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ADMINISTRATIVE FACTORS INVOLVING EFFECTIVENESS OF COMMUNICABLE DISEASE CONTROL

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One of the important functions of a health department is its work in attempting to limit the spread of infectious diseases. To accomplish this purpose a public health nurse is usually sent to the home as soon as a case is reported, to instruct the family and to assist with arrangements for the isolation of the patient. Effective efforts at control are seldom made prior to the nurse's first visit.

It is doubtful whether the nurse's activities exert much effect on the spread in a community of certain of the communicable diseases, such as poliomyelitis and meningitis. Little or no pretense is made at control of measles, the primary object of the nurse's visits being to reduce mortality. For some of the other communicable diseases, however, such as diphtheria, scarlet fever, whooping cough, and typhoid fever, in which our knowledge of the etiology is more complete, it should be possible to effect a definite measure of control if our control measures could be instituted promptly at the onset of the illness, and provided that the nurse is able to secure intelligent cooperation from the members of the household.

Communicable disease control is admittedly imperfect, especially in diseases where there are large numbers of unrecognizable carriers and mild, missed cases. Since at best our efforts at control can only limit the number of cases of a disease occurring at any one time, in some cases merely postponing the attack, and cannot be expected to reduce the incidence to anything approaching zero, their effectiveness is difficult to evaluate. Such an evaluation will not be attempted here. It is assumed that such measures are of value and that their usefulness is impaired by the delay that usually occurs in carrying them out. This study was made to determine the magnitude of this delay and some of the reasons for it.

Communicable disease control, in the limited sense that includes only the activities undertaken to control the spread of infection from

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the patient and his immediate environment, is, in the Westchester County Department of Health, the joint responsibility of the divisions of nursing and of communicable diseases. Reports of cases received by the latter which call for control measures are referred to the department nurses in the field. This is done by telephone for cases of diphtheria, dysentery, meningitis, ophthalmia neonatorum, paratyphoid fever, poliomyelitis, scarlet fever, and typhoid fever. For all other diseases notification is given by mail. Reporting by physicians to the health department is carried on in accordance with regulation 2 of chapter II of the State Sanitary Code which requires that every case shall be reported to the local health officer within 24 hours from the time the case is first seen. Nearly all case reports are received by mail.

The following material was obtained from the records for 1936. It does not include cases in the city of White Plains where physicians report mainly by telephone.

SOURCE OF MORBIDITY REPORTS

Approximately three-quarters of the case reports were received from physicians. The other reports were transmitted by public health, school, and visiting nurses for cases that were not attended by a private physician.

As would be expected, the more serious diseases were seen and reported by physicians in larger percentages than were the less serious diseases. The relatively high percentage of cases of German measles (rubella) reported by physicians is rather striking, especially since that disease reached epidemic proportions during the year covered by this study.

TABLE 1.—*Source of morbidity reports*

Disease	Cases reported	Percent reported by—	
		Physicians	Others
Chickenpox	1,352	39	61
Diphtheria	14	100	0
Rubella	2,867	86	14
Measles	3,239	71	29
Scarlet fever	486	100	0
Whooping cough	859	71	29
Total	8,817	73	27

INTERVAL BETWEEN DATE OF ONSET AND DATE OF PHYSICIAN'S FIRST VISIT

The interval between the date of onset of a disease and the physician's first visit would presumably be influenced by several factors, including the severity of the illness at the onset, the ability of the

family to pay a physician, and the duration of disability before the nature of the illness is suspected. Oddly enough, the seriousness of the disease, while it affected the percentage of cases in which medical attention was sought, as shown in table 1, did not appear to influence the promptness with which a physician was called. That is, if a physician was called, he was summoned about as promptly in a case of chickenpox as he was in a case of diphtheria or scarlet fever. The only exception to this is whooping cough, where the greater delay may have been due to the fact that for the first few days the illness appears to be nothing more than a common cold.

While improved economic conditions or a change in the manner of furnishing medical service might shorten this interval, it will never be obliterated and will always be more or less a hindrance to effective control of infection.

Because of the small numbers of cases involved, the data (table 2) for the less common and more serious diseases do not have much significance. In meningitis and poliomyelitis the interval between onset and physician's visit is of little moment, since a delay in calling a physician and in instituting control measures would probably have little or no effect on the incidence of the disease. In diphtheria, however, where the figures suggest that such a delay has occurred only too frequently, this time interval might be of considerable importance in the spread of the infection.

The other diseases listed show varying intervals, from chickenpox with 28 percent of the cases not seen by a physician until the third day of the illness or later to whooping cough with 82 percent in this category. In the latter disease a physician was not called in over half of the cases (55 percent) until the second week of the illness or later. Forty percent of both measles and scarlet fever patients were not seen by a doctor until after the second day of their illness.

If to the frequent delay in calling a physician is added the further obstacle that the physician, when called, may not always report the case promptly to the health department and that he may not always insure complete compliance with all of the necessary control measures on the part of the family, although charged by the State Sanitary Code with the responsibility for so doing pending the arrival of the health department representative, it can readily be appreciated why our control measures are not always as effective as they might be.

There were only two cases of typhoid fever in the group studied, one of which was first seen by a physician on the third day of the illness and the other not until the ninth day. In view of the vague, insidious character of the onset, delay in securing medical attention in this disease, while dangerous to the other members of the household, is readily understandable and occasional secondary cases will continue to occur.

TABLE 2.—*Interval between date of onset and date of physician's first visit*

Interval	Chickenpox		Measles		Scarlet fever		Whooping cough		Diphtheria		Meningitis[1]		Poliomyelitis	
	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Per cent
Same day	85	37	328	30	90	28	20	14	6	55	4	66	2	40
1 day	80	35	327	30	102	32	5	4	1	9	1	17	2	40
2 days	21	9	218	20	54	17	6	4	1	9	0	------	0	------
3 days	16	7	102	9	32	10	5	4	2	18	0	------	1	20
4 days	8	4	62	6	12	4	8	6	1	9	1	17	0	------
5 days	6	3	16	2	12	4	6	4	0	------	0	------	0	------
6 days	5	2	12	1	8	3	12	9	0	------	0	------	0	------
7–13 days	6	3	18	2	6	2	42	30	0	------	0	------	0	------
14–20 days	0	------	2	(2)	0	------	27	19	0	------	0	------	0	------
21–27 days	0	------	0	------	0	------	9	6	0	------	0	------	0	------
Total	227	100	1,085	100	316	100	140	100	11	100	6	100	5	100

[1] Meningitis, meningococcus.

[2] Less than ½ of 1 percent.

INTERVAL BETWEEN DATE OF PHYSICIAN'S FIRST VISIT AND DATE OF RECEIPT OF HIS REPORT

According to the State Sanitary Code (ch. II, regulation 2), a physician is expected to report cases of communicable diseases within 24 hours from the time he first sees the patient. From 12 to 24 hours would be required for the report to reach the health department by mail. There would, therefore, be a permissible interval of from 12 to 48 hours between the time of the physician's first visit and the time of receipt of the report at the health department. This interval might occasionally be longer should the physician experience difficulty in arriving at a diagnosis or desire to await the result of a laboratory examination before making his report. An upper limit of 48 hours would, however, be a generous allowance of time for receipt of the report in most cases. It will be observed in table 3 that the promptness of reporting, on this basis, was far from satisfactory. In the following percentages of cases the interval between date of physician's first visit and date of receipt of report was longer than 2 days: Whooping cough, 87 percent; meningococcus meningitis, 83 percent; poliomyelitis, 80 percent; diphtheria, 73 percent; measles, 66 percent; chickenpox, 63 percent; scarlet fever, 55 percent.

It should be remembered that in many cases the interval under consideration here would be in addition to that shown in table 2 and would thus serve to increase the time elapsing before the case came under the control of the health department.

Of the 2 cases of typhoid fever, one was reported on the fourth day and the other on the seventh day after the physician's first visit.

TABLE 3.—*Interval between date of physician's first visit and date of receipt of his report*

Interval	Chickenpox		Measles		Scarlet fever		Whooping cough		Diphtheria		Meningitis[1]		Poliomyelitis	
	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent	Cases	Percent
Same day	18	8	79	7	25	7	1	1	1	9	1	17	0	------
1 day	24	10	138	12	50	15	5	3	1	9	0	------	1	20
2 days[2]	43	19	165	15	77	23	14	9	1	9	0	------	0	------
3 days	32	14	153	14	51	15	6	4	1	9	2	33	1	20
4 days	29	13	143	13	42	12.5	6	4	0	------	0	------	0	------
5 days	15	6	107	10	22	7	10	6	0	------	1	17	0	------
6 days	8	3	52	5	18	5	7	5	1	9	0	------	3	60
7–13 days	43	19	194	17	42	12.5	36	23	6	55	2	33	0	------
14–20 days	16	7	52	5	8	2	29	19	0	------	0	------	0	------
Over 3 weeks	3	1	29	2	2	1	40	26	0	------	0	------	0	------
Total	231	100	1,112	100	335	100	154	100	11	100	6	100	5	100

[1] Meningitis, meningococcus. [2] Maximum satisfactory interval.

INTERVAL BETWEEN DATE OF ONSET AND DATE OF HOSPITALIZATION

The percentages of reported cases hospitalized in 1936 is known for the following diseases: Diptheria, 58 percent; measles, 1 percent; scarlet fever, 23 percent; typhoid fever, 100 percent; whooping cough, 1 percent. The interval between onset and hospitalization has been tabulated (table 4) for all of these diseases except whooping cough, and also for meningococcus meningitis and poliomyelitis. The numbers of cases are very small except for measles and scarlet fever.

While hospitalization is ordinarily provided solely for the better care of the patient, it should, in diseases like diphtheria, scarlet fever, and typhoid fever, be of value in preventing the spread of infection if carried out early enough in the course of the illness and if a sufficiently large number of patients in homes ill suited for proper control are included. Poor facilities for medical and nursing care and for isolation and control are likely to go hand in hand, and such conditions often obtain in the presence of the more serious diseases for which efficient nursing service is desirable. Hospitalization, as well as other known control measures, probably has little or no effect upon the incidence of poliomyelitis and meningitis. As for measles and whooping cough, even if cases could be hospitalized in sufficiently large numbers, it is doubtful whether this procedure would have any appreciable effect on prevalence in view of the continued occurrence of unreported cases and the difficulty of securing sufficiently early knowledge of the reported cases. The purpose of hospitalization in these two diseases is now solely the care of the patient, either because home conditions are extremely unsatisfactory or because the case is unusually severe and the patient a poor risk.

