246, 486	217	52, 793	46	1932	305, 031	245	67, 083	54
1927	256, 858	219	56, 144	47	1933	321, 824	257	69, 368	55
1928	264, 511	222	59, 417	50	1934	332, 094	262	69, 934	55
1929	272, 252	226	60, 500	50	1935	342, 167	269	72, 438	57
1930	280, 252	229	62, 738	51	1936	353, 305	276	--------	--------
1931	292, 284	236	67, 152	54					

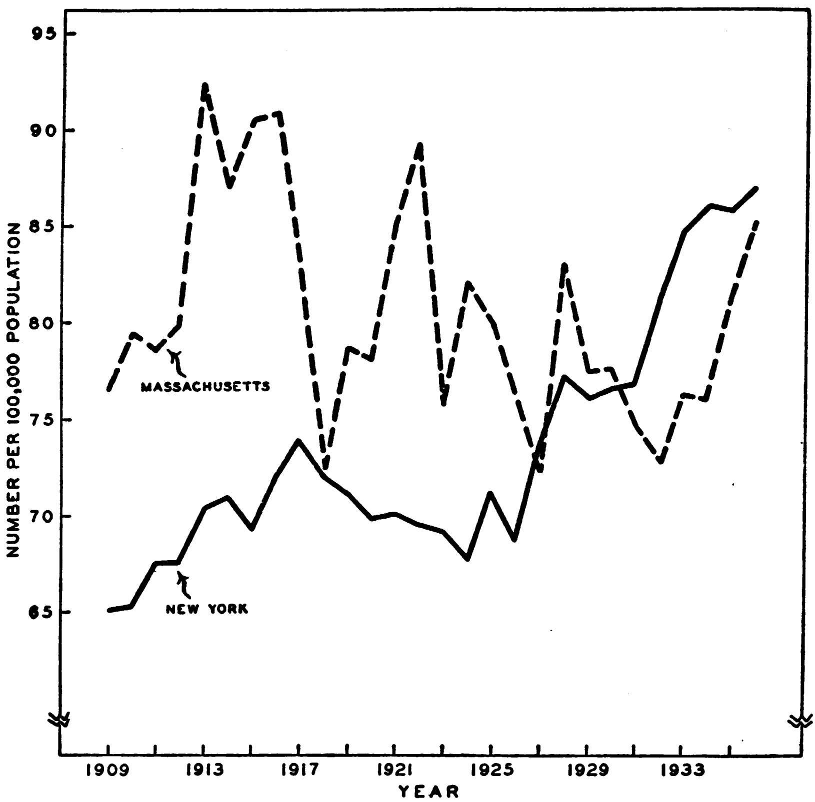

FIGURE 1.—Number of first admissions to mental hospitals per 100,000 population, New York and Massachusetts, 1909–1935

whether or not the relative number of persons with mental disease is increasing. Fundamentally, even though there is a definite physical basis for many mental disorders, mental disease, or insanity as it is popularly called, is a cultural concept and varies from one group to another. In some situations the mentally deranged have become soothsayers, medicine men, prophets, or group leaders; in other situations the same persons would be incarcerated.

Only a few hundred years ago the violently insane were thought to be obsessed by demons and were frequently killed or forced to leave the community. With some modification, mainly the substitution of incarceration as the method of treatment, this idea of "insanity," as it was called, prevailed even later, and indeed still prevails in some places; but, with increased knowledge of the functioning of the human body, the concept of mental ill health has gradually expanded until today it includes many conditions formerly considered normal. The recognition that mental ill health is more prevalent than hospital admissions reveal has led to the establishment of child guidance clinics, the employment of psychiatric social workers, the addition of psychiatrists to the staffs of hospitals, prisons, and similar institutions, to devoting special attention to problem children in school and to various adult education programs.

It is gradully becoming accepted that mental aberration is simply a form of illness which may be cured or alleviated by suitable care and treatment. This attitude is clearly reflected by the fact that the "insane asylums" of 50 years ago have become "mental hospitals" today. Commitment to a hospital is no longer universally regarded with the same horror as formerly. This change in the public attitude toward hospitalization, which has been concomitant with a changing cultural conception of mental disease, has undoubtedly increased the frequency with which cases of mild mental disorder are hospitalized.

The increasing proportion of the population living in cities also tends to increase the use of hospital facilities. Many persons, who would be regarded as merely "queer" in a rural community, undoubtedly experience difficulty in adjusting themselves to an urban environment. Moreover, due to inadequate housing, low income, and the uncertainty of continuous employment, home care of nonviolent cases of mental disorder, especially those associated with senility, is more difficult in the city than on the farm. The two principal exogenous factors which are thought to effect the prevalence of mental disease, alcoholism and syphilis, are also more common in urban communities. For these reasons some increase in the proportion of the population thought to be mentally ill is to be expected, even if there has been no real increase in the incidence of mental disorder.

However, it is impossible to determine whether or not this is true, because there is no practical method of determining the incidence of mental disease, either at the present time or in the past. Regardless of the amount of mental illness in the population, we are forced to measure it by the number of mental cases recognized and committed to an institution. This method of measurement is not so unsatisfactory as might at first appear, since cases of mental disease become a public burden only after they are recognized. And so, instead of speaking of the number of persons with some form of mental disease, a number which is unknown, it will be necessary to restrict this discussion to the number of persons who are committed to a mental disease hospital. This does not, of course, include all persons with a mental disorder, but merely those who have been recognized as needing institutional care and for whom hospital facilities are available.

This measure of mental illness will not lead to an unequivocal answer to the question of whether or not the proportion of the population with mental disease is increasing. An increase in the proportion of the population committed to a mental hospital does not necessarily mean that an increasing proportion of the population has some form of mental disease. It may arise solely from the operation of the factors previously mentioned. However, if there is no real increase in the proportion of the population committed to a mental hospital, then it is probably true that there has been no increase in the incidence of mental disease.

This measure of mental disease may be expressed in two ways—one, the total number of patients under care during a given period, the other, the number of first admissions during a corresponding period. The former is a measure of the total public burden of mental disease; the latter is a measure of the proportion of the population which eventually is committed at least once to a mental hospital.

Since the present discussion is concerned solely with the latter problem, it is based upon first admissions only. It should be noted, however, that the number of first admissions is not an accurate index of the total number of persons with mental disease at any time, since it does not take into consideration the duration of the disease nor the number of readmissions. Consequently, the number of persons with mental disease is always greater than the number of first admissions.

There are several ways of expressing the incidence of mental disease as just defined. One frequently used index is the number of first admissions per 100,000 population, but this rate is subject to the same criticism as a crude death rate; namely, that it is affected by the composition of the population to which it refers. If the population contains a large proportion of old persons, the rate will be high, since the elderly are more subject to mental disease than the youthful.

Age specific commitment rates for mental disease can be computed in the same way as age specific mortality rates, but it is difficult to summarize concisely a large number of such rates.

A simple modification of the method of computing a life table leads to a measure of mental disease analogous to the expectation of life of the life table. This measure may be called the expectation of mental disease, which is a simplified expression of the longer phrase, expectation of commitment to a mental hospital. This is calculated by applying the mortality and first commitment rates of a given population at a given time to a hypothetical number of infants, usually 1,000 or 100,000, and determining the number who would be alive and sane at each age if they were continually subject to the assumed mortality and mental disease rates. The expectation of mental disease is simply the ratio of the number who live to become insane to the original 1,000 infants. This is also referred to as the probability or chance of developing mental disease. For example, it may be said that 50 out of every 1,000 infants will be committed to a mental hospital before death or that the probability or chance of insanity is 50 per 1,000 or 5 per 100.

To a certain extent the increase in the number of first admissions to mental hospitals merely reflects an increase in hospital facilities. In order to eliminate this factor insofar as it is possible, the data used will be the number of first admissions to mental hospitals in Massachusetts, New York, and Illinois, where hospital facilities have been fairly adequate for several years. These States had a combined population of more than 24,000,000 in 1930.

Fifty-seven out of every 1,000 male infants and 53 out of every 1,000 female infants would live to be committed to a mental hospital if subject throughout their lifetime to the mortality and first admission for mental disease rates prevailing in Massachusetts during 1929–31. These represent increases of 3.6 and 8.2 percent, respectively, since 1920, when 55 male and 49 female babies could expect to live to be committed to a mental hospital (table 2 and fig. 2).

For females the chance of eventually being committed to a mental hospital increased at each age throughout the entire span of life. In general, the largest increases were at the older ages. Since there are very few commitments before age 15, the differences in the probabilities of commitment for the younger ages are determined by differences in mortality rates at those ages.

In contrast to the females, the probability of developing mental disease among males decreased from ages 5 to 55 during the period 1920 to 1930. As will be shown later, this difference in the expectancy on the basis of sex results from different rates of change in the mortality rates of the two sexes.

In New York State the chances of eventual commitment for mental disease are slightly less than in Massachusetts, being 53 per 1,000 for male infants and 48 per 1,000 for female infants. With the exception of a few ages for women, the chances increased appreciably at all ages for both sexes. The increase for males was considerably greater than in Massachusetts (table 3 and figs. 3 and 4).

The exact meaning of the data in tables 2 and 3 should be kept clearly in mind. They apply to a hypothetical population unaffected by emigration or immigration and subject throughout its lifetime to the mortality rate and first commitment rate for mental disease existing in 1930. Moreover, the figure for any age is affected by the rates at

Table 2.—*Chances per 1,000 of being committed to a hospital for mental disease, by age and sex, total population, State of Massachusetts, 1919–21, and 1929–31*

Exact age	Males			Females		
	Chance per 1,000		Percent change 1919–21 to 1929–31	Chance per 1,000		Percent change 1919–21 to 1929–31
	1919–21	1929–31		1919–21	1929–31	
0	55	57	+3.6	49	53	+8.2
5	64	62	−3.1	55	57	+3.6
10	65	63	−3.1	56	58	+3.6
15	65	63	−3.1	56	58	+3.6
20	64	61	−4.7	55	56	+1.8
25	61	59	−3.3	53	54	+1.9
30	58	55	−5.2	51	52	+2.0
35	54	52	−3.7	47	49	+4.3
40	50	48	−4.0	44	46	+4.5
45	46	45	−2.2	41	43	+4.9
50	43	42	−2.3	37	40	+8.1
55	41	40	−2.4	34	36	+5.9
60	38	38	0.0	32	34	+6.3
65	36	37	+2.8	31	33	+6.5
70	34	35	+2.9	30	32	+6.7
75	30	33	+10.0	27	30	+11.1
80	27	30	+11.1	25	28	+12.0

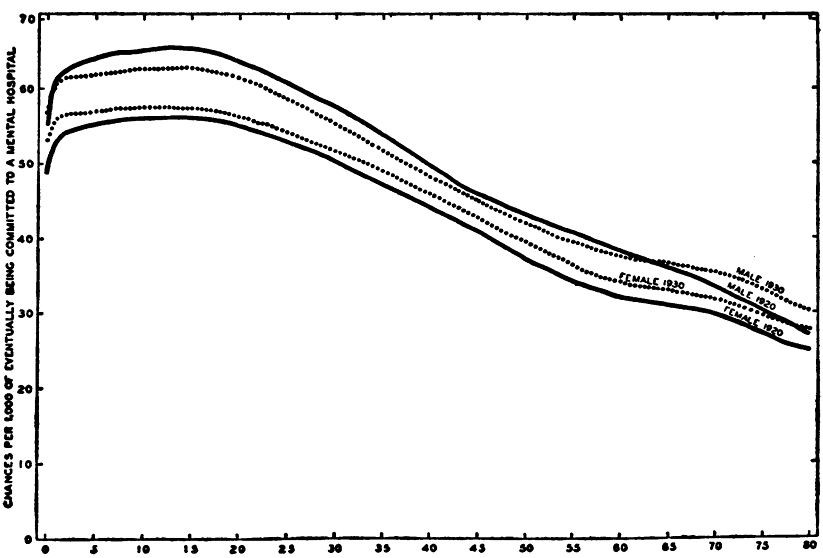

Figure 2.—Chances per 1,000 of eventually being committed to a mental hospital, by sex and age, total population, Massachusetts, 1919–21 and 1929–31.

each older age. For example, the fact that 57 out of 1,000 male infants will eventually be admitted to a hospital for mental disease results from the mortality and mental disease rates affecting these infants throughout their lifetime. If they should all die before age 20, very few would develop mental disease; if all lived until age 80, a large number would develop mental disease. It is obvious, then,

Table 3.—*Chances per 1,000 of being committed to a hospital for mental disease, by age and sex, total population, New York State, 1919–21* [1] *and 1929–31*

Exact age	Males			Females		
	Chance per 1,000		Percent change 1919–21 to 1929–31	Chance per 1,000		Percent change 1919–21 to 1929–31
	1919–21	1929–31		1919–21	1929–31	
0	47	53	12.8	44	48	9.1
5	54	58	7.4	50	51	2.0
10	54	59	9.3	51	52	2.0
15	54	59	9.3	51	52	2.0
20	53	58	9.4	50	51	2.0
25	50	55	10.0	49	49	0.0
30	47	52	10.6	46	47	2.2
35	44	48	9.1	44	44	0.0
40	40	45	12.5	41	41	0.0
45	37	41	10.8	38	38	0.0
50	34	38	11.8	34	35	2.9
55	31	36	16.1	31	32	3.2
60	28	34	21.4	29	30	3.4
65	26	32	23.1	26	29	11.5
70	23	31	34.8	24	28	16.7
75	20	28	40.0	22	26	18.2
80	18	24	33.3	20	24	20.0

[1] Data for 1919–21 are from H. M. Pollock and Benjamin Malzberg, "Expectation of Mental Disease," Psychiatric Quarterly, October 1928.

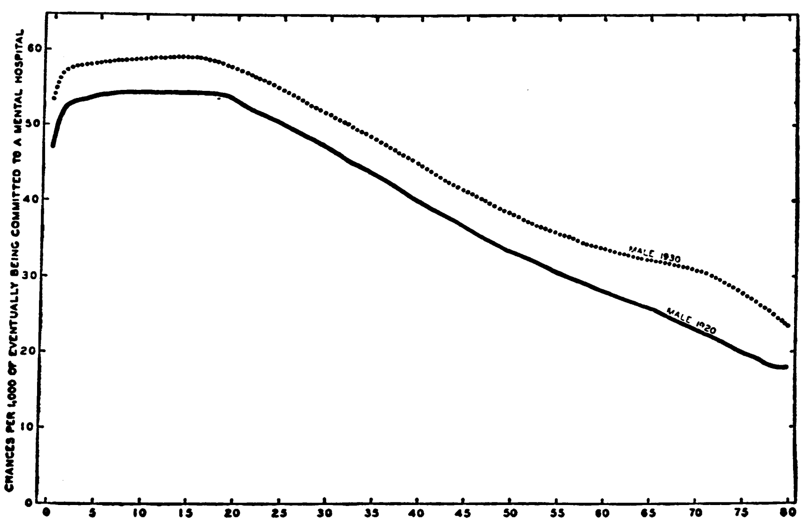

Figure 3.—Chances per 1,000 of males eventually being committed to a mental hospital, by age, total population, New York State, 1919–21 and 1929–31.

that the data in tables 2 and 3 reflect changes both in mortality and mental disease rates.

To compare changes in the incidence of mental disease at any age independently of changes in mortality rates or of changes in mental disease rates at other ages, it is necessary to consider commitment rates for each age separately as given in tables 4 and 5. These

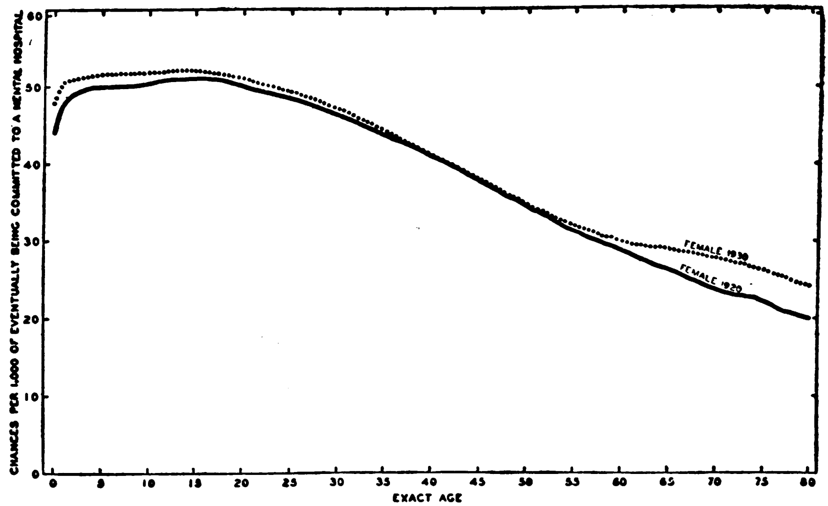

FIGURE 4.—Chances per 1,000 of females eventually being committed to a mental hospital, by age, total population, New York State, 1919–21 and 1929–31.

TABLE 4.—*Number of first admissions to hospitals for mental diseases per 100,000 total population, by age and sex, State of Massachusetts, 1919–21 and 1929–31*

Exact age	Males: Admissions per 100,000 population		Males: Percent change 1919–21 to 1929–31	Females: Admissions per 100,000 population		Females: Percent change 1919–21 to 1929–31
	1919–21	1929–31		1919–21	1929–31	
15	33	24	−27.3	25	21	−16.0
20	76	64	−15.8	57	49	−14.0
25	94	82	−12.8	76	62	−18.4
30	103	87	−15.5	93	70	−24.7
35	116	96	−17.2	96	82	−14.6
40	119	98	−17.6	92	85	−7.6
45	110	102	−7.3	106	92	−13.2
50	104	110	+5.8	111	104	−6.3
55	122	116	−4.9	102	106	+3.9
60	147	131	−10.9	106	102	−3.8
65	192	165	−14.1	133	129	−3.0
70	264	243	−8.0	199	195	−2.0
75	331	355	+7.3	261	267	+2.3
80	399	434	+8.8	314	341	+8.6

tables present the number who will be committed to a mental hospital within one year, out of 100,000 persons alive and sane at the beginning of each age. For example, the figure 24 opposite males aged 15 for 1929–31 in table 4 means that out of 100,000 males alive and sane on their fifteenth birthday 24 will be committed to a mental hospital before they become 16 years of age.

In Massachusetts, from 1920 to 1930, with two exceptions, these rates decreased at each age for both males and females until age 75. The decreases were larger for ages under 40 and were generally slightly greater for males than for females (fig. 5).

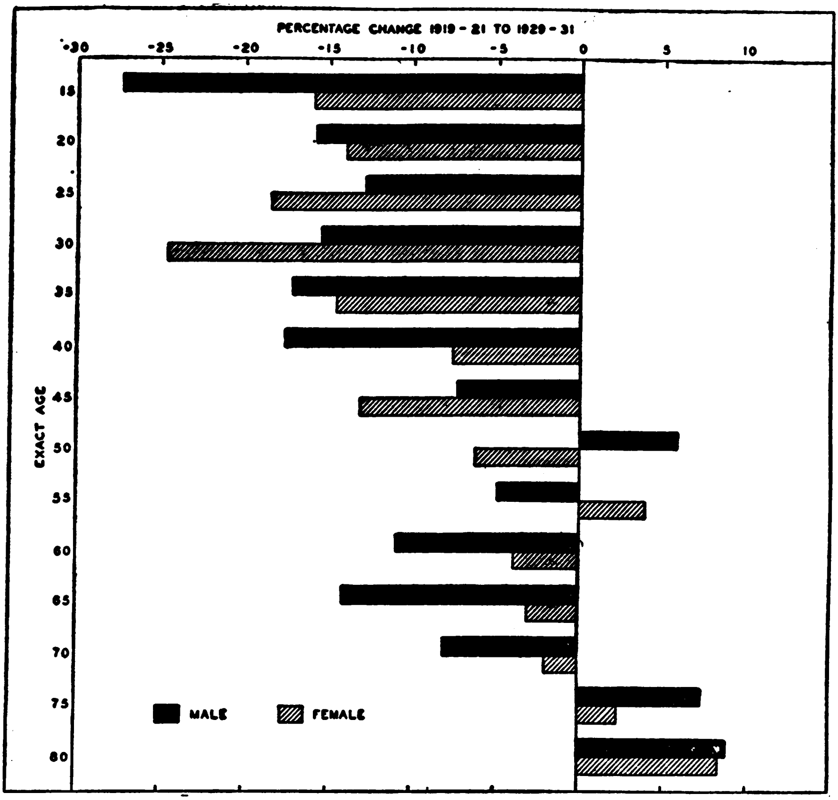

FIGURE 5.—Percentage change in the number of first admissions to mental hospitals per 100,000 total population, by age and sex, Massachusetts, 1919–21 to 1929–31.