The interval between date of onset and of hospitalization is affected, among other things, by the delay on the part of the family in summoning a physician (table 2), and it probably cannot be reduced to any great extent. Table 4 may indicate a satisfactory degree of promptness in hospitalizing the patient insofar as his medical and nursing care are concerned, but it does not indicate that any great degree of assistance may be expected from this measure in controlling the spread of infection in the community.

TABLE 4.—*Interval between date of onset and date of hospitalization*

Interval	Diphtheria	Measles	Scarlet fever	Meningitis[1]	Poliomyelitis	Typhoid fever
Same day	2	6	10	1	0	0
1 day	1	6	42	0	1	0
2 days	1	5	22	3	1	0
3 days	0	4	15	0	0	1
4 days	2	0	3	1	0	0
5 days	1	0	3	0	1	0
6 days	0	1	2	0	0	0
7–13 days	0	1	4	1	0	1
Total	7	23	101	6	3	2

[1] Meningitis, meningococcus.

INTERVAL BETWEEN DATE OF ONSET AND DATE OF NURSE'S FIRST VISIT

The interval between date of onset and date of the nurse's first visit very largely determines the effectiveness of our control measures. Unfortunately it is a composite interval that includes not only any delay that may occur from the time the case report is received until the nurse visits the home but also the delay on the part of the family in summoning a physician (table 2) and the further delay on the part of the physician in reporting the case (table 3).

Nurses are expected to make the first visit to cases of diseases that are reported by telephone as soon as possible and not later than 24 hours after the report is received. The initial visit to cases reported by mail, while made as soon as more urgent duties permit, must be made within 36 hours. Thus the longest permissible interval that should occur would be in the latter group of diseases when a case which was reported in the afternoon might not be visited until the second morning following. Nurses are expected to use discrimination in deferring visits, being guided in so doing by their knowledge of home conditions and whether or not a physician is known to be in attendance. That visiting is reasonably prompt is indicated by the fact that only 10 of 221 cases of those diseases that are reported by telephone were visited later than the day after the report was received. One hundred and ninety-five cases were visited the same day.

TABLE 5.—*Interval between date of onset and date of nurse's first visit*

Interval	Measles		Scarlet fever		Whooping cough		Diphtheria		Meningitis		Poliomyelitis	
	Cases	Per-cent	Cases	Per-cent	Cases	Per-cent	Cases	Per-cent	Cases	Per-cent	Cases	Per-cent
Same day	108	5	7	2	6	2	1	9	0	-------	0	-------
1 day	167	8	52	13	2	0.5	0	-------	0	-------	0	-------
2 days	206	10	80	20	0	-------	2	18	0	-------	0	-------
3 days	193	9	79	20	7	2	2	18	2	33	1	20
4 days	225	10	61	15	2	0.5	3	28	0	-------	0	-------
5 days	225	10	43	10	5	1	2	18	1	17	1	20
6 days	182	9	30	7	8	2	0	-------	0	-------	2	40
7–13 days	658	31	42	10	77	19	1	9	3	50	1	20
14–20 days	137	6	7	2	93	23	-------	-------	-------	-------	-------	-------
21–27 days	30	1	3	1	71	18	-------	-------	-------	-------	-------	-------
Over 4 weeks	13	1	0	-------	125	32	-------	-------	-------	-------	-------	-------
Total	2,144	100	404	100	396	100	11	100	6	100	5	100

For the diseases that are reported by mail there is the further delay while the reports are in transit. Through timing a small sample of these reports it was found that the length of time in transit varied from ½ to 4 days, depending upon the destination, as follows:

Time in transit	*Number of reports*
½ day	5
1 day	21
1½ days	4
2 days	2
2½ days	3
4 days	2

The two reports that required 4 days to reach their destinations might well be excluded as exceptional cases since other reports sent to the same places were received within 1 or 2 days.

Of the 2 cases of typhoid fever, one was first visited by a department nurse on the tenth day of the illness and the other on the sixteenth day.

SUMMARY AND CONCLUSIONS

Tabular data are presented showing the delay that may occur under generally satisfactory public health conditions in instituting communicable disease control measures and some of the reasons therefor.

Even if communicable disease control measures were intrinsically more effective than they are, their effectiveness would be subject to very definite limitations owing to delays in putting them into effect.

It appears doubtful whether the delays due to the reasons above mentioned can be reduced appreciably under present conditions.

CEREBROSPINAL PATHOLOGY OF EXPERIMENTAL POLIOMYELITIS IN THE EASTERN COTTON RAT, *SIGMODON HISPIDUS HISPIDUS*, AND IN THE WHITE MOUSE, *MUS MUSCULUS*[1]

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Since Armstrong's experimental propagation of the virus of poliomyelitis in the cotton rat (*1*) and in the white mouse (*2*), a histologic study of the brain and spinal cord lesions produced has been carried out. The findings on the first 31 cotton rats studied have already been reported (*3*), and the current report includes material from those animals together with material from 31 additional cotton rats, 1 gray mouse, and 35 white mice.

PATHOLOGY IN THE COTTON RAT

Data concerning inocula, passage generations, and anatomical diagnoses in the first 31 cotton rats have been published in a previous report (*3*). Table 1 presents these data for the 31 additional cotton rats considered in this study. Of the 62 animals, 7 have been excluded (*3*) (table 1), 2 are given special consideration as examples of chronic lesions, and the remainder are being considered as a group without reference to the fact that part of the material was previously reported.

Cord lesions were present in all but 4 of the 49 cotton rats in which spinal cord was saved for study. Often lesions were absent in one or more levels of the cord and present in others. Thus, the thoracic cord was reported as free of lesions in 10, the cervical in 7, and the lumbar in 5 of 27 cotton rats, while some cord involvement was present in all but 2. Uninvolved lumbar and thoracic levels were less frequent in animals dead 7 days or more after inoculation. Altogether, uninvolved levels were most frequent in the thoracic cord, least in the lumbosacral.

In about four-fifths of the animals a few, or sometimes many, small vessels in gray or white substance, often near the central canal, showed sheath lymphocyte infiltration or, less often, endothelial swelling and proliferation, or both. Perivascular glia proliferation was infrequent. In about two-thirds of the animals, coagulated necrotic nerve cells in the anterior horns were present in greater or less numbers. They presented strongly oxyphil cytoplasm and more or less completely karyolyzed nuclei. Often there was no evident cellular reaction about them. Frequently large vacuoles surrounded masses of oxyphil coagulated material, and the necrotic nerve cells apparently disappeared by a process of cytolysis, leaving no trace behind them.

[1] From the Divisions of Pathology and of Infectious Diseases, National Institute of Health.

Such necrotic cells have been seen as early as 3 days and as late as 26 days after inoculation, but are somewhat more frequent before the tenth day.

TABLE 1.—*Data concerning passage generations, source of inocula, survival periods, location and duration of paralysis, and anatomical diagnoses in 31 additional cotton rats experimentally infected with the virus of poliomyelitis*

Cotton rat No.	Pathology No.	Passage generation	Source of inoculum	Site of paralysis	Duration of paralysis, days	Day dead	Killed or died	Anatomical diagnosis	Remarks
49	16987	3	CR25	RF, RH, Atr.	171	180	D	Chronic poliomyelitis	Muscle atrophy.
323	16446	3	MR529	2F	2	12	K	Negative	
255	16440	12	CR269	+	2	6	D	Polioencephalomyelitis.	
321	16794	12	CR269	2F, RH	73	78	K	Chronic poliomyelitis	
338	16451	14	CR214	2F, 2H, LN	5	10	K	Polioencephalomyelitis.	
325	16523	14	CR214	2F	2	12	D	do	
319	16850	14	CR214	0	0	88	D	Negative	Excluded.
386	16524	15	CR337	2F	1	7	D	Acute poliomyelitis	
398	16529	15	CR329	0	0	7	D	Polioencephalomyelitis.	
387	16556	15	CR329	2F, 2H	6	13	K	do	
295	16531	15M1	MM1	2F	1	6	K	Polioencephalitis	
394	16558	16	CR373	2F, 2H, J	2	9	K	Polioencephalomyelitis.	
365	16567	16	CR177	2F, 2H	4	12	K	do	
353	16468	M2	MMP2:1	2F, LH	4	10	K	Slight polioencephalitis	No cord.
400	16559	17	CR286	2F	1	3	D	Acute poliomyelitis	
290	16553	M3	MMP3:4	RF	1	7	K	Acute polioencephalomyelitis.	
356	16591	19	CR278, 389	+	1	3	D	Early acute poliomyelitis.	
281	16611	19	CR278, 389	+	1	4	D	Acute poliomyelitis	
302	16612	19	CR278, 389	+	1	4	D	Acute polioencephalomyelitis.	
336	16613	19	CR278, 389	Complete	4	7	K	Polioencephalomyelitis.	
377	16644	19	CR278, 389	Complete	4	14	K	do	
445	16646	20	CR433	+	1	7	K	do	
464	16708	M11	MMP27:1:2	+	1	4	D	Acute poliomyelitis	
501	16758	M13	MMP34:2	2F	2	5	D	Polioencephalomyelitis.	
319	16863	32	CR529	+	4	4	K	do	Second inoculation.
332	16864	32	CR529	+R	1	4	K	Acute polioencephalomyelitis.	
207	16869	32	CR529	+	1	6	K	Polioencephalomyelitis.	
573	17097	M19	MMP50:12	2F, 2H	2	6	K	Poliomyelitis	
575	17154	36	CR570	Rolling	2	5	D	Acute poliomyelitis	
581	17228	37	CR574	+	1	6	D	do	
563	16988	38	CR559	R	1	2	K	Negative	

R=right, L=left, F=foreleg, H=hind leg, R=respiration, N=neck, B=back, +=present, 0=none noted.

Often one or more polymorphonuclear leucocytes were seen invading the necrotic nerve cells, but the accumulation of a ring of leucocytes about the necrotic cell was infrequent in this species. A diffuse irregular polymorphonuclear leucocyte infiltration of the gray substance of the anterior horns occurred as early as 3 days after inoculation, was present in over two-thirds of the rats from the fifth to the ninth day, and was infrequent thereafter. Cellular gliosis appeared in nodular and diffuse form at about the fifth day and was somewhat more frequent and greater in amount after the tenth day. Neuronophagia by macrophages was late and relatively infrequent. Massive replacement of the anterior horn by monocytes or foamy macrophages

was present in 3 cotton rats in one (lumbar) level of the cord, and in these areas there were no remaining surviving nerve cells.