TABLE 5.—*Number of first admissions to hospitals for mental disease per 100,000 total population, by age and sex, New York State, 1919–21* [1] *and 1929–31*

Exact age	Males			Females		
	Admissions per 100,000 population		Percent change 1919–21 to 1929–31	Admissions per 100,000 population		Percent change 1919–21 to 1929–31
	1919–21	1929–31		1919–21	1929–31	
15	35	27	−22.9	24	19	−20.8
20	78	73	−6.4	48	48	0.0
25	95	89	−6.3	70	64	−8.6
30	102	91	−10.8	87	75	−13.8
35	107	102	−4.7	91	84	−7.7
40	108	111	+2.8	94	94	0.0
45	102	116	+13.7	100	97	−3.0
50	99	123	+24.2	106	100	−5.7
55	106	131	+23.6	108	105	−2.8
60	122	149	+22.1	111	109	−1.8
65	149	182	+22.1	135	133	−1.5
70	190	257	+35.3	167	186	+11.4
75	220	355	+61.4	214	265	+23.8
80	261	390	+49.4	280	333	+18.9

[1] Data for 1919–21 are from H. M. Pollock and Benjamin Malzberg, "Expectation of Mental Disease," Psychiatric Quarterly, October 1928.

Much the same holds true for females in New York State, except that the percentage decrease was smaller; but for males, beginning at age 40 the rates in New York State increased rapidly at each age from 1920 to 1930 (fig. 6). The reason for this is not readily apparent. Examination of the commitment rates for individual psychoses reveals that this increase results largely from an increase in the manic depressive and cerebral arteriosclerotic psychoses.

The seeming contradiction of tables 2 and 3 and tables 4 and 5 is more apparent than real. Owing to the fact that the decrease in mortality rates between 1920 and 1930 permits a larger proportion of the popula-

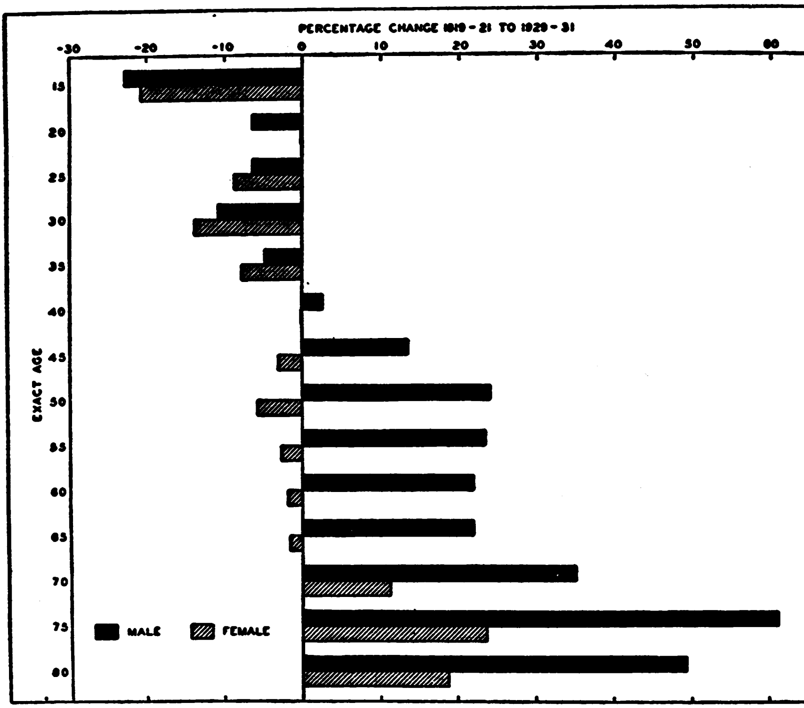

FIGURE 6.—Percentage change in the number of first admissions to mental hospitals per 100,000 total population, by age and sex, New York State, 1919–21 to 1929–31.

tion to live to the ages when mental disease most frequently develops, it is inevitable that there should be an increase in the proportion of the total population which eventually is subject to some mental disorder, even though the probability of mental disease at each age remains unchanged. The increase in the expectation of life means that an increased number of persons now live to develop mental disease. Similarly, an increase in mortality rates would result in fewer persons living to develop mental disease, so that the expectation of mental illness at birth would decrease.

The rates of first admissions to mental hospitals in Illinois shown in table 6 are ungraduated average rates for the respective age groups. The rates standardized for age decreased 3.1 percent for males and 5.3

TABLE 6.—*Number of first admissions to mental hospitals per 100,000 population, by age and sex, Illinois, 1922–24 and 1929–31*

Age	Male			Female		
	1922–24	1929–31	Percentage change	1922–24	1929–31	Percentage change
10–14	2.2	0.2	−90.9	2.2	1.0	−54.5
15–19	35.8	28.6	−20.1	20.8	20.0	−3.8
20–24	77.2	65.1	−15.7	42.4	37.8	−10.8
25–29	96.4	81.1	−15.9	59.2	52.3	−11.7
30–34	120.3	100.5	−16.5	76.7	63.9	−16.7
35–39	139.1	116.2	−16.5	76.9	71.4	−7.2
40–44	145.9	123.8	−15.1	85.4	80.4	−5.9
45–49	125.1	123.0	−1.7	87.7	85.5	−2.5
50–54	126.3	133.9	+6.0	89.0	79.1	−11.1
55–59	116.5	146.8	+26.0	73.8	84.2	+14.1
60–64	149.0	165.4	+11.0	93.0	83.5	−10.2
65–69	175.9	216.1	+22.9	96.7	109.8	+13.5
70–74	238.0	270.3	+13.6	160.4	140.8	−12.2
75–79	260.8	399.5	+53.2	197.3	208.3	+5.6
80 and over	306.6	463.8	+51.3	203.3	290.4	+42.8
Total	83.6	83.9	+0.4	51.2	50.5	−1.4
Standardized rate [1]	86.6	83.9	−3.1	53.3	50.5	−5.3

[1] Standardized on the basis of the 1930 population of Illinois.

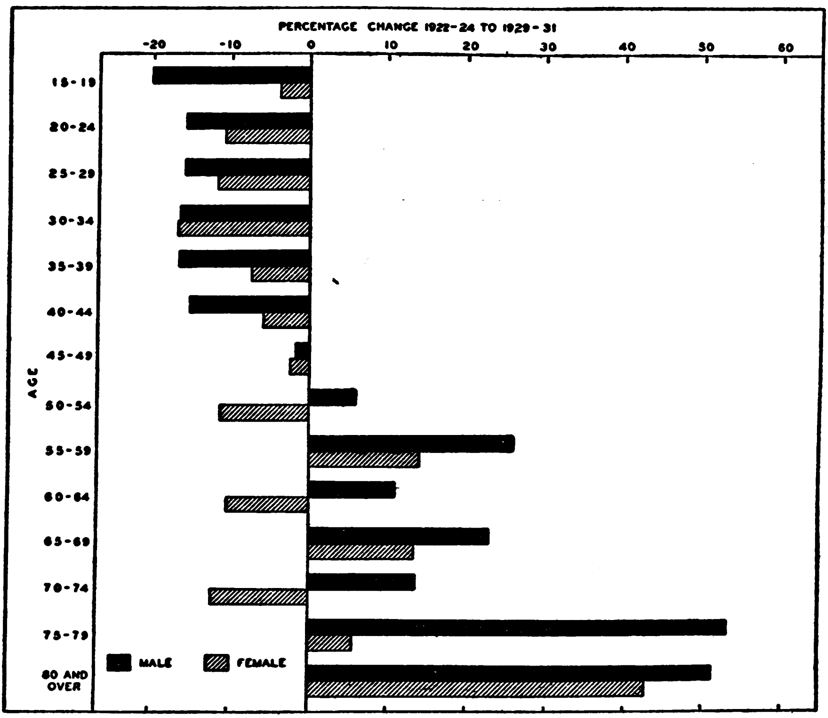

FIGURE 7.—Percentage change in the number of first admissions to mental hospitals per 100,000 total population, by age and sex, Illinois, 1922–24 to 1929–31.

percent for females during the 7-year period 1922–24 to 1929–31. Substantial decreases occurred until the age group 75–79 for females. The rates for males decreased for all age groups under 50–54 but increased markedly at the older age groups (fig. 7).

From the data in tables 7 and 8 an appreciation can be obtained of the influence of changes in mortality rates upon the incidence of mental disease. The expectation of mental disease based upon first commitment rates for 1929–31 and mortality rates for 1919–21, which assumes that mortality rates remained unchanged during the decade, is shown in these tables. For Massachusetts these figures are about 10 percent less than those computed from the mortality rates of 1929–31 (table 7, column 5). In other words, if mortality rates had remained unchanged during the two periods, the probability of developing mental disease during a lifetime would have decreased 10 percent instead of increasing as it did. The increase in average length of life accounted for the entire increase in the incidence of mental disease.

TABLE 7.—*Chances per 1,000 at birth of being committed to a hospital for mental disease, 1919–21 and 1929–31, compared with corresponding chances based upon the mortality rate of 1919–21 and the commitment rate of 1929–31, by sex, total population, Massachusetts*

Sex	Chances per 1,000 of being committed to a hospital for mental disease, based on—			Ratio of column 2 to column 1	Ratio of column 3 to column 1
	1919-21 commitments 1919-21 mortality	1929-31 commitments 1929-31 mortality	1929-31 commitments 1919-21 mortality		
Male	55	57	49	1.04	0.89
Female	49	53	44	1.08	0.90

TABLE 8.—*Chances per 1,000 at birth of being committed to a hospital for mental disease, 1919–21 and 1929–31, compared with corresponding chances based upon 1919–21 mortality statistics and 1929–31 first admissions, by sex, total population, New York State*

Sex	Chances per 1,000 of being committed to a hospital for mental disease, based on—			Ratio of column 2 to column 1	Ratio of column 3 to column 1
	1919-21 commitments 1919-21 mortality	1929-31 commitments 1929-31 mortality	1929-31 commitments 1919-21 mortality		
Male	47	53	54	1.13	1.15
Female	44	48	46	1.09	1.05

In New York State the expectation of life decreased after about age 40 for males and age 60 for females. Consequently, some decrease in the expectation of mental disease would be expected, especially among males, if there had been no increase in the incidence of mental disease. The decrease in mortality rates for females accounted for about one-half of the increase in the expectation of mental disease. The remaining increase resulted from an increase in the age specific commitment rates at the older ages. Since mortality rates actually increased for males at the ages when the incidence of mental disease is greatest, the entire increase in mental disease arose from increases in the age specific commitment rates.

In general, the data for Massachusetts, New York, and Illinois do not support the contention that the incidence of mental disorders has been rapidly increasing. This does not mean that the public burden of caring for persons with mental disease has not been increasing. The average number of patients in State hospitals increased from 248,852 in 1926 to 347,620 in 1935. Rather it means that most of the increase may be attributed to increase in the expectation of life, an increasing proportion of old people in the population, increasing urbanization, and similar environmental factors. As the standards of care and treatment are raised, the total cost will increase, although there is no increase in the incidence of the disease.

Even if mental aberration apparently is not increasing appreciably, its importance should not be minimized. Of the 2,144,800 children born in 1936, from 110,000 to 120,000 will probably be committed to a hospital for mental disease. The loss in future productive power as well as the cost of caring for this number of patients emphasizes the importance of developing a thorough mental hygiene program.

This is all the more important, since the total burden of caring for the mentally ill is almost certain to increase, even though there is no increase in the incidence of mental disease at each age. Changes now underway in the population of the nation presage an increase in the number of mentally ill in the total population because a larger proportion of the population will be in the age groups when mental disease is most frequent (table 9).

TABLE 9.—*Percentage age distribution, total population, United States, 1900, 1930, 1960* [1]

Age	1900	1930	1960
0–4	12	9	7
5–19	32	30	22
20–44	38	38	38
45–64	14	18	23
65 and over	4	5	10
Total	100	100	100

[1] Estimated population for 1960 taken from Population Statistics: I. National Data, National Resources Committee, 1937.

An idea of the effect of population changes upon the problem of mental disease can be obtained by applying the age specific first commitment rates of New York State, 1929–31, to the estimated population of the United States in 1960. In an estimated population of about 150,000,000 in 1960, there would be nearly 135,000 persons committed to mental hospitals for the first time. The number is nearly twice the present number of annual first admissions. An appreciable increase in the cost of caring for the mentally ill must be expected, even if there is no increase in the incidence of such diseases.

SUMMARY

It is commonly believed that there has been an alarming increase in mental disease in recent years and that this is in large part the direct result of the stress and strain of a complex urban environment.

Analysis of the number of first admissions to mental hospitals in Massachusetts, New York, and Illinois does not bear out this belief. The number of first admissions per 100,000 population decreased among women under 70 years of age in each State. In Massachusetts the same was true for men. In New York and Illinois commitment rates decreased at the younger ages, but after age 45 or 50 some increase occurred.

Even though the incidence of mental disease has not been increasing as rapidly as commonly supposed, nevertheless mental diseases constitute an important health problem. Unless there is a decrease in the first admission rates to mental hospitals, from 110,000 to 120,000 of the 2,144,800 infants born during 1936 will eventually be committed to a hospital for mental disease. This number includes only the most severe cases of mental illness and excludes the large number of emotionally unstable and unbalanced persons who should be included in a comprehensive mental hygiene program.

Owing to the increasing proportion of the population in the older age groups, an increase in the number of admissions to mental hospitals is to be expected in the future, since rates of mental disease are highest at the older ages. A continued increase in expectation of life will also tend to increase the number of mentally ill, since more persons will live to the ages when mental disease is most frequent. Assuming that the commitment rates for mental disease for the total United States are no greater in 1960 than they were in New York State during the 3-year period 1929–31, it is estimated that about 135,000 persons annually will be committed to a mental hospital for the first time. This is nearly twice the present number of first commitments.

STUDIES ON THE MECHANISM OF EXPERIMENTAL INTRANASAL INFECTION IN MICE*

By CHARLES ARMSTRONG, *Senior Surgeon, United States Public Health Service*

The causes which determine that certain common respiratory ailments tend to be at their minimum prevalence during the hot summer and fall months and to increase with the advent of cool weather, while with poliomyelitis and encephalitis of the St. Louis and Japanese types the reverse is true, are largely matters of conjecture.

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Previously reported pathological studies (*1*) indicate that the intensity of the brain reactions in mice experimentally infected with the virus of St. Louis encephalitis tend to be at a minimum during the warm season of the year or when artificially high environmental temperatures are maintained, and that they tend to intensify at lower temperatures. Notwithstanding these pathological findings, the incidence of death following intranasal inoculation with a uniform dose of St. Louis encephalitis virus "D" did not appear to be significantly different in groups of mice held at temperatures of approximately 95°, 70°, and 42° F., although deaths did tend to occur somewhat earlier at the higher environmental temperatures (table 1). These results, which have been verified many times during our studies, suggest that temperature *per se* has but little effect upon the susceptibility of groups of mice to intranasally inoculated encephalitis virus. Nevertheless, in man the pathogenic agents of diphtheria (the disease or carrier states), scarlet fever, catarrhal conditions, and the like, apparently do tend to multiply or spread at an increased rate with the advent of cool weather. It further appears reasonable to assume that the factors accountable for the increase in these agents probably exert a similar stimulating influence upon the so-called normal bacterial flora of the nose and throat as well.

With this conception in mind, the writer was led to investigate the possibility that an alteration of the nasal flora, whatever its cause, might exert an influence upon the susceptibility of experimental animals to intranasal infection with certain neurotropic viruses.

PROCEDURE OF STUDY

The nares of several normal white mice from clean stock were washed out with sterile saline and the pooled washings were cultured in plain broth and on blood agar slants. After 24 to 48 hours, the growth was removed from the agar slants by means of a loop and suspended in saline to a turbidity approximating 500 parts of silica per million. The broth cultures were employed either directly or diluted with equal parts of saline.

These suspensions of nasal bacteria (types undetermined) were given 2 to 4 times intranasally to groups of white mice [1] at intervals of 2 to 7 days; each mouse was lightly etherized, and 0.03 cc of the suspension was dropped into its nostrils. The mice usually showed no ill effects from the treatment. One to 2 days following the last bacterial instillation, the mice so treated, together with the nonprepared controls, were inoculated intranasally with 0.03 cc of a suspension of encephalitis virus (St. Louis type). One mouse was inoculated from each cage in succession so that the period of time between the begin-

[1] White mice from various producers were employed—the only precaution being that mice for each test be from a single source.

ning and completion of inoculation of all cages was approximately the same. The identity of the cages was unknown to the administrator of the virus. The animals were observed for 14 days and the date of all deaths was recorded.

By reference to table 1, it may be noted that the various environmental temperatures apparently exerted no noteworthy effect upon the total number of deaths. The prepared groups of mice maintained at temperatures of approximately 95°, 70°, and 42° F. in each instance, however, resisted the infection better than the controls, 63.8 percent of the total prepared animals surviving as compared to 24.7 percent for the controls. Surviving animals of all groups tended to be immune to subsequent intracerebral inoculation of the virus.

TABLE 1.—*Effect of temperature and intranasal instillation on intranasal inoculation of mice with encephalitis virus*

		0.03 cc suspension of nasal bacteria intranasally			Virus "D" 0.03 cc 1:1000 dil. intranasally	Deaths, by dates, of prepared and nonprepared mice following encephalitis virus intranasally												Survived	Percent surviving	Total percent dying
		Number of mice																		
	Date	1/24	1/31	2/3	4	5	6	7	8	9	10	11	12	13	14	15	16			
Room temperature	Nasal culture in saline	35	34	33	33	---	---	---	---	---	---	4	6	2	2	---	---	19	57.5	49.0
	Nasal culture broth	35	35	34	33	---	---	---	---	---	---	4	3	4	---	---	---	22	66.6	
	Nonprepared controls	35	35	34	34	---	---	---	---	---	2	6	6	9	1	---	---	10	29.4	
Cold room	Nasal culture in saline	35	33	32	32	(1)	---	(1)	---	---	---	5	6	---	---	---	---	19	63.3	46.8
	Nasal culture broth	35	35	34	31	---	---	---	(1)	---	---	5	1	1	---	---	---	23	76.6	
	Nonprepared controls	35	34	34	34	---	---	---	---	---	3	14	5	---	3	---	1	8	23.5	
Hot room	Nasal culture in saline	35	35	35	34	---	(1)	---	---	---	---	13	2	---	1	---	---	17	51.5	53.6
	Nasal culture broth	35	33	31	30	---	---	---	(1)	---	1	7	1	---	---	---	---	20	68.9	
	Nonprepared controls	35	35	33	33	---	---	---	---	---	6	18	2	---	---	---	---	7	21.2	

[1] Excluded; death too early to be due to virus.

MECHANISM OF PROTECTION

Cultures from the nostrils of several groups of apparently normal mice have been employed in various tests and the results have been uniformly consistent, with one exception. In this instance, a pathogenic agent was present which killed, with a hemorrhagic pneumonia, many of the mice receiving the culture. It therefore appeared probable that no specific type of organism was involved. However, to test this belief further, a mixed culture, No. 824, was plated and four distinctly different colonies showing microscopically distinct organisms were cultured in broth. After 24 hours, the various broth cultures were administered intranasally to separate groups of mice, administration being repeated three times at intervals of 3 to 4 days. The virus was given intranasally on the day following the last bacterial instillation. The four cultures and also a fifth, one of Park 8 diphtheria bacilli conveyed a definite degree of protection as shown by a comparison with the control group (table 2). It was likewise found that both bacterial suspensions killed by heating at 158° to 167° F. for 45 minutes and the sterile Berkefeld filtrate from broth cultures were effective.

TABLE 2.—*Protective effect of intranasal administration of 5 different broth cultures*

Broth culture used	Broth culture, 0.03 cc intranasally — Number of mice			0.03 cc 1:1050 dil. "D" virus, intranasally	Deaths, by dates, from encephalitis virus administered following pure strain of broth cultures of organisms												Number surviving	Per cent surviving
Date	5/9	12	16	17	18	19	20	21	22	23	24	25	26	27	28	29		
Colony 1 (cocci)	35	35	35	35	---	---	---	1	---	---	4	9	1	3	---	---	17	50.0
Colony 2 (bacilli)	35	35	34	34	---	---	---	---	---	---	3	4	5	1	---	1	18	52.9
Colony 3 (bacilli)	35	34	33	33	---	1	---	---	---	---	4	3	4.	1	---	---	20	62.5
Colony 4 (cocci and bacilli)	35	34	32	32	---	---	---	---	---	---	4	7	3	1	---	---	17	53.1
Park 8 culture (broth)	35	35	31	31	---	---	---	---	---	1	5	4	4	---	---	---	17	54.8
Nonprepared controls	35	34	32	32	---	---	---	---	---	4	11	7	6	1	---	---	4	12.5

That the presence of bacteria *per se* in the nasal cavities was not the immediate cause of the protective effect against the encephalitis infection was further clearly shown by the addition of bacteria to the intranasally inoculated virus, when it was found that their presence exerted no protection but, as employed, actually tended to lessen the protection, especially in the non-prepared control groups (table 3).