The cerebral reaction was later in appearing than that in the spinal cord, in spite of the intracerebral route of inoculation used in all animals, and appeared sooner in the pons and medulla than anteriorly (table 2). Several animals dead in the first 4 days after inoculation showed well marked cord lesions in one or more levels and minimal or no cerebral reaction. The amount and frequency of the reaction diminished in the brain stem from the pons forward. In the cerebral cortex, focal lesions were most frequently present in the frontal area, but still few in number. The cerebellar and occipital cortex least often showed focal lesions (table 3).

TABLE 2.—*Number of cotton rats showing brain and cord lesions in relation to time*

Days	Reaction	Frontal	Parietal	Temporal	Occipital	Hippocampus	Corpus striatum	Thalamus	Midbrain	Pons	Cerebellar nucleus	Cerebellar cortex	Medulla	Cord
3-4	+	1	1	0	0	2	0	1	2	4	2	2	3	7
	−	7	7	8	8	6	8	7	6	4	4	6	4	1
5-7	+	11	6	5	4	11	6	14	19	20	3	6	14	17
	−	9	13	14	11	8	14	5	0	0	13	13	0	2
8-10	+	7	6	5	0	4	4	8	8	10	3	3	9	9
	−	8	4	5	4	6	6	2	2	0	2	7	0	0
11-14	+	8	3	6	4	7	5	6	7	8	4	2	5	8
	−	2	7	4	4	3	5	4	3	2	4	8	2	1
15-26	+	3	1	0	2	3	2	2	4	4	5	0	3	4
	−	2	4	5	3	2	3	3	0	0	0	5	0	0

TABLE 3.—*Number of cotton rats showing various grades of reaction in various parts of the brain*

Reaction	Frontal	Parietal	Temporal	Occipital	Hippocampus	Corpus striatum	Thalamus	Midbrain	Pons	Cerebellar nucleus	Cerebellar cortex	Medulla	Spinal cord
−	23	35	36	30	25	36	21	11	6	13	39	6	4
±	23	11	10	4	13	14	22	17	15	13	11	17	19
+	4	3	3	4	10	2	8	19	27	14	2	15	18
++	3	3	3	2	4	1	1	5	4	0	0	2	8
Total	53	52	52	40	52	53	52	52	52	40	52	40	49

Cerebral cortical lesions were usually vascular, consisting chiefly of vessel sheath lymphocyte infiltration. Few foci of cellular gliosis were seen. Nerve cell necrosis in the hippocampus was seen in 7 cotton rats and was usually accompanied by a more or less diffuse cellular gliosis, with some polymorphonuclear leucocyte infiltration in one animal.

The corpora striata and thalamus showed chiefly vascular lesions, nodular glia foci remaining infrequent even in the thalamus.

Focal and diffuse cellular gliosis was more frequent in the midbrain, especially in the tegmental area and substantia nigra. Isolated necrotic nerve cells were seen in 13 cotton rats, situated usually in red nuclei and tegmentum, sometimes in the substantia nigra or oculomotor nuclei. Neuronophagia by macrophages was occasionally seen, but polymorphonuclear exudation was not observed.

In the pons, reactions were more frequent and more marked than in any other part of the brain. The tegmentum and trigeminus nuclei showed the most involvement, including much diffuse and focal cellular gliosis and frequent necrotic nerve cells. Nerve cell necrosis was noted in about half of the animals, but definite neuronophagia and polymorphonuclear exudation were infrequent.

The cerebellar roof nuclei presented vascular lesions and focal and diffuse cellular gliosis in about two-thirds of the animals, and isolated necrotic nerve cells were noted in 4 cotton rats. The mesial or tectal nuclei were apparently more involved than the lateral or dentate, as in man and monkeys. The cerebellar cortex presented infrequent vascular lesions and occasional glia nodes, the latter usually in the molecular layer.

In the medulla also there were many vascular lesions and much focal and diffuse cellular gliosis, particularly in the reticular gray substance. Necrotic nerve cells were noted in 15 of 40 cotton rats, occurring chiefly in the reticular substance, occasionally in other nuclei.

Meninges commonly showed diffuse and perivascular infiltration in which lymphocytes predominated.

In addition to the 53 cotton rats considered in the foregoing description, studies were made in 2 rats which survived 78 and 180 days with paralyses in both cases of the right fore and right hind legs which had lasted 73 and 171 days, respectively. These animals showed no evident brain lesions in any area. In both, the anterior horns of lower cervical and lumbosacral levels showed reduction in number of nerve cells and slight spindle cell gliosis, more marked on one side, with normal or less reduced cell content on the other.

Muscle from the atrophic foreleg of one of these cotton rats showed some normal muscle bundles and other bundles of muscle fibers of less than half the normal width and a greatly increased number of nuclei.

PATHOLOGY IN THE WHITE MOUSE

During the period from November 1, 1939, to March 1, 1940, central nervous systems of 36 mice inoculated with poliomyelitis virus were studied. Data regarding survival periods, presence, duration and location of paralyses, virus transfers and anatomical diagnoses are

recorded in table 4. During the same period brains from some 130 mice were sectioned and studied in connection with lymphocytic choriomeningitis, typhus, and spotted fever studies. Pictures corresponding to that about to be described were not encountered in this other material.

Cord lesions were present in 21 of the 23 mice in which sections of spinal cord were taken for study. Lesions were present in the cervical levels in 18 of 23 mice, in thoracic levels in 6 of 21 mice, and in lumbosacral cord in 12 of 21 mice. They were confined to one level in 9 mice and to two in 4.

Cord lesions appeared as early as 2 days after inoculation. Two and 3 days after inoculation they were present in 4 of the 5 mice in which spinal cord sections were made. In this period cerebral lesions were absent (4 mice) or infrequent (7 mice) in spite of the intracerebral inoculation (table 5). Four to 7 days after inoculation lesions were present in 7 of the 8 spinal cords studied. Brain stem lesions were present and often numerous in 11 of the 12 mice, cerebral cortical lesions were still infrequent, absent in 4, few in 4, and moderately frequent in 4 mice. In the 10 mice surviving to the tenth day or longer, brain stem lesions were constantly present and often numerous, cortical lesions were present in 9 and moderately frequent in 3, and cord lesions were more often confined to a single level (6 mice) or two levels (2 mice).

Coagulation necrosis of nerve cells in the anterior horns of the spinal cord was present in all 3 of the mice dying 2 days after inoculation, and in 1 of the 2 spinal cords examined in mice dead 3 days after inoculation. It was accompanied by vacuolation of some of the remaining nerve cells, tigrolysis, more or less focal or diffuse cellular gliosis, and vessel sheath lymphocyte infiltration or vascular endothelial swelling and proliferation. Polymorphonuclear leucocyte infiltration was present in some sections, but not all, and invasion of necrotic nerve cells was seen in one mouse.

In the 4- to 7-day period vascular lesions and cellular gliosis became more prominent, nerve cell necrosis was usually demonstrable, polymorphonuclear infiltration was seen in 1 of the 8 cords studied, and neuronophagia by macrophages was sometimes clearly evident.

The 10 mice dead 10 to 95 days after inoculation showed generally more pronounced cellular gliosis with small clumps sometimes suggesting previous neuronophagia, generally moderate or marked vessel sheath lymphocyte infiltration, sometimes definite macrophage neuronophagia, inconstantly a few coagulated necrotic nerve cells, no polymorphonuclear leucocytes, and often an evident reduction in number of nerve cells. The last is particularly striking when unilateral.

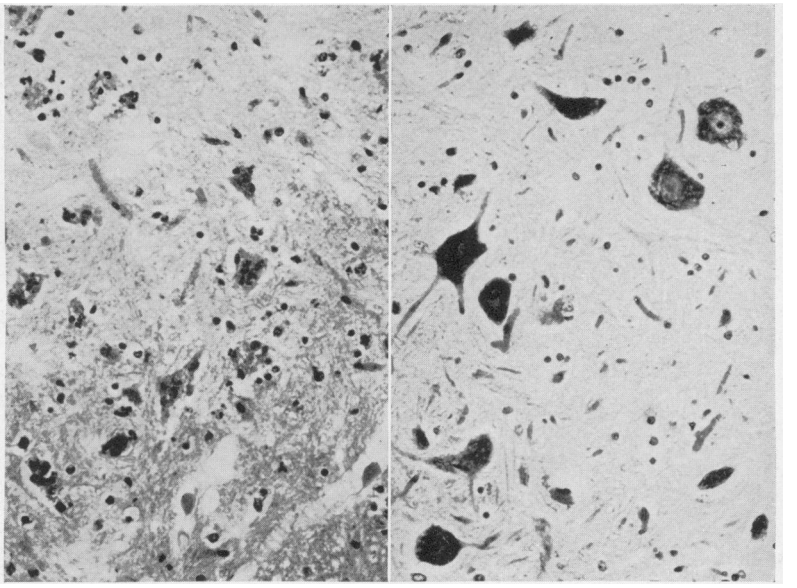

FIGURE 1.—Cotton rat 16559, 3 days. Contralateral anterior horns in same level of spinal cord. Left, necrosis and polymorphonuclear invasion of nerve cells; right, normal. (× 200)

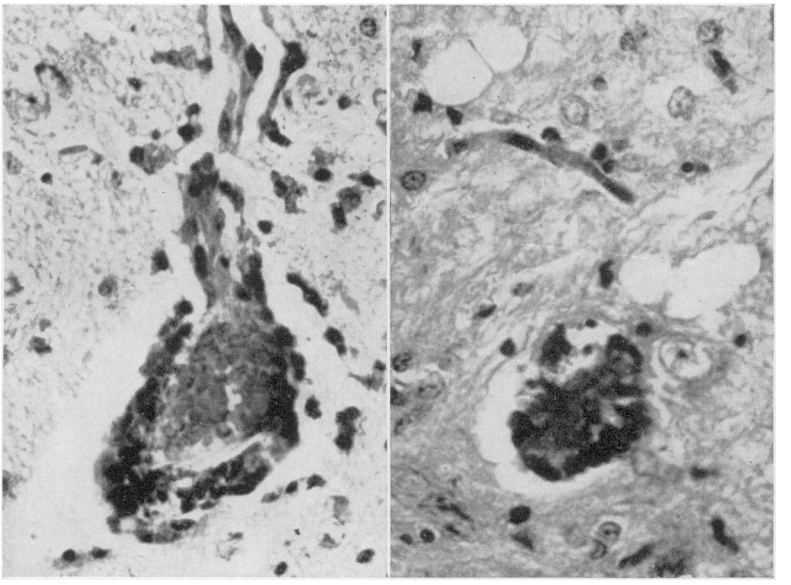

FIGURE 2.—Cotton rat 16558, 9 days. Perivascular lymphocyte infiltration in tegmentum of pons (left) and cerebellar roof nuclei (right). (× 400)