TABLE 3.—*Effect of adding bacterial suspension to virus*

	0.03 cc bacterial suspension intranasally — Number of mice			0.03 cc 1:1000 dil. "D" virus + bacteria	0.03 cc 1:1000 dil. "D" virus	Deaths, by dates, following inoculation with encephalitis virus and with same virus suspension plus bacterial suspension											Number surviving	Per cent surviving
Date	2/2	5	8	9	9	10	11	12	13	14	15	16	17	18	19	20		
Bacterial suspension intranasally	37	37	37	36	------	---	---	---	---	---	---	---	4	3	---	---	29	80.6
Nonprepared controls	----	----	----	36	------	---	---	---	---	1	---	11	8	3	---	1	12	33.3
Bacterial suspension intranasally	37	36	36	------	35	---	---	---	---	---	---	---	2	---	2	---	31	88.6
Nonprepared controls	----	----	----	------	37	---	---	---	---	---	---	---	4	7	4	---	22	59.4

Cook (*2*) sprayed, simultaneously, cultures of various organisms (strength of suspension not stated) and St. Louis encephalitis virus into the nasal passages of mice and found the pathogenetic quality of the virus unaltered.

It appears, therefore, as though the bacterial suspensions produced their protective action through the effect which they induced in the host and that an interval of time must elapse before the protective effect is apparent. Probably the effect is largely a local one, since groups of animals that have received the bacterial suspensions tend to show but slight protection against intracerebral inoculation of the virus.

STUDY OF NASAL WASHINGS

Since both living and dead bacteria (*3*, *4*), or their products (*5*), are known to be chemotactic for leucocytes, an attempt was made to determine the effect of the bacterial instillations upon the number of leucocytes in the nasal washings of control and treated mice.

Each nostril of five prepared and five control mice was washed out each day with 0.5 cc of sterile saline. The recovered washings from each group were pooled and the leucocytes counted, without further dilution, in an ordinary blood counting chamber. The results indicate that the prepared animals respond to the bacterial instillations by a definite outpouring of leucocytes into the nasal cavities. The counts tend to fall sharply after a couple of days, and then more gradually for several succeeding days (table 4).

TABLE 4.—*Effect of bacterial instillations on leucocytes in nasal washings of control and treated mice*

Preparation	Number of leucocytes, by days, in pooled nasal washings of five test and five control mice					
	Interval in days, from the last bacterial instillation to cell count					
	1	2	3	4	5	6
Broth culture intranasally	1,308	1,800	391	686	514	101
Nonprepared controls	18	52	18	25	20	49

BACTERIAL INSTILLATION AND TETANUS TOXIN

The effect of the bacterial method of prophylaxis upon the absorption of a fixed dose of tetanus toxin administered intranasally was next investigated, tetanus toxin being incapable of multiplication and not being influenced, so far as known, by the presence of leucocytes. The results indicate that the preliminary intranasal preparations afforded no protection against tetanus toxin; in fact, more of the prepared animals tended to die, and did die earlier than the controls.

The different behavior of tetanus toxin from that noted with encephalitis virus might theoretically be explained by assuming that multiplication of the virus tended to be inhibited in the prepared animals. It would seem to be quite as probable, however, that the results are related to the smaller size, different chemical composition or lack of chemotactic properties of the toxin molecule as compared with the virus particles, or may be explained by assuming that a different mechanism of absorption applies to the effective portions of the two types of injurious agents.

BACTERIAL INSTILLATIONS AND INFLUENZA VIRUS

The effect of the bacterial instillations upon the death rate in groups of mice subsequently inoculated intranasally with influenza virus was next investigated.

The earlier trials in which 0.03 cc of the virus suspension was instilled into the nostrils and the animals jolted while in an inverted position with a view to aiding the spread of the virus, as was our custom with the encephalitis inoculations, indicated that the bacterial treatment had practically no influence upon the death incidence. This did not appear to be peculiar, since influenza in mice invades the lungs. However, when tests were made by instilling the same quantity of virus in 0.03 and 0.01 cc of saline, respectively, into different groups, with the mice being handled gently, it was found that the prepared mice were less affected by the virus than were the controls, especially with the smaller quantity of inoculum (table 5).

TABLE 5.—*Effect of bacterial instillation on the death rate of mice subsequently intranasally inoculated with influenza virus*

	Number of mice given bacterial intranasal prophylaxis				Number of mice given influenza virus intranasally	Deaths, by dates, following inoculation with influenza virus intranasally													Total number of deaths	Per cent surviving
Date	4/13	16	19	22	23	24	25	26	27	28	29	30	5/1	2	3	4	5	6		
0.03 cc 1:2400 suspension	40	40	37	36	36	---	---	---	---	3	2	6	3	1	---	1	1	1	18	50.1
0.01 cc 1:800 suspension	40	39	38	38	35	---	---	---	---	---	---	---	---	---	1	---	---	---	1	97.1
0.03 cc 1:2400 suspension (controls)	---	---	---	---	35	---	---	---	---	4	3	9	11	---	2	---	---	---	29	17.1
0.01 cc 1:800 suspension (controls)	---	---	---	---	35	---	---	---	---	---	1	5	8	---	---	2	---	---	16	54.2

These results suggest either that there was a tendency for the virus to be prevented from multiplying, for it to be neutralized or destroyed in the nasal passages, or, more probably, in some way for it to be prevented from spreading to the lungs of the prepared mice.

POSSIBLE INFLUENCE OF LEUCOCYTES AND FIXED TISSUE CELLS

The significance of leucocytes in virus infections is, for obvious reasons, much less understood than is the case in bacterial infections. Observations have, however, been made from time to time which indicate that they may be of some significance in virus ailments. For instance, Landsteiner and Russ (*6*), in 1906, found the virus of fowl plague present in greater amounts in the cellular elements of the blood than in the plasma, a fact which Todd (*7*), in 1928, confirmed by showing that the virus was most abundant in the leucocytes. Likewise, Douglas and Smith (*8*), in 1930, found that leucocytes take up the virus of vaccinia *in vitro*. By reference to tables 4 and 6 it may be noted that the rather sharp falling off in the percentage of survivors among mice inoculated after the first 48 hours following the last bacterial instillation is paralleled by a simultaneous rapid fall in the leucocytes of the nasal washings, and it is possible that these two occurrences are related. It is conceivable, however, that other elements of the induced exudate may exert a protective influence.

We have attempted to test *in vitro* mixtures of leucocytes and virus for infectivity, but the results with the methods employed were inconclusive and must be repeated.

There is also the possibility that the fixed cells may be altered by the intranasal instillations in such a way that they also play a part in the increased resistance noted in treated mice. The writer (*9*, *10*) found that the irritation produced in rabbits by means of diphtheria toxin rendered the affected area resistant to vaccine virus and that the insusceptibility was evident after the acute irritation had subsided.

PATHOLOGY OF THE NARES

In the light of presented facts, the pathology of the nasal cavity of the experimental animals is of interest. A total of 16 mice killed 24 hours after receiving the last of a series of intranasal instillations with a broth culture of mixed organisms and 16 normal controls have been examined by Surgeon R. D. Lillie. A possible tendency was noted for local cellular infiltration and cellular exudation to be more prevalent in the nostrils of the prepared animals than in the control group. It was not possible, however, for the pathologist to determine whether individual mice in most instances were from the control or test groups.

DURATION OF PROTECTION

The duration of protection has not been fully explored, but, according to table 6, the protection appeared to be most marked during the first two days following the bacterial treatment, after which it tended to drop rather sharply and then more slowly, but was still in evidence after the lapse of 5 days.

TABLE 6.—*Duration of protection following last intranasal inoculation of bacterial culture*

	Number of mice given bacterial culture, by days												Virus "D" 1:1100 dil. 0.03 cc, intranasally	Number of mice dying, by days											Total surviving	Percent surviving
Date	2/17	18	19	20	21	22	23	24	25	26	27	28	3/2	3	4	5	6	7	8	9	10	11	12	13		
	70	---	---	---	68	---	---	---	64	---	---	---	60	---	---	---	---	---	1	7	15	3	4	3	27	45.0
	---	70	---	---	---	70	---	---	---	66	---	---	64	---	---	---	([1])	---	1	10	12	8	2	1	29	46.0
	---	---	70	---	---	---	68	---	---	---	66	---	65	---	---	---	---	---	---	9	10	2	---	4	40	61.5
	---	---	---	70	---	---	---	69	---	---	---	69	69	---	---	---	---	---	---	2	10	3	3	2	49	71.0
Nonprepared controls	80	---	---	---	---	---	---	---	---	---	---	---	69	---	---	---	([1])	---	2	31	17	---	2	1	15	22.0

[1] Excluded from calculation as death not due to virus.

DISCUSSION

The resistance engendered in mice by the intranasal instillation of nonpathogenic bacterial cultures is probably related to the activity of a natural defense mechanism. In the experiments here reported, a huge dose of virus was flooded into the nostrils at one time, and it seems probable that the defense mechanism would be relatively more effective against the small initial infecting dose of virus that conveys a naturally acquired infection. Moreover, if the engendered defense tends to prevent the spread of a virus, as is suggested with influenza, the virus would apparently have a lessened chance of reaching an inaccessible portal of entry, such as the olfactory area of a mouse or man. Thus the individual would tend to be protected from encephalitis infection. Likewise, the opportunity for spread from individual to individual might conceivably be lessened, especially if the virus particles should become fixed to the relatively huge phagocytes.

We must, of course, be careful in reasoning from mice to man, especially since we have failed to engender the protection by natural means, such as changes in the environmental temperature. This failure, however, may be related to the crude method of inoculating the virus, to the tendency of mice to pile up in the cages and thus to protect themselves from temperature changes, or to the fact that the ratio of the mouse's nasal membranes to the cross section of the external nasal openings is tremendous as compared to that in man. However, the observed experimental facts seem to be in harmony with many of the epidemiological peculiarities of certain neurotropic virus infections of man and appear worthy of additional investigation.

SUMMARY AND CONCLUSIONS

1. Cultures or culture products of nonpathogenic organisms from the nostrils of mice when given intranasally to other groups of mice tend to render them resistant to subsequent intranasal inoculation with St. Louis strain of encephalitis virus.

2. The protection is apparently the result of a nonspecific type of local stimulation and is accompanied by an outpouring of leucocytes.

3. The curve of protection roughly parallels the leucocyte count in the nasal washings and is in evidence for at least five days—longer intervals have not yet been tested.

4. The method affords no protection in mice against intranasally instilled tetanus toxin, but does apparently afford some protection against influenza virus, provided the dosage is given in a small volume of fluid.

5. The experimental results in mice suggest a possible antagonistic relationship between the bacterial flora of the upper respiratory tract and susceptibility to intranasally inoculated encephalitis virus (St. Louis type).

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DEATHS DURING WEEK ENDED OCTOBER 22, 1938

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

	Week ended Oct. 22, 1938	Corresponding week, 1937
Data from 88 large cities of the United States:		
Total deaths	7,973	[1] 8,195
Average for 3 prior years	[1] 7,842	
Total deaths, first 42 weeks of year	340,672	365,175
Deaths under 1 year of age	478	[1] 493
Average for 3 prior years	[1] 526	
Deaths under 1 year of age, first 42 weeks of year	22,117	23,524
Data from industrial insurance companies:		
Policies in force	68,263,546	79,003,932
Number of death claims	13,245	13,138
Death claims per 1,000 policies in force, annual rate	10.1	9.8
Death claims per 1,000 policies, first 42 weeks of year, annual rate	9.3	9.8

[1] Data for 86 cities.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

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

Cases of certain diseases reported by telegraph by State health officers for the week ended October 29, 1938, rates per 100,000 population (annual basis), and comparison with corresponding week of 1937 and 5-year median

Division and State	Diphtheria				Influenza				Measles			
	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median
NEW ENG.												
Maine	18	3	1	2	12	2	------	------	30	5	19	14
New Hampshire	0	0	1	0	10	1	------	------	10	1	40	1
Vermont	0	0	1	1	------	------	------	------	54	4	14	2
Massachusetts	8	7	3	11	------	------	------	------	92	78	28	47
Rhode Island	8	1	0	0	------	------	------	------	------	------	3	3
Connecticut	0	0	2	2	15	5	4	1	87	29	2	8
MID. ATL.												
New York	12	29	30	34	[1] 12	[1] 17	[1] 7	[1] 7	54	135	86	122
New Jersey	8	7	10	20	6	5	9	9	19	16	121	23
Pennsylvania	11	22	25	49	------	------	------	------	24	46	287	53
E. NO. CEN.												
Ohio	54	70	64	95	------	------	19	19	19	24	300	58
Indiana	42	28	25	66	15	10	32	28	8	5	11	11
Illinois [3]	23	35	42	42	5	8	8	8	10	15	121	20
Michigan [2]	22	20	31	22	------	------	1	2	48	44	24	22
Wisconsin	5	3	8	8	66	37	31	26	119	67	33	51
W. NO. CEN.												
Minnesota	4	2	25	10	4	2	2	1	161	82	4	11
Iowa	51	25	3	18	4	2	------	------	18	9	3	3
Missouri	27	21	62	87	20	15	35	35	12	9	167	26
North Dakota	103	14	3	4	44	6	2	------	790	107	------	1
South Dakota	15	2	2	2	38	5	------	------	196	26	------	3
Nebraska	8	2	1	6	------	------	3	------	4	1	1	2
Kansas	11	4	30	14	3	1	6	2	6	2	10	7

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 29, 1938, rates per 100,000 population (annual basis), and comparison with corresponding week of 1937 and 5-year median—Continued

Division and State	Diphtheria				Influenza				Measles			
	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median
SO. ATL.												
Delaware	20	1	0	2					20	1		
Maryland [2]	3	1	16	15	19	6	7	6	115	37	3	6
Dist. of Col	50	6	8	8	8	1		1	8	1	1	2
Virginia	148	77	43	82	116	60			17	9	44	15
West Virginia	78	28	39	66	28	10	16	16	20	7	29	6
North Carolina [3] [4]	212	142	114	138			2	8	76	51	101	30
South Carolina [4]	114	41	29	14	996	358	229	185	6	2	8	8
Georgia [4]	103	61	42	57	61	36			3	2		
Florida	34	11	18	18	3	1	5	3	72	23	4	2
E. SO. CEN.												
Kentucky	89	50	37	74	61	34	5	11	30	17	35	35
Tennessee	105	58	43	72	45	25	18	22	2	1	22	22
Alabama [4]	95	53	40	45	59	33	45	36	11	6	1	9
Mississippi [2]	46	18	17	27								
W. SO. CEN.												
Arkansas	87	34	25	23	104	41	19	12	20	8	5	2
Louisiana	61	25	23	29	2	1	10	10	2	1	2	2
Oklahoma	53	26	37	25	68	33	32	32	27	13		1
Texas [4]	65	77	39	75	160	189	134	129	16	19	8	8
MOUNTAIN												
Montana	10	1	0	2	97	10	36	5	880	91	34	10
Idaho	0	0	0	0			4	3	190	18	4	
Wyoming	22	1	0	0					44	2	1	1
Colorado	54	11	9	11	68	14					30	6
New Mexico	37	3	2	5	161	13	2	2	235	19	24	19
Arizona	38	3	13	8	835	66		5	25	2	3	3
Utah [2]	10	1	21	0	171	17	1		291	29	34	8
PACIFIC												
Washington	3	1	3	3					35	11	9	12
Oregon	20	4	3	2	107	21	15	23	25	5	14	14
California [4]	20	24	28	45	7	8	17	19	236	279	37	137
Total	43	1,053	1,018	1,555	53	1,093	756	698	56	1,359	1,727	1,317
43 weeks	21	22,488	20,576	27,581	60	52,719	279,394	145,393	734	769,163	250,987	347,825

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median
NEW ENG.												
Maine	0	0	0	0	0	0	2	2	43	7	10	10
New Hampshire	0	0	0	0	0	0	0	0	31	3	2	9
Vermont	0	0	0	0	0	0	0	0	0	0	11	6
Massachusetts	1.2	1	2	2	2.4	2	2	2	86	73	109	120
Rhode Island	0	0	2	0	0	0	0	0	15	2	10	10
Connecticut	0	0	1	0	0	0	5	2	69	23	35	35
MID. ATL.												
New York	1.2	3	7	6	0.4	1	14	14	71	176	188	244
New Jersey	0	0	2	0	0	0	4	4	50	42	62	68
Pennsylvania	1.5	3	2	4	1	2	8	4	98	192	177	291

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 29, 1938, rates per 100,000 population (annual basis), and comparison with corresponding week of 1937 and 5-year median—Continued

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933–37 median
E. NO. CEN.												
Ohio	2.3	3	2	2	1.5	2	7	7	222	287	251	290
Indiana	5	3	0	1	0	0	4	3	165	110	125	125
Illinois [2]	1.3	2	1	3	0.7	1	16	15	141	213	273	278
Michigan [2]	2.2	2	1	1	1.1	1	9	9	329	305	308	196
Wisconsin	0	0	2	1	0	0	11	1	244	137	95	150
W. NO. CEN.												
Minnesota	0	0	1	1	0	0	12	1	110	56	78	78
Iowa	0	0	1	1	4	2	3	1	127	62	101	70
Missouri	0	0	0	1	0	0	11	1	86	66	181	124
North Dakota	0	0	0	0	0	0	0	1	74	10	45	28
South Dakota	0	0	0	0	8	1	2	1	249	33	0	13
Nebraska	0	0	1	0	0	0	1	1	57	15	12	25
Kansas	2.8	1	0	0	0	0	3	3	269	96	91	88
SO. ATL.												
Delaware	0	0	0	0	0	0	0	0	100	5	8	5
Maryland [2]	9	3	1	1	6	2	1	1	25	8	37	81
Dist. of Col.	8	1	1	1	25	3	1	0	108	13	14	13
Virginia	4	2	3	3	8	4	2	2	94	49	65	68
West Virginia	11	4	2	2	0	0	1	2	252	90	110	155
North Carolina [2] [4]	3	2	2	1	0	0	2	2	137	92	63	135
South Carolina [4]	2.8	1	1	0	0	0	0	0	47	17	10	14
Georgia [4]	0	0	1	0	0	0	1	1	42	25	33	33
Florida	3	1	1	0	0	0	0	0	6	2	7	6
E. SO. CEN.												
Kentucky	4	2	3	2	1.8	1	0	3	168	94	81	77
Tennessee	5	3	4	2	1.8	1	7	2	119	66	44	87
Alabama [4]	11	6	4	1	5	3	3	1	70	39	19	27
Mississippi [2]	5	2	0	0	8	3	5	0	39	15	17	19
W. SO. CEN.												
Arkansas	0	0	1	0	0	0	7	0	25	10	25	18
Louisiana†	0	0	1	1	0	0	3	1	32	13	18	16
Oklahoma	0	0	1	2	0	0	3	0	61	30	52	21
Texas [4]	0.8	1	1	1	0.8	1	4	4	71	84	56	56
MOUNTAIN												
Montana	0	0	0	0	0	0	1	0	223	23	14	38
Idaho	0	0	1	1	11	1	0	0	127	12	18	18
Wyoming	0	0	1	0	0	0	0	0	155	7	9	9
Colorado	0	0	3	2	5	1	2	0	127	26	26	34
New Mexico	12	1	1	0	0	0	0	0	173	14	34	20
Arizona	0	0	0	0	13	1	0	0	38	3	3	12
Utah [2]	0	0	0	0	0	0	2	0	111	11	35	17
PACIFIC												
Washington	3	1	0	1	0	0	4	4	66	21	22	37
Oregon	0	0	1	1	5	1	1	2	188	37	17	30
California [4]	0.8	1	1	2	0	0	14	14	142	168	152	171
Total	2	49	60	60	1.4	34	178	178	116	2,882	3,153	3,990
43 weeks	2.3	2,499	4,732	4,732	1.4	1,514	8,853	6,650	145	154,452	183,639	183,639