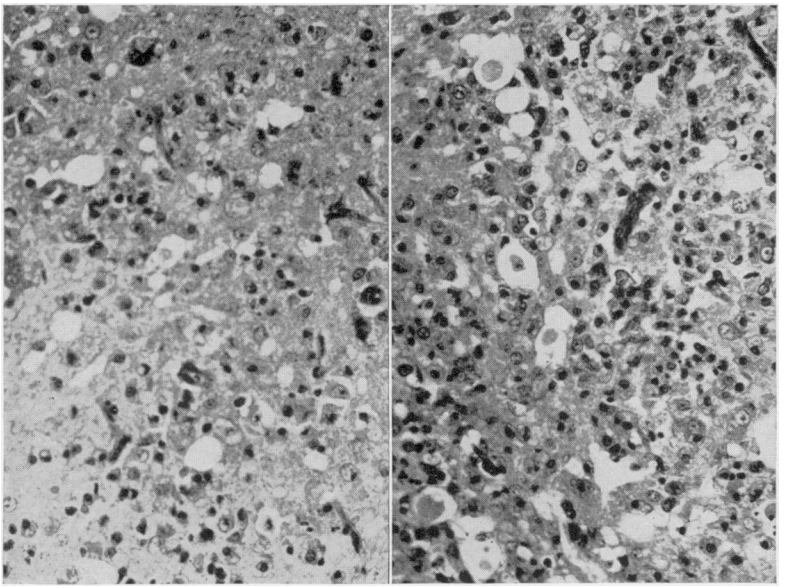

FIGURE 3.—Cotton rat 16556, 13 days. Diffuse foam cell gliosis of anterior horns of spinal cord with nerve cell destruction and (right) remains of necrotic cells in large vacuoles. (× 200)

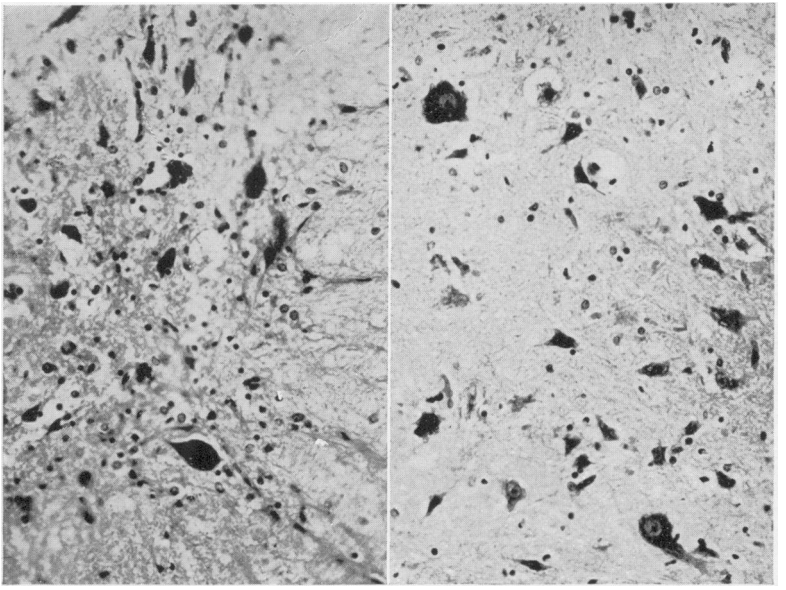

FIGURE 4.—Cotton rat 16987, 180 days. Cell decrease, paralyzed side (left) compared with nonparalytic side (right), anterior horns of spinal cord in same level. (× 200)

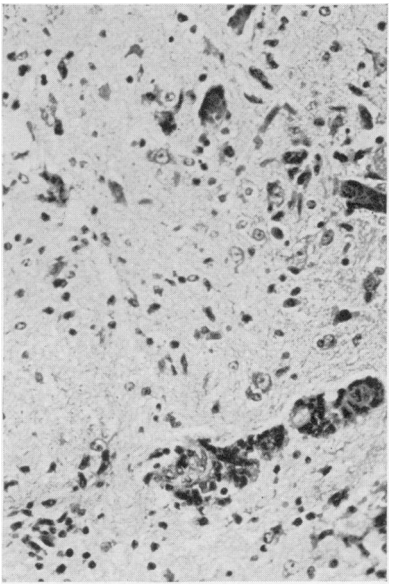

FIGURE 5.—Mouse 16561, 5 days. Anterior horn of spinal cord, vascular lesion and focal gliosis. (× 200)

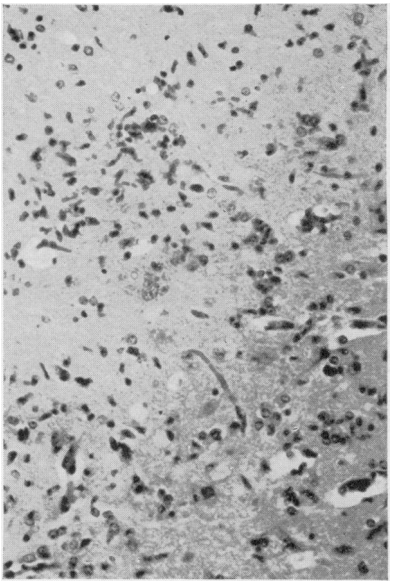

FIGURE 6.—Gray mouse 17046, 6 days. Anterior horn of spinal cord, rod cell gliosis and probable neuronophagia. (× 200)

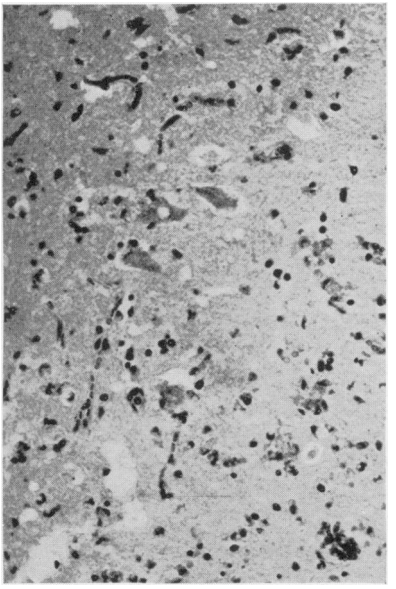

FIGURE 7.—Mouse 17247, 6 days. Nerve cell necrosis, anterior horn of spinal cord. (× 200)

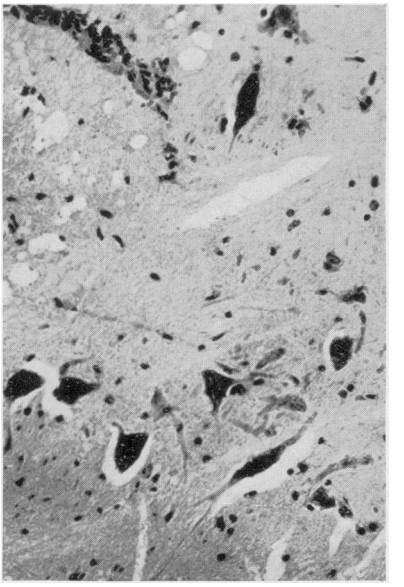

FIGURE 8.—Mouse 16737, 12 days. Anterior horn of spinal cord, normal nerve cells, slight perivascular lymphocyte infiltration. (× 200)

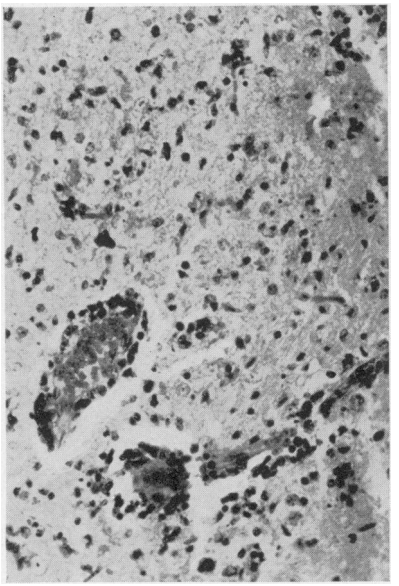

FIGURE 9.—Mouse 17247, 6 days. Pons, fifth nucleus, destruction of nerve cells, cellular gliosis, perivascular lymphocyte infiltration. (× 200)

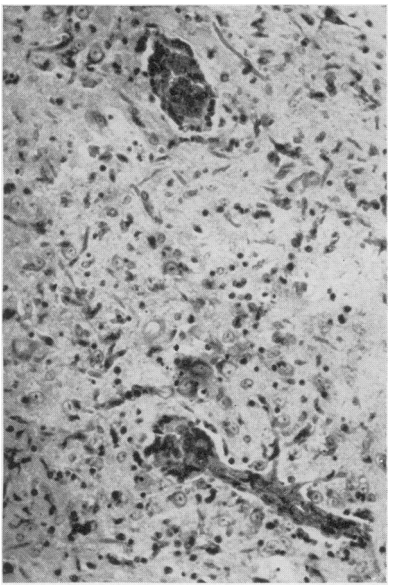

FIGURE 10.—Mouse 16695, 19 days. Pons, fifth nucleus, cell decrease, gliosis, and vascular lesions. (× 200)