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 29, 1938, rates per 100,000 population (annual basis), and comparison with corresponding week of 1937 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933-37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases	1933-37 median	Oct. 29, 1938, rate	Oct. 29, 1938, cases	Oct. 30, 1937, cases
NEW ENG.											
Maine	0	0	0	0	24	4	4	4	432	71	16
New Hampshire	0	0	0	0	10	1	0	0	41	4	12
Vermont	0	0	0	0	14	1	2	1	209	66	8
Massachusetts	0	0	0	0	1	1	2	2	95	81	89
Rhode Island	0	0	0	0	8	1	1	1	314	41	17
Connecticut	0	0	0	0	3	1	2	2	207	69	15
MID. ATL.											
New York	0	0	0	0	6	14	11	13	185	461	307
New Jersey	0	0	0	0	2	2	4	4	174	145	71
Pennsylvania	0	0	0	0	18	36	20	20	107	209	------
E. NO. CEN.											
Ohio	0	0	1	1	10	13	13	19	118	153	100
Indiana	6	4	3	2	5	3	2	11	15	10	27
Illinois [3]	1	2	3	3	11	17	18	20	324	490	83
Michigan [2]	15	14	0	0	5	5	7	14	246	228	179
Wisconsin	0	0	0	4	0	0	0	4	599	336	240
W. NO. CEN.											
Minnesota	14	7	2	3	2	1	3	3	35	18	45
Iowa	2	1	8	3	4	2	3	6	18	9	------
Missouri	1	1	10	0	7	5	24	17	27	21	78
North Dakota	0	0	21	0	44	6	0	2	133	18	41
South Dakota	0	0	0	0	0	0	1	1	0	0	38
Nebraska	4	1	0	2	0	0	0	0	11	3	23
Kansas	0	0	1	1	0	0	3	5	59	21	63
SO. ATL.											
Delaware	0	0	0	0	0	0	0	4	80	4	9
Maryland [2]	0	0	0	0	28	9	4	14	65	21	70
Dist. of Col	0	0	0	0	25	3	1	2	25	3	5
Virginia	0	0	0	0	27	14	3	25	94	49	54
West Virginia	0	0	0	0	22	8	11	17	56	20	26
North Carolina [3] [4]	0	0	0	0	42	28	9	9	188	126	104
South Carolina [4]	0	0	0	0	22	8	5	12	97	35	25
Georgia [4]	0	0	0	0	15	9	8	11	20	12	5
Florida	0	0	0	0	0	0	3	3	34	11	------
E. SO. CEN.											
Kentucky	0	0	25	0	23	13	7	19	96	54	81
Tennessee	0	0	0	0	11	6	19	19	119	66	19
Alabama [4]	0	0	0	0	23	13	2	11	22	12	14
Mississippi [2]	0	0	0	0	10	4	9	9	------	------	------
W. SO. CEN.											
Arkansas	0	0	1	0	15	6	16	11	84	33	20
Louisiana	0	0	0	1	20	8	12	27	2	1	2
Oklahoma	4	2	0	0	16	8	21	21	25	12	28
Texas [4]	5	6	1	1	42	50	38	35	40	47	------
MOUNTAIN											
Montana	87	9	10	10	29	3	3	3	164	17	13
Idaho	21	2	11	2	42	4	3	2	11	1	3
Wyoming	22	1	0	0	0	0	0	0	133	6	16
Colorado	34	7	3	1	15	3	5	4	97	20	4
New Mexico	0	0	0	0	62	5	11	32	247	20	28
Arizona	13	1	0	0	25	2	3	2	38	3	12
Utah [2]	0	0	3	0	0	0	2	0	151	15	17
PACIFIC											
Washington	3	1	8	8	13	4	3	3	135	43	61
Oregon	36	7	4	0	0	0	2	4	20	4	18
California [4]	8	10	1	0	8	10	5	13	118	139	216
Total	3	76	116	70	13	331	325	455	132	3,228	2,302
43 weeks	12	13,136	8,662	5,686	12	12,675	13,291	15,351	168	176,266	------

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Oct. 29, 1938, 5 cases as follows: Illinois, 1; North Carolina, 4.
[4] Typhus fever, week ended Oct. 29, 1938, 68 cases as follows: North Carolina, 10; South Carolina, 6; Georgia, 20; Alabama, 12; Texas, 19; California, 1.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningitis, meningococcus	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid and paratyphoid fever
July 1938										
Colorado	5	33	82	2	110		0	82	9	28
Massachusetts	8	8		1	763	3	4	332	0	7
September 1938										
Arizona	0	17	100	1	23	1	0	16	2	26
Florida	5	32	2	95	80	17	2	16	0	19
Hawaii Territory	1	9	14		9		1	2	0	9
Kansas	1	22	6	4	16		1		6	15
Louisiana	2	37	9	78	38	17	0	14	0	54
Maryland	6	20	9	6	31	1	4	43	0	44
Massachusetts	5	10		3	138	1	4	139	0	30
Nebraska	2	15			11		0	47	1	4
Oregon	0	9	19	8	34		1	79	29	8
Virginia	5	185	248	26	12	8	5	89	0	59

July 1938

Colorado: Cases
- Chickenpox 45
- Colorado tick fever 9
- Dysentery (amoebic) 7
- Encephalitis, epidemic or lethargic 2
- Mumps 15
- Rocky Mountain spotted fever 4
- Septic sore throat 9
- Tularaemia 1
- Undulant fever 1
- Whooping cough 173

Massachusetts:
- Chickenpox 402
- Dysentery (bacillary) 11
- Encephalitis, epidemic or lethargic 1
- German measles 34
- Mumps 431
- Ophthalmia neonatorum 58
- Rabies in animals 5
- Septic sore throat 11
- Tetanus 3
- Trichinosis 2
- Undulant fever 4
- Whooping cough 379

September 1938

Chickenpox:
- Arizona 16
- Florida 7
- Hawaii Territory 25
- Kansas 37
- Louisiana 1
- Maryland 14
- Massachusetts 82
- Nebraska 3
- Oregon 31
- Virginia 10

Dengue:
- Florida 1

Diarrhea:
- Maryland 102

Dysentery:
- Arizona 88
- Florida (bacillary) 2
- Kansas (bacillary) 3
- Louisiana (amoebic) 7
- Louisiana (bacillary) 1
- Maryland (bacillary) 145
- Massachusetts (bacillary) 29
- Virginia (bacillary) 336

September 1938—Continued

Encephalitis, epidemic or lethargic: Cases
- Arizona 1
- Florida 2
- Hawaii Territory 1
- Kansas 9
- Massachusetts 11
- Nebraska 2
- Virginia 1

German measles:
- Arizona 1
- Kansas 4
- Maryland 4
- Massachusetts 18

Hookworm disease:
- Florida 161
- Hawaii Territory 15
- Louisiana 4

Impetigo contagiosa:
- Hawaii Territory 17
- Maryland 16
- Oregon 110

Jaundice, epidemic:
- Kansas 4
- Maryland 3
- Oregon 2

Leprosy:
- Hawaii Territory 3
- Louisiana 3

Mumps:
- Arizona 16
- Florida 14
- Hawaii Territory 31
- Kansas 45
- Maryland 25
- Massachusetts 144
- Nebraska 21
- Oregon 33
- Virginia 23

Ophthalmia neonatorum:
- Louisiana 1
- Massachusetts 64

Rabies in animals:
- Louisiana 7
- Massachusetts 2
- Oregon 8

Rocky Mountain spotted fever:
- Maryland 3
- Virginia 9

Scabies:
- Kansas 6
- Oregon 22

September 1938—Continued

Septic sore throat: Cases
- Florida 3
- Hawaii Territory 3
- Kansas 2
- Louisiana 10
- Maryland 17
- Massachusetts 6
- Nebraska 6
- Oregon 7
- Virginia 55

Tetanus:
- Florida 1
- Hawaii Territory 1
- Kansas 2
- Louisiana 9
- Maryland 3
- Massachusetts 6
- Virginia 1

Trachoma:
- Arizona 35
- Hawaii Territory 2
- Louisiana 3

Trichinosis:
- Massachusetts 1

Tularaemia:
- Kansas 2
- Louisiana 1

Typhus fever:
- Florida 18
- Hawaii Territory 6
- Louisiana 4
- Maryland 1

Undulant fever:
- Arizona 2
- Florida 3
- Kansas 15
- Louisiana 9
- Maryland 4
- Oregon 2
- Virginia 4

Vincent's infection:
- Florida 24
- Kansas 3
- Maryland 8
- Oregon 7

Whooping cough:
- Arizona 56
- Florida 95
- Hawaii Territory 134
- Kansas 125
- Louisiana 84
- Maryland 107
- Massachusetts 323
- Nebraska 45
- Oregon 97
- Virginia 106

PLAGUE INFECTION IN GROUND SQUIRREL IN ELDORADO COUNTY, CALIF.

Under date of October 26, 1938, Dr. W. M. Dickie, Director of Public Health of California reported plague infection proved in one *Beecheyi* squirrel collected October 10, 2 miles southeast of Bay View Resort, Eldorado County, Calif.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 22, 1938

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	236	105	29	229	449	820	6	347	59	811	-------
Current week	205	80	29	388	438	671	2	325	35	1,288	-------
Maine:											
Portland	0	------	0	1	3	1	0	0	0	6	24
New Hampshire:											
Concord	0	------	0	0	0	0	0	0	0	0	6
Nashua	0	------	0	0	0	0	0	0	0	0	7
Vermont:											
Barre	0	------	0	3	0	0	0	0	0	8	4
Burlington	0	------	0	1	0	0	0	0	0	0	8
Rutland	0	------	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	3	------	0	6	19	22	0	7	1	27	218
Fall River	0	------	0	0	0	0	0	0	0	0	22
Springfield	0	------	0	6	1	1	0	0	0	2	34
Worcester	0	------	0	5	6	0	0	1	0	0	46
Rhode Island:											
Pawtucket	0	------	0	0	2	0	0	0	1	3	15
Providence	0	3	1	0	1	5	0	3	0	29	63
Connecticut:											
Bridgeport	0	------	0	0	1	1	0	0	0	0	24
Hartford	2	1	0	0	0	3	0	5	0	4	30
New Haven	0	------	0	3	0	1	0	1	0	16	35
New York:											
Buffalo	1	------	1	8	10	11	0	3	0	12	136
New York	15	6	3	17	92	39	0	71	5	225	1,422
Rochester	0	------	0	3	3	2	0	2	0	0	58
Syracuse	0	------	0	0	6	3	0	0	0	6	53
New Jersey:											
Camden	0	------	0	0	1	4	0	0	0	0	27
Newark	1	1	1	1	5	4	0	5	1	52	103
Trenton	0	1	0	0	10	1	0	0	0	0	44
Pennsylvania:											
Philadelphia	6	11	3	8	23	38	0	32	1	56	472
Pittsburgh	2	4	3	0	28	28	0	5	1	20	188
Reading	11	------	0	1	0	1	0	0	0	0	24
Scranton	0	------	-------	0	-------	1	0	-------	0	3	-------
Ohio:											
Cincinnati	17	2	0	1	5	29	0	8	0	2	137
Cleveland	2	1	0	4	10	17	0	10	0	44	194
Columbus	10	1	1	0	3	4	0	2	0	0	82
Toledo	1	------	0	1	0	5	0	2	0	0	64
Indiana:											
Anderson	0	------	0	1	1	0	0	0	0	0	11
Fort Wayne	0	------	0	0	2	6	0	0	0	0	18
Indianapolis	6	------	1	5	11	16	2	3	0	9	82
South Bend	0	------	0	0	0	2	0	0	0	0	12
Terre Haute	12	------	0	0	0	5	0	0	0	0	19
Illinois:											
Alton	0	------	0	0	0	0	0	0	0	0	5
Chicago	11	4	2	6	19	88	0	32	5	362	646
Elgin	0	------	0	0	1	1	0	0	0	1	8
Moline	0	------	0	0	1	2	0	0	0	0	10
Springfield	0	------	0	0	0	1	0	0	0	0	8

City reports for week ended Oct. 22, 1938—Continued

State and city	Diphtheria cases	Influenza: Cases	Influenza: Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Michigan:											
Detroit	9	------	1	8	16	75	0	16	1	79	223
Flint	0	------	0	7	3	17	0	0	1	0	27
Grand Rapids	1	------	0	0	2	13	0	1	0	0	31
Wisconsin:											
Kenosha	0	------	0	0	0	4	0	0	0	5	6
Madison	0	------	0	2	0	1	0	0	0	2	16
Milwaukee	1	1	1	2	2	32	0	0	0	147	85
Racine	0	------	0	2	0	0	0	1	0	6	15
Superior	0	------	0	1	2	5	0	0	0	3	7
Minnesota:											
Duluth	0	------	0	0	4	2	1	0	0	8	20
Minneapolis	2	------	0	34	9	9	0	1	0	7	107
St. Paul	0	1	1	6	6	5	0	2	0	6	61
Iowa:											
Cedar Rapids	1	------	------	0	------	1	0	------	0	0	------
Davenport	3	------	------	1	------	5	0	------	0	0	------
Des Moines	0	------	0	0	0	8	0	0	0	0	27
Sioux City	1	------	------	6	------	2	0	------	0	1	------
Waterloo	11	------	------	0	------	1	0	------	0	1	------
Missouri:											
Kansas City	1	------	0	0	11	6	0	4	0	2	95
St. Joseph	0	------	0	0	2	0	0	0	0	0	18
St. Louis	6	------	0	1	7	16	0	2	0	7	168
North Dakota:											
Fargo	0	------	0	116	0	4	0	0	0	0	10
Grand Forks	0	------	------	0	------	2	0	0	------	0	------
Minot	1	------	0	0	0	1	0	0	0	0	5
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	------	1	------	2	0	------	0	0	------
Nebraska:											
Lincoln	1	------	------	0	------	3	0	------	0	3	------
Omaha	0	------	1	1	4	2	0	1	0	0	45
Kansas:											
Lawrence	0	1	------	0	0	0	0	0	0	0	4
Topeka	0	------	------	0	------	3	0	------	0	5	------
Wichita	0	------	0	0	0	4	0	1	0	0	28
Delaware:											
Wilmington	1	------	0	0	1	1	0	1	0	0	26
Maryland:											
Baltimore	1	2	1	16	12	11	0	6	3	6	199
Cumberland	0	------	0	0	1	0	0	0	0	0	9
Frederick	0	------	0	0	0	0	0	0	2	0	4
Dist. of Col.:											
Washington	6	------	0	0	6	13	0	11	0	7	159
Virginia:											
Lynchburg	7	------	0	0	1	3	0	0	0	0	12
Norfolk	0	------	0	0	8	3	0	2	0	0	34
Richmond	7	------	0	0	3	5	0	1	0	0	52
Roanoke	0	------	0	0	0	2	0	1	0	0	14
West Virginia:											
Charleston	1	------	0	0	0	1	0	1	0	0	16
Huntington	3	------	------	0	------	0	0	------	0	0	------
Wheeling	0	------	0	0	2	0	0	1	0	6	18
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	0	------
Raleigh	1	------	0	0	------	0	0	2	0	3	9
Wilmington	1	------	0	0	3	1	0	0	0	0	15
Winston-Salem	3	------	0	0	0	0	0	1	0	0	17
South Carolina:											
Charleston	1	7	0	0	4	0	0	1	1	0	20
Florence	0	------	0	0	1	0	0	0	0	0	8
Greenville	7	------	0	0	1	0	0	1	0	1	9
Georgia:											
Atlanta	10	8	0	0	9	8	0	3	0	1	87
Brunswick	0	------	0	0	0	0	0	0	0	0	4
Savannah	0	13	2	0	3	0	0	0	0	4	30
Florida:											
Miami	0	------	2	0	4	0	0	3	0	4	37
Tampa	1	------	0	0	1	1	0	0	0	0	25
Kentucky:											
Ashland	13	------	0	0	2	3	0	0	3	0	17
Covington	1	------	0	0	1	1	0	1	0	0	9
Lexington	1	------	0	0	2	2	0	1	0	0	23
Louisville	0	1	0	0	3	15	0	3	1	1	50
Tennessee:											
Knoxville	4	------	0	0	2	1	0	1	0	0	53
Memphis	1	------	0	0	1	4	0	5	0	7	72
Nashville	0	------	2	0	2	3	0	1	0	3	61

City reports for week ended Oct. 22, 1938—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								
Alabama:											
Birmingham	0	2	1	0	9	6	0	6	0	1	26
Mobile	1	------	0	0	3	1	0	2	0	0	72
Montgomery	1	------	------	0	------	4	0	------	0	0	------
Arkansas:											
Fort Smith	2	------	------	0	------	1	0	------	2	0	------
Little Rock	5	------	0	0	0	1	0	1	0	0	------
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	3
New Orleans	13	3	2	0	12	0	0	11	8	16	153
Shreveport	1	------	0	0	4	4	0	1	0	0	36
Oklahoma:											
Oklahoma City	1	------	0	0	1	5	0	0	0	0	27
Tulsa	0	------	------	0	------	7	0	------	1	3	------
Texas:											
Dallas	0	------	0	0	0	6	0	3	3	4	57
Fort Worth	1	------	0	2	5	11	0	1	2	0	26
Galveston	0	------	0	0	0	1	0	0	1	0	16
Houston	5	------	0	0	5	3	0	6	0	0	72
San Antonio	1	1	1	0	3	0	0	6	0	2	53
Montana:											
Billings	0	------	0	0	1	1	0	0	0	0	10
Great Falls	0	------	0	1	0	2	0	0	0	0	10
Helena	0	------	0	0	0	0	0	0	0	0	6
Missoula	0	------	0	0	0	0	0	0	0	0	8
Idaho:											
Boise	0	------	0	0	1	1	0	0	0	0	4
Colorado:											
Colorado Springs	0	------	0	0	0	0	0	1	0	1	10
Denver	5	------	1	0	4	9	0	9	0	8	94
Pueblo	0	------	0	0	1	1	0	0	0	0	8
New Mexico:											
Albuquerque	0	------	0	0	0	4	0	3	3	0	13
Utah:											
Salt Lake City	1	------	0	1	1	0	0	0	0	5	42
Washington:											
Seattle	0	------	0	0	0	3	0	5	0	4	92
Spokane	0	------	0	1	1	1	0	1	0	0	34
Tacoma	0	------	0	0	1	3	0	0	0	4	25
Oregon:											
Portland	1	------	0	1	1	10	0	4	0	0	81
Salem	0	------	------	0	------	0	0	0	------	0	------
California:											
Los Angeles	10	4	0	5	7	37	0	13	0	16	269
Sacramento	0	------	0	2	1	1	0	3	1	6	32
San Francisco	3	2	0	106	8	7	0	4	0	30	154

State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	0	0
New York:			
Buffalo	2	1	0
New York	5	1	0
Pennsylvania:			
Philadelphia	1	0	1
Pittsburgh	1	0	0
Ohio:			
Cleveland	1	0	0
Illinois:			
Chicago	1	0	0
Minnesota:			
Minneapolis	0	0	1
Missouri:			
St. Louis	1	0	0
South Dakota:			
Sioux Falls	0	0	1
Maryland:			
Baltimore	1	0	0
District of Columbia:			
Washington	0	0	1
Virginia:			
Norfolk	1	0	0
Alabama:			
Mobile	0	0	1
Louisiana:			
Shreveport	0	1	0
Idaho:			
Boise	1	0	0
Oregon:			
Portland	0	2	0
California:			
Los Angeles	0	0	2

Encephalitis, epidemic or lethargic.—Cases: New York, 2; St. Paul, 1; Sioux City, 1.
Pellagra.—Cases: Atlanta, 6; Savannah, 3; Birmingham, 1; Montgomery, 1.
Typhus fever.—Cases: New York, 2; Atlanta, 3; Savannah, 3; Mobile, 1; Montgomery, 1; Fort Worth, 2; San Antonio, 2.

FOREIGN AND INSULAR

CZECHOSLOVAKIA

Communicable diseases—July 1938.—During the month of July 1938, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	7		Paratyphoid fever	26	2
Cerebrospinal meningitis	47	19	Poliomyelitis	4	1
Chickenpox	84		Puerperal fever	13	3
Diphtheria	1,676	64	Scarlet fever	1,617	21
Dysentery	53	1	Trachoma	118	
Influenza	10	3	Typhoid fever	676	54
Lethargic encephalitis	5		Typhus fever	5	
Malaria	653				

ITALY

Communicable diseases—4 weeks ended August 14, 1938.—During the 4 weeks ended August 14, 1938, cases of certain communicable diseases were reported in Italy as follows:

Disease	July 18-24	July 25-31	Aug. 1-7	Aug. 8-14
Anthrax	38	38	60	60
Cerebrospinal meningitis	15	12	12	16
Chickenpox	90	118	126	78
Diphtheria	316	328	330	366
Dysentery	43	123	116	95
Hookworm disease	49	20	61	39
Lethargic encephalitis	3	1	4	
Measles	1,357	988	934	747
Mumps	114	133	122	73
Paratyphoid fever	198	248	275	218
Pellagra	16	8	8	7
Poliomyelitis	67	70	67	49
Puerperal fever	17	30	25	25
Rabies			1	
Scarlet fever	162	138	147	135
Typhoid fever	1,098	1,444	1,637	1,851
Undulant fever	99	98	89	94
Whooping cough	597	642	532	348

JAMAICA

Communicable diseases—4 weeks ended October 1, 1938.—During the 4 weeks ended October 1, 1938, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	1	5	Leprosy	1	5
Diphtheria	4	2	Puerperal sepsis		1
Dysentery	6	1	Tuberculosis	47	66
Erysipelas		1	Typhoid fever	3	35

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 October 28, 1938, pages 1946–1959. A similar cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

China.—During the week ended October 22, 1938, cases of cholera were reported in China as follows: Hong Kong, 7, Shanghai, 87.

Indochina (French).—During the week ended October 22, 1938, 7 cases of cholera were reported in Annam Province, and 1 case of cholera was reported in Tonkin Province, French Indochina.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—A rat found on October 14, 1938, and another rat found on October 18, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved positive for plague.

United States—California.—A report of a plague-infected squirrel in Eldorado County, California, appears on page 2019 of this issue of PUBLIC HEALTH REPORTS.

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