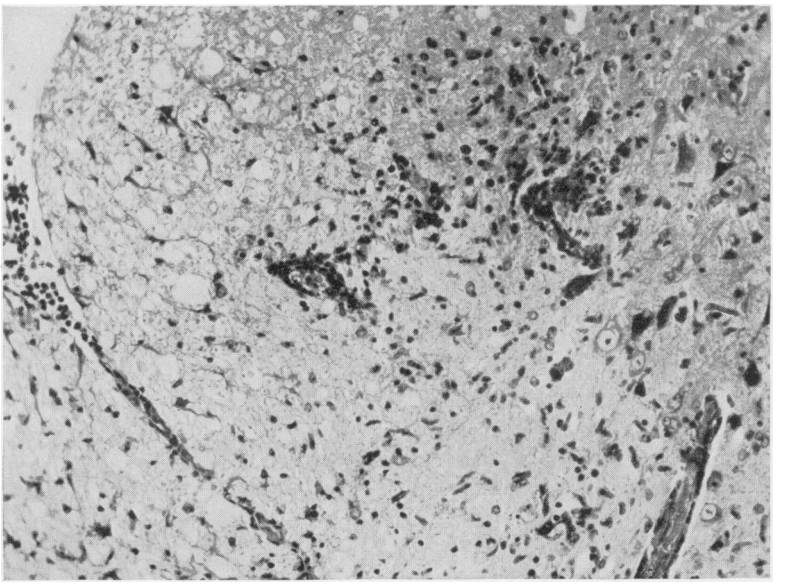

FIGURE 11.—Mouse 16695, 19 days. Cervical cord, gliosis, vascular lesions, meningeal infiltration. (× 200)

TABLE 4.—*Data concerning passage generation in mice, source of inoculum, survival period, location and duration of paralysis, and anatomical diagnoses in poliomyelitis in mice*

Mouse No.	Pathology No.	Passage generation	Source of inoculum	Site of paralysis	Duration of paralysis, days	Day dead	Killed or died	Anatomical diagnosis	Remarks
SX2:4:2	16561	1	337-5M1	0	0	5	D	Poliomyelitis, probable	
Ex329-4	16608	1	CR329	LF, 2H	2	23	K	Acute polioencephalomyelitis	
ExCr559:1	16986	1	CR559	+	1	2	K	Dubious, slight encephalitis	Bacterial infection, excluded.
ExCR559:2	16985	1	CR559	+	1	2	K	Encephalitis	
P54-5	17148	1	CR568	2F, 2H	1	7	K	Polioencephalomyelitis	
ExCR405:5	17173	1	CR405	2F, R	1	95	D	Acute polioencephalomyelitis	
M2-A1	16436	2	M1	2F, R	1	3	D	Indefinite	No cord.
M2-A2	16435	2	M1	2F, R	1	3	D	Indefinite	Do.
P1:2	16560	2	CR337-M2	RF, 2H	2	6	D	Indefinite	Do.
Sx1:P4:14	16562	2	CR337-M2	+	1	6	D	Dubious, slight encephalitis	Do.
P3:M3:9	16450	3	M2:1	2F, R	1	5	D	Polioencephalomyelitis	
M3:10	16467	3	M2:1	2F, R	1	7	D	Polioencephalitis	
P14M6:2	16597	6	P12:M5:405	2F, R	1	3	K	Acute poliomyelitis	
Sx11:1:1	16642	7	P18:9	2F	1	3	D	Indefinite	Do.
Sx11:1:2	16643	7	P18:9	+	1	3	D	Negative	Do.
Sx15:15:1	16641	7	P18:9	0	0	3	D	Negative	Do.
Sx15:15:2	16640	7	P18:9	0	0	3	D	Negative	Do.
Sx15:15	16738	7	P18:9	RF	-------	23	K	Poliomyelitis	
P22:1	16650	9	P19-M8	0	0	4	D	Polioencephalitis	Do.
P22:2	16651	9	P19-M8	0	0	4	D	Polioencephalitis	Do.
P19:1P	16695	9	M8-4	LF, B	1	19	K	Polioencephalomyelitis	
P19:10V	16696	9	M8-4	2F, N, B, R	2	19	K	Polioencephalomyelitis	
P22:10	16736	9	P19-M8	2F, 2H, R	1	20	K	Polioencephalomyelitis	
P27:6V	16737	10	P22-4	RF	2	12	K	Polioencephalomyelitis	
P29:1	16697	10	P22-5:6	RF	1	3	K	Dubious, slight encephalitis	
P30:3:3:M	16757	12	P27-2:3	2F, 2H	1	17	K	Poliomyelitis	
P35:1	16762	14	P34:2	2H	1	6	K	Acute polioencephalitis	
P40:10	17004	16	P38:9	LF, 2H	1	13	D	Purulent meningoependymitis	Excluded.
P48:5	17045	19	P46:3	2F	1	15	K	Polioencephalomyelitis	
P50:11	16989	19	P48:10	RH	1	7	K	Acute poliomyelitis	
P51:4	17046	19	P49:3	2F, 2H	1	6	K	Acute polioencephalomyelitis	Gray mouse.
P53:10	17099	20	P50:10	2H	2	10	K	Polioencephalomyelitis	
P65:2	17247	21	P59:6	2F, 2H, R	2	6	K	Acute polioencephalomyelitis	
P63:13	17185	21	P65:4	0	0	2	D	Acute poliomyelitis	
P64:2	17186	21	P65:4	0	0	2	D	Acute poliomyelitis	
P64:7	17189	21	P65:4	0	0	2	D	Probably early poliomyelitis	

R=right, L=left, F=foreleg, H=hind leg, R=respiration, N=neck, B=back, +=present, 0=none noted.

TABLE 5.—*Numbers of mice showing various grades of reaction in the various parts of the brain and cord by time periods*

	Reaction	Cerebral cortex 4 levels	Hippocampus	Corpus striatum	Thalamus	Midbrain	Pons	Cerebellar nuclei	Cerebellar cortex	Medulla	Cervical cord	Thoracic cord	Lumbar cord
2-3 days, 11 mice	−	38	9	11	8	10	8	8	11	9	2	4	2
	±	4	1	0	2	1	1	1	0	0	2	0	1
	+	0	1	0	1	0	1	0	0	1	1	1	2
	++	0	0	0	0	0	0	0	0	0	0	0	0
	0	2	0	0	0	0	1	2	0	1	6	6	6
4-7 days, 12 mice	−	27	7	11	6	1	2	6	9	1	2	3	2
	±	13	0	1	4	3	1	2	2	3	1	3	0
	+	5	3	0	2	4	3	1	0	4	4	1	2
	++	0	2	0	0	3	5	0	0	4	1	0	3
	0	3	0	0	0	1	1	3	1	0	4	5	5
Over 7 days, 10 mice	+	22	3	7	3	0	0	6	9	0	1	3	5
	±	9	3	3	6	3	3	2	0	1	0	1	1
	+	6	4	0	1	5	2	0	1	6	7	0	2
	++	2	0	0	0	1	5	1	0	2	2	0	1
	0	1	0	0	0	1	0	1	0	1	0	1	1
All 33 mice	−	87	19	29	17	11	10	20	29	10	5	15	9
	±	26	4	4	12	7	5	5	2	4	3	4	2
	+	11	8	0	4	9	6	1	1	11	12	2	6
	++	2	2	0	0	4	10	1	0	6	3	0	4
	0	6	0	0	0	2	2	6	1	2	10	12	12

−=negative, ±=slight, +=moderate, ++=marked, 0=missing.

Lesions appeared in the medulla at about the fourth day and were almost regularly present thereafter. Vascular lesions were prominent, and focal and diffuse cellular gliosis was frequent. The reticular substance, seventh, ninth, tenth, and ambiguus nuclei were noted as especially involved in some animals. Coagulated necrotic cells were seen in 3 mice, but neither definite neuronophagia nor polymorphonuclear infiltration were recorded.

In the pons lesions appeared about the same time, were of similar types, and were generally somewhat more frequent and marked than in the medulla. Sites of predilection are tegmentum and trigeminus nuclei, though restriction to these areas is less definite than in cotton rats and monkeys. Coagulated necrotic nerve cells were noted in 8 mice, definite neuronophagia in 2, but the presence of polymorphonuclear leucocytes was not recorded.

Seven mice presented few to moderate numbers of vascular lesions and focal and diffuse cellular glioses in the central cerebellar nuclei. In one, diffuse gliosis was quite marked in the mesial or tectal portion. Occasional perivascular lymphocyte infiltration was noted in the cerebellar cortex.

The midbrain presented fewer lesions, but similar to those in the pons. Appreciably marked reactions were later in appearance, about the sixth day. Tegmental areas, substantia nigra, and red and third nuclei were particularly involved. Necrotic nerve cells were seen in

4 mice, accompanying neuronophagia and polymorphonuclear infiltration in 1 each.

Thalamic lesions were few, usually focal glioses or vascular lesions, and were infrequent before the seventh day. Focal lesions in the corpora striata were of the same types, absent before the seventh day and infrequent thereafter.

Cerebral cortical lesions consisted of perivascular lymphocyte infiltration, vascular endothelial swelling and proliferation, patches of diffuse cellular gliosis, often of rod cells and fewer small nodular and perivascular glioses. They showed definitely greater frequency in the hippocampus and were here occasionally accompanied by necrotic nerve cells. The other cortical areas, frontal, parietal, temporal, and occipital showed fewer lesions in fewer mice.

The leptomeninges commonly showed some infiltration by lymphocytes, slight up to the sixth day, somewhat more marked thereafter. Sections of chorioid plexus were noted in 91 locations in 28 mice. Slight lymphocyte infiltration was noted in 6 of these locations in 5 mice.

SUMMARY

Intracerebral inoculation with the Lansing strain of poliomyelitis virus produces in cotton rats (*Sigmodon hispidus hispidus*) and white mice (*Mus musculus*) an inflammatory process characterized by necrosis of nerve cells, polymorphonuclear leucocyte exudation and invasion of necrotic cells, neuronophagia by macrophages, diffuse and focal cellular gliosis, vascular endotheliosis and sheath lymphocyte infiltration. In the brain the dorsal portion of the pons shows the greatest involvement, then medulla, midbrain, thalamus and cerebellar roof nuclei. Cerebral cortex in both species shows relatively little involvement, most in the hippocampus. Corpora striata and cerebellar cortex show the least involvement. In spite of intracerebral inoculation into the thalamomesencephalic region, the earliest observed lesions are found in the spinal cord in both species.

The process in both species is considered closely similar to the reaction of poliomyelitis in man and monkeys. In general, the amount of vessel sheath lymphocyte infiltration is less in cotton rats than in mice, monkeys, or man.

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(*2*) Armstrong, C.: Successful transfer of the Lansing strain of poliomyelitis virus from the cotton rat to the white mouse. Pub. Health Rep., **54**: 2302 (1939).

(*3*) Lillie, R. D., and Armstrong, C.: The pathology of poliomyelitis experimentally induced in the eastern cotton rat, *Sigmodon hispidus hispidus*. Pub. Health Rep., **55**: 115 (1940).

A NOTE ON THE PATHOLOGY IN MONKEYS OF THE LANSING STRAIN OF POLIOMYELITIS VIRUS BEFORE AND AFTER PASSAGE IN THE COTTON RAT [1]

By JAMES H. PEERS, *Research Associate, United States Public Health Service*

Last autumn Armstrong (*1*) reported the successful transfer of a strain of poliomyelitis virus from the monkey to the eastern cotton rat. Subsequently, Lillie and Armstrong (*2*) described and illustrated the lesions produced in the cotton rat by this virus. In the interval the virus has been propagated through more than 45 serial rat passages. Material was reinoculated into monkeys from the third, sixth, fifteenth, and thirty-third rat transfer in order to confirm the identity of the virus. Previous to establishing the strain in rats, it had been maintained by passage through 15 monkeys, in 11 of which pathological examination was made. By a comparison of lesions in the 11 monkeys before rat transfer with those of the 4 after transfer, it is possible to gage the effect on the virus of a fairly prolonged sojourn in a new and very different animal host.

The "Lansing" strain of poliomyelitis virus was originally obtained from a portion of the spinal cord of a 16-year-old boy who died of bulbar poliomyelitis during a small outbreak in Lansing, Mich., in the summer of 1937. Unfortunately we have not had the opportunity of examining the brain from this patient, so we have no exact knowledge of the character and distribution of the original human lesions. Judged by pathologic standards, this strain of virus is highly virulent, for the brain stem lesions in monkeys are somewhat more widespread and severe than those usually obtained with other strains in this laboratory.

From examination of the brains of the 11 monkeys in which the Lansing strain had been carried before rat transfer, it is possible to construct a composite pattern of the lesions produced by this virus. All brains regularly showed maximum inflammatory infiltration with more or less necrosis of nerve cells in the red nucleus, the substantia nigra, the reticular substance of the tegmentum of pons and medulla, and the tectal and dentate nuclei of the cerebellum. Lesions somewhat less constant and severe appeared in the nuclei of the trigeminal, abducens, facial, and vestibular portion of the eighth nerve, and the nuclei of the funiculi gracilis and cuneatus. The nuclei of the oculomotor, trochlear, vagus, and hypoglossal nerves generally escaped or presented only minimal lesions.

The lesions in the basal ganglia were more difficult to evaluate because of the presence there of an often large area of nonspecific necrosis and reaction caused by the intracerebral inoculation. After this had been discounted, there appeared quite constantly scattered

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

microglial foci in the thalamus and hypothalamus, a few in the globus pallidus, and rare lesions in the putamen. Lesions almost never appeared in the caudate nucleus. Definite changes were observed only once in the olfactory bulbs. In a few animals there were one or two scanty perivascular infiltrations in the olfactory tubercles and hippocampus.

The majority of brains presented sparse lesions in the cerebral cortex, generally confined to the motor portion of the frontal lobes. The lesions consisted of small foci of microglia, and rarely neuronophagia of a single nerve cell. Similar microglial foci were more constantly present in the molecular layer of the vermis cerebelli.

More or less marked round cell infiltration of the meninges and chorioid plexus was seen in occasional animals throughout the series. This bore no apparent relation to the source of the inoculum or to the severity of the parenchymatous damage.

After successful transfer and propagation of this strain of virus in cotton rats, material from the third, sixth, fifteenth, and thirty-third consecutive rat passages was again transferred to monkeys by intracerebral inoculation. All 4 animals developed symptoms of severe poliomyelitis in an average of 7 days, and were killed to obtain tissue for study. Pathologic examination of their brains furnished comparable data from which to estimate any modification of pathogenicity for monkeys of the Lansing strain of virus caused by prolonged rat passage. The lesions observed varied only slightly in severity in the 4 monkeys, and their type and distribution corresponded exactly to that characteristic of the strain before rat passage. The pathologic picture in the first and last monkey was practically identical, though 30 generations of rat passage of the virus intervened between them.

CONCLUSION

The lesions produced in 11 monkeys by the Lansing strain of poliomyelitis virus before transfer to the cotton rat have been briefly described. After transfer and during its propagation in rats the virus has been reinoculated into 4 monkeys. In these it produced uniform lesions morphologically indistinguishable from those observed before rat passage. It therefore appears that neither the initial transfer nor the subsequent passage through 33 cotton rats visibly modified the pathogenic properties of this strain of poliomyelitis virus.

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A HIGHLY VIRULENT STRAIN OF ROCKY MOUNTAIN SPOTTED FEVER VIRUS ISOLATED IN THE EASTERN UNITED STATES [1]

By NORMAN H. TOPPING, *Passed Assistant Surgeon*, and R. E. DYER, *Senior Surgeon, United States Public Health Service*

In 1931 Badger, Dyer, and Rumreich (*1*) reported the isolation and identification in the eastern part of the United States of an infection of the Rocky Mountain spotted fever type. Three strains of the infection were isolated from 3 cases of the disease. Two of these strains were carefully studied and identified. Of a total of 617 guinea pigs used in this study they reported a fatality of 25 percent and the appearance of scrotal lesions in only 1 of the guinea pigs.

Including these 2 strains of Rocky Mountain spotted fever reported by the above authors, a total of 13 strains have been isolated from cases occurring in the eastern part of the United States and have been studied over varying periods of time. Five of these 13 strains have been carried in the laboratory for a year or longer. In 12 of them the fatality rate has been between 7 and 40 percent; only 2 have exhibited scrotal lesions in the guinea pigs and then only rarely and with great inconsistency. The other strain of Rocky Mountain spotted fever isolated in the summer of 1939 and hereafter called the "W" strain has differed rather markedly from the usual strains isolated in the eastern United States. The purpose of this paper is to report in some detail the reaction in guinea pigs of this strain of the infection as compared to a known virulent western strain and a freshly isolated strain which has been representative of the usual strains in the East.

The differences between the various strains of infection may be shown by comparisons in fatality rates, incubation periods, and the presence or absence of involvement of the scrotum. With a strain recovered in Montana and highly virulent for guinea pigs, only about 50 percent of the guinea pigs inoculated develop the scrotal lesions; the others usually die before sufficient time has elapsed for the lesions to develop, or the lesions occasionally fail to appear for some unknown reason. The first appearance of the scrotal reaction is usually noted somewhere between the fourth and seventh day of fever. The scrotal reaction is initiated by a very slight diffuse erythema and at this stage the skin of the scrotum becomes stretched and assumes a shiny appearance. The following day a macular rash is seen over the scrotum and may extend upward onto the groin. These macules become darker very rapidly so that within 24 hours the skin of the scrotum appears purpuric where the dark purplish macules have coalesced. The superficial layers of the skin then begin to become necrotic and crusts are found over the purpuric lesions. These hard

[1] From the Division of Infectious Diseases, National Institute of Health.

crusts are easily palpated on the scrotal skin. The crusts and the superficial layers of the skin slough leaving ulcers which may have more or less bizarre shapes. Before the slough is complete healing begins, both from the bottom of the ulcer and from the edges where the epithelium may become somewhat "piled up." Healing is usually complete in 5 to 7 days and leaves a permanent scar or scars on the scrotum. The whole process has been confined to the skin proper and at no time have the deeper layers or structures in the scrotum been involved macroscopically.

Seven strains of Rocky Mountain spotted fever were isolated from patients in and around Washington during the season of 1939. One of these strains ("W") after the eighth passage through guinea pigs began to exhibit the typical scrotal lesions just described and commonly seen in strains which have been isolated in the West and studied in guinea pigs. This is the first strain isolated in the East that has shown these scrotal lesions with any degree of consistency. The incubation period in this strain has been shorter than the other strains, and the guinea pig fatality rates have been much higher. Using these three criteria (i. e., scrotal lesions, incubation period, and fatality rate) as the comparative points, this one strain ("W") is almost identical with our stock strain of Rocky Mountain spotted fever ("B. R.") isolated in the Bitterroot Valley in Montana. The data on these two strains, plus a third strain ("M") which also was isolated in the East, are summarized in table 1.

TABLE 1

Strain	Isolated in—	Number of guinea pigs	Number died	Number recovered	Percent fatality
B. R.	Montana	50	41	9	82
W	Washington, D. C.	22	19	3	86
M	do	41	14	27	34

The figures in this table show the results of the routine passage of the strains in 500-gm. male guinea pigs inoculated with 2 cc. of whole blood drawn from an infected guinea pig on about the second day of fever. The data were assembled for exactly comparable seasons of the year. The "B. R." strain has been carried for several years as our type strain of Rocky Mountain spotted fever. Complete cross immunity exists between it and the "W" and "M" strains, as well as between the "W" and "M" strains themselves. No cross immunity exists between any of these three strains and endemic typhus, epidemic typhus, or "Q" fever. Figure 1 shows typical temperature curves for the three strains and illustrates the similarity between the "B. R." and the "W" strains.

In order to observe simultaneously some of the aspects of the 3 strains, each was inoculated into 12 male (500-gm.) guinea pigs. The inoculation consisted of 1 cc. of whole blood injected intra-

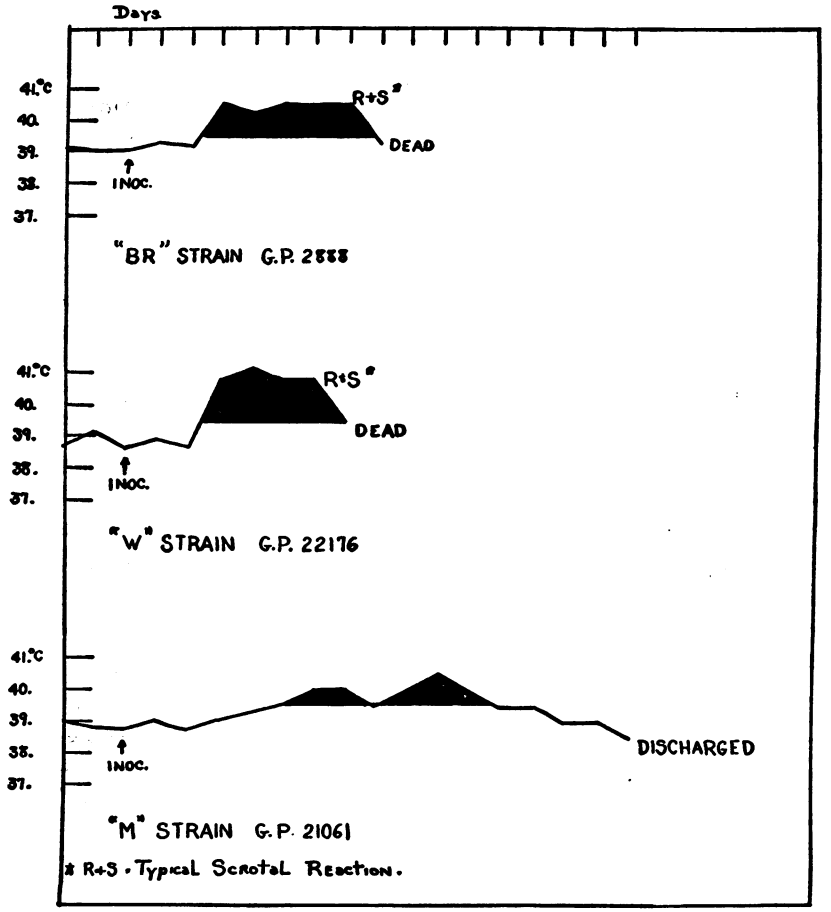

FIGURE 1.—Daily temperature records of guinea pigs inoculated with different strains of Rocky Mountain spotted fever.

peritoneally, drawn from an infected guinea pig on the second day of fever.

The data for these 36 guinea pigs are summarized in table 2.

TABLE 2

Strain	Number of guinea pigs	Incubation period	Number died	Number recovered	Number with scrotal lesions
B. R.	12	2.6	7	5	9
W	12	3.1	6	6	10
M	12	4.2	0	12	0

These data illustrate the very close similarity between the "B. R." and the "W" strains. The 3-day incubation period for the "W" strain represents the shortest period that we have observed in strains isolated in the East. The usual incubation period for these strains has been between 4 and 6 days or even a little longer.

The isolation of a strain of spotted fever which on inoculation into guinea pigs produces the typical picture (short incubation period, high fatality rate, and necrosis of the scrotum) characteristic of the strains usually encountered in the Northwest leads us to question the further use of the terms "western type" and "eastern type" in reference to spotted fever strains. We have no evidence that this strain ("W") of spotted fever had any direct or indirect connection with the West, nor have we any acceptable evidence regarding any of the other strains isolated in the East. It is, of course, possible that there may be strains of virus in Montana which will produce in guinea pigs the picture usually associated with eastern strains, although reports of such are not found in the literature. With the reporting of the new strain in this paper, it would seem that spotted fever strains can be more accurately described by reference to the virulence for guinea pigs and to the presence or absence of scrotal involvement than by a geographical designation which does not hold true in all instances.

SUMMARY

A strain of Rocky Mountain spotted fever which has a short incubation period, high fatality rate, and commonly produces scrotal lesions in guinea pigs, has been isolated in the eastern United States. This strain has been compared to a typical highly virulent strain isolated in Montana and to a moderately virulent strain which does not produce scrotal lesions isolated in the eastern United States.

REFERENCES

(1) Badger, L. F., Dyer, R. E., and Rumreich, A.: An infection of the Rocky Mountain spotted fever type, identification in the eastern part of the United States. Pub. Health Rep., **46**: 463–470 (Feb. 27, 1931).

CANCER MORTALITY IN THE UNITED STATES ACCORDING TO SITE, BY SEX AND AGE, 1938

The accompanying tables (1 and 2), recently issued by the Bureau of the Census,[1] present some interesting data on cancer mortality in the United States by sex and site of tumor for the years 1934–38 and by 10-year age groups for 1938.

[1] Vital Statistics—Special Reports, vol 9, No. 25, pp. 173-174, March 12, 1940.

A total of 149,214 deaths from cancer was recorded in this country in 1938, of which 69,857, or 47 percent, occurred in males, and 79,357, or 53 percent, in females (the respective distribution of the population by sex in 1930 being 50.6 and 49.4).

The recorded mortality from cancer and other malignant tumors of all sites, which has been shown to have increased in the registration States of 1900 from 68.3 in 1900 to 120.6 in 1935,[2] even with the changing age composition of the population taken into account, has shown a further continuous increase during the period 1934–1938. During the 4-year interval, the increase in recorded mortality from cancer amounted to 10.5 percent, as compared with an estimated increase of 2.8 percent in the population. An increase of 13 percent is shown for males as compared with 9 percent for females.

The largest percentage increase was recorded for cancer of the respiratory system (52 percent for males and 39 percent for females), while the only broad classification groups showing a decrease were cancer of the buccal cavity and pharynx (for both sexes) and cancer of the skin (for males only).

Cancer of the digestive tract and peritoneum was the most important group from the standpoint of number of deaths, causing 47 percent of the total cancer mortality in 1938. The number of deaths from cancer of the various sites grouped in this classification increased 9.3 percent for males and 6.8 percent for females during the 4-year period. Deaths from cancer of the genitourinary organs (uterus excluded) increased by about 20 percent for both sexes. In females, cancer of the uterus (which caused 20 percent of all cancer mortality in that sex in 1938) increased 4 percent, while cancer of the breast, also a numerically important cause of cancer mortality in women, increased 10 percent during the 4 years.

In table 2 the cancer deaths for 1938 are presented by site and 10-year age groups. The percentage of the total population (1930) in these age groups and the percentage of cancer mortality falling in these ages in 1938 are as follows:

	Under 10	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80 and over
Percent of population	19.6	19.2	16.9	14.9	12.2	8.7	5.4	2.5	0.6
Percent of cancer mortality	0.5	0.5	1.3	4.2	11.7	21.1	27.6	24.0	8.9

[2] Cancer Mortality in the United States. I. Trend of Recorded Cancer Mortality in the Death Registration States of 1900 from 1900 to 1935. By Mary Gover. Pub. Health Bull. No. 248. U. S. Government Printing Office, 1939.

TABLE 1.—*Number of deaths from cancer in the United States, by sex and site, 1934–38*

Cause of death	1938		1937		1936		1935		1934	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Cancer and other malignant tumors	69,857	79,357	67,349	77,425	65,545	77,068	62,933	74,716	61,610	72,818
Cancer of the buccal cavity and pharynx	4,030	901	4,007	974	4,004	989	3,982	923	4,064	945
Lip	657	63	693	78	681	83	671	56	654	58
Tongue	943	172	860	198	887	210	878	198	864	192
Mouth	440	130	441	138	487	133	441	109	441	114
Jaw	718	192	704	216	724	226	776	223	825	228
Other and unspecified parts of buccal cavity	485	143	514	134	524	126	466	134	479	132
Pharynx	787	201	795	210	701	211	750	203	801	221
Cancer of the digestive tract and peritoneum	38,126	32,681	37,307	32,028	36,280	31,959	35,224	31,237	34,886	30,590
Esophagus	1,952	546	2,035	546	1,846	540	1,715	541	1,747	496
Stomach and duodenum	16,288	10,814	16,150	10,758	16,210	11,031	16,077	11,027	15,894	10,975
Intestines (except duodenum, rectum, anus)	7,585	9,103	7,175	8,803	6,833	8,531	6,428	8,037	6,358	7,747
Rectum and anus	4,727	3,718	4,413	3,481	3,975	3,350	3,824	3,237	3,692	3,048
Liver and biliary passages	4,303	5,763	4,418	5,879	4,490	5,935	4,434	6,045	4,596	6,072
Pancreas	2,737	2,169	2,594	2,011	2,446	1,994	2,309	1,809	2,126	1,649
Mesentery and peritoneum	511	529	500	533	462	560	424	526	441	558
Others under this title	23	39	22	17	18	18	13	15	32	45
Cancer of the respiratory system	6,065	2,056	5,484	1,872	4,931	1,909	4,478	1,723	3,989	1,484
Larynx	1,197	143	1,083	154	1,069	170	987	165	963	137
Lungs and pleura	3,669	1,631	3,464	1,521	3,099	1,549	2,951	1,405	2,631	1,246
Other respiratory organs	1,199	282	937	197	763	190	540	153	395	101
Cancer of the uterus	------	16,291	------	16,338	------	16,280	------	15,853	------	15,635
Cancer of other female genital organs	------	3,944	------	3,643	------	3,553	------	3,345	------	3,271
Ovary and Fallopian tube	------	3,312	------	3,018	------	2,941	------	2,795	------	2,676
Vagina and vulva	------	577	------	577	------	568	------	509	------	545
Other female genital organs	------	55	------	48	------	44	------	41	------	50
Cancer of the breast	145	14,315	182	13,757	171	13,537	162	13,064	161	13,010
Cancer of the male genitourinary organs	13,539	------	12,651	------	12,356	------	11,702	------	11,342	------
Kidneys and suprarenals	1,414	------	1,283	------	1,244	------	1,178	------	1,149	------
Bladder	3,216	------	3,084	------	3,148	------	3,014	------	2,825	------
Prostate	8,069	------	7,490	------	7,140	------	6,765	------	6,578	------
Testes	482	------	466	------	476	------	412	------	452	------
Scrotum	32	------	24	------	26	------	34	------	30	------
Other male genitourinary organs	326	------	304	------	322	------	299	------	308	------
Cancer of the skin	2,039	1,301	2,048	1,294	2,065	1,339	2,113	1,278	2,073	1,242
Cancer of other or unspecified organs	5,913	7,868	5,670	7,519	5,738	7,502	5,272	7,293	5,095	6,641
Kidneys and suprarenals (female)	------	937	------	879	------	831	------	870	------	865
Bladder (female)	------	1,535	------	1,567	------	1,505	------	1,485	------	1,351
Brain	977	646	802	576	750	534	654	487	715	449
Bones (except of jaw)	1,134	977	1,017	861	1,063	913	889	875	968	864
Other or unspecified organs	3,802	3,773	3,851	3,636	3,925	3,719	3,729	3,576	3,412	3,112

TABLE 2.—*Number of deaths from cancer, by age and site, 1938*

Cause of death	Total	Under 10 years	10 to 19 years	20 to 29 years	30 to 39 years	40 to 49 years	50 to 59 years	60 to 69 years	70 to 79 years	80 to 89 years	90 and over	Not stated
Cancer and other malignant tumors	149,214	719	743	1,985	6,296	17,477	31,541	41,244	35,871	12,289	1,000	49
Cancer of the buccal cavity and pharynx	4,931	13	16	26	96	381	959	1,442	1,375	570	53	------
Lip	720	1	------	3	18	39	108	198	227	106	20	------
Tongue	1,115	------	------	4	21	109	238	363	265	111	4	------
Mouth	570	------	------	------	7	37	101	163	171	84	7	------
Jaw	910	9	9	11	23	68	143	247	290	101	9	------
Other and unspecified parts of buccal cavity	628	2	3	3	8	53	143	176	152	82	6	------
Pharynx	988	1	4	5	19	75	226	295	270	86	7	------
Cancer of the digestive tract and peritoneum	70,807	124	81	498	1,833	6,275	14,174	21,497	19,530	6,348	427	20
Esophagus	2,498	------	1	7	26	184	648	850	631	139	11	1
Stomach and duodenum	27,102	8	16	105	560	2,164	5,226	8,309	7,986	2,550	168	10
Intestines (except duodenum, rectum, anus)	16,688	26	24	152	558	1,583	3,266	4,779	4,564	1,608	122	6
Rectum and anus	8,445	6	7	102	305	882	1,806	2,636	2,021	636	43	1
Liver and biliary passages	10,066	31	15	62	207	820	1,884	3,114	2,892	974	67	------
Pancreas	4,906	------	4	26	97	479	1,106	1,517	1,271	392	13	1
Mesentery and peritoneum	1,040	53	14	44	78	156	227	273	151	41	2	1
Others under this title	62	------	------	------	2	7	11	19	14	8	1	------
Cancer of the respiratory system	8,121	27	68	133	336	1,322	2,387	2,336	1,213	283	15	1
Larynx	1,340	------	1	3	27	163	339	428	289	89	1	------
Lungs and pleura	5,300	26	63	110	243	836	1,560	1,517	767	168	9	1
Other respiratory organs	1,481	1	4	20	66	323	488	391	157	26	5	------
Cancer of the uterus	16,291	6	7	381	1,602	3,520	4,193	3,672	2,252	607	43	8
Cancer of other female genital organs	3,944	7	36	103	299	771	1,077	963	549	133	5	1
Ovary and Fallopian tube	3,312	6	34	95	270	704	967	791	377	66	1	1
Vagina and vulva	577	------	2	8	26	54	100	155	165	63	4	------
Other female genital organs	55	1	------	------	3	13	10	17	7	4	------	------
Cancer of the breast	14,460	------	4	99	929	2,608	3,768	3,578	2,460	918	89	7
Cancer of the male genito-urinary organs	13,539	106	39	163	281	627	1,757	3,869	4,898	1,686	106	7
Kidneys and suprarenals	1,414	83	18	29	86	219	370	388	185	34	1	1
Bladder	3,216	7	2	6	31	188	587	960	1,056	356	23	------
Prostate	8,069	4	3	4	16	114	700	2,395	3,521	1,227	80	5
Testes	482	12	15	117	126	70	45	40	38	18	------	1
Scrotum	32	------	1	------	3	4	9	5	6	3	1	------
Other male genito-urinary organs	326	------	------	7	19	32	46	81	92	48	1	------
Cancer of the skin	3,340	12	11	45	72	186	352	659	1,005	839	158	1
Cancer of other or unspecified organs	13,781	424	481	537	848	1,787	2,874	3,228	2,589	905	104	4
Kidneys and suprarenals (female)	937	83	13	17	44	108	199	260	167	43	3	------
Bladder (female)	1,535	1	------	6	34	90	267	487	461	174	13	2
Brain	1,623	110	113	130	230	391	387	180	43	8	1	------
Bones (except of jaw)	2,111	41	187	131	123	254	425	492	345	104	8	1
Other or unspecified organs	7,575	159	168	253	417	944	1,596	1,809	1,573	576	79	1

For age groups up to age 49 the percentage of cancer mortality is below the percentage of the population in each group, but from that

age on the percentage of total cancer mortality is increasingly higher than the percentage of population in each age group.

The 1938 death rates for cancer for all sites and for 9 broad classifications, by 10-year age groups, computed on the basis of the estimated population as of July 1, 1938, are as follows:

TABLE 3.—*Death rates per 100,000 for cancer and other malignant tumors by 10-year age groups, 1938* [1]

Site	Under 10 years	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80 and over
All sites	2.8	3.0	9.0	32.4	110.0	278.4	586.5	1,101.9	1,700.9
Buccal cavity and pharynx	(2)	(2)	(2)	(2)	2.4	8.5	20.5	42.2	79.7
Digestive tract and peritoneum	(2)	(2)	2.3	9.4	57.6	125.1	305.7	599.9	867.1
Respiratory system	(2)	(2)	(2)	1.7	8.3	21.1	33.2	37.3	38.1
Uterus	(2)	(2)	1.7	8.2	22.1	37.0	52.2	69.2	83.2
Other female genital organs	(2)	(2)	(2)	1.5	4.8	9.5	13.7	16.9	17.7
Breast	(2)	(2)	(2)	4.8	16.4	33.3	50.9	75.6	128.9
Male genitourinary organs	(2)	(2)	(2)	1.4	3.9	15.5	55.0	150.4	229.4
Skin	(2)	(2)	(2)	(2)	1.2	3.1	9.4	30.9	127.6
Other unspecified organs	1.7	1.9	2.4	4.4	11.2	25.4	45.9	79.5	129.1

[1] Rates computed by the Public Health Service on the basis of the 1930 percentage age distribution of the population.
[2] Less than 1 per 100,000.

COURT DECISION ON PUBLIC HEALTH

Recovery by restaurant patron for trichinosis.—(New York Court of Appeals; *Eisenbach* v. *Gimbel Bros., Inc., et al.*, 24 N.E.2d 131; decided November 21, 1939.) The plaintiff was served smoked pork tenderloin at a restaurant and thereafter became infected with trichinosis. He brought an action against the restaurant keeper for breach of warranty of the fitness of the meat for human food. The trial judge, in his charge to the jury, said:

> Of course, if the pork tenderloin was cooked so that all of it reached a temperature of at least 137 degrees, it is conceded by everybody that it did not have any live trichinae left in it. * * * So, if you believe the chef's testimony that he cooked this pork tenderloin for 2 hours or more in boiling water, and if you believe the testimony * * * to the effect that if pork tenderloin is cooked for even an hour in boiling water the temperature reaches 137 degrees even in the center of the pork tenderloin, then you have a right to conclude that trichinae were no longer alive in this pork tenderloin, even if they were there to start with, and that the plaintiff could not have gotten his trichinosis from this particular piece of pork tenderloin.

There was a verdict for the plaintiff and the court of appeals stated that, in view of the above instructions, such verdict must be taken as a finding that the defendant did not adequately discharge its undertaking properly to cook the meat it served to the plaintiff. The plaintiff's recovery was affirmed but, inasmuch as the meat had not been cooked as the restaurant keeper concededly knew it ought to have been cooked, the appellate court held that such restaurant keeper had no case against the wholesaler from whom the meat had been

purchased (and so the wholesaler had no case against its vendor, a packer) because the wholesaler was entitled to invoke against the restaurant keeper the principle that a party cannot recover for a loss that he could have averted by the exercise of due care.

DEATHS DURING WEEK ENDED APRIL 6, 1940

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

	Week ended Apr. 6, 1940	Corresponding week, 1939
Data from 87 large cities of the United States:		
Total deaths	9,197	[1] 8,863
Average for 3 prior years	8,965	
Total deaths, first 14 weeks of year	132,062	131,848
Deaths under 1 year of age	551	[1] 499
Average for 3 prior years	540	
Deaths under 1 year of age, first 14 weeks of year	7,248	7,690
Data from industrial insurance companies:		
Policies in force	65,866,801	67,615,322
Number of death claims	13,926	15,639
Death claims per 1,000 policies in force, annual rate	11.1	12.1
Death claims per 1,000 policies, first 14 weeks of year, annual rate	10.7	11.4

[1] Data for 88 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

REPORTS FROM STATES FOR WEEK ENDED APRIL 20, 1940

Summary

On the basis of weekly reports received from State health officers, little change from last week is indicated in conditions in the United States with respect to the nine important communicable diseases. The incidence of diphtheria, influenza, scarlet fever, and whooping cough declined, while that of measles, meningococcus meningitis, poliomyelitis, smallpox, and typhoid fever registered slight increases. All of the nine diseases included in the table, with the exception of influenza, were below the median (1935–39) expectancy for the current week, and the cumulated totals for the first 16 weeks of the current year, ended with the week of April 20, are below the 5-year median expectancies for the corresponding period for all diseases except influenza and poliomyelitis.

For the current week, 38 cases of smallpox were reported in Iowa, where 19 cases occurred last week, 10 cases of typhoid fever in Texas, 3 cases of Rocky Mountain spotted fever in Wyoming and 1 case in Montana, 1 case of undulant fever in Maryland, 2 cases of tularaemia in South Carolina and 1 case in Mississippi, and a total of 15 cases of endemic typhus fever distributed in 7 South Atlantic and South Central States.

Telegraphic morbidity reports from State health officers for the week ended April 20, 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
	Apr. 20, 1940	Apr. 22, 1939		Apr. 20, 1940	Apr. 22, 1939		Apr. 20, 1940	Apr. 22, 1939		Apr. 20, 1940	Apr. 22, 1939	
NEW ENG.												
Maine	0	4	2	1	40	8	507	43	109	0	0	0
New Hampshire	0	0	0	------	------	------	30	1	15	0	0	0
Vermont	0	0	0	------	------	------	1	58	58	0	0	0
Massachusetts	2	1	3	------	------	------	513	884	621	0	2	3
Rhode Island	0	0	0	------	------	------	181	49	78	0	0	1
Connecticut	1	1	2	4	15	6	47	995	632	0	0	1
MID. ATL.												
New York	17	19	33	[1] 15	[1] 28	[1] 10	711	1,782	2,653	4	8	8
New Jersey	9	15	12	5	8	8	534	52	1,244	0	1	2
Pennsylvania	14	26	38	------	------	------	410	63	1,509	11	4	8
E. NO. CEN.												
Ohio	7	19	19	23	------	19	14	17	1,041	2	0	2
Indiana	4	9	10	24	53	22	25	19	365	0	0	1
Illinois	16	27	35	26	64	54	99	25	188	0	4	5
Michigan [2]	7	4	9	1	17	2	671	493	493	0	2	3
Wisconsin	0	0	1	62	124	52	478	751	751	0	1	1
W. NO. CEN.												
Minnesota	1	3	3	4	4	2	170	442	442	1	0	1
Iowa	4	3	4	10	35	8	98	196	196	0	1	1
Missouri	7	5	21	8	------	92	45	8	56	0	1	6
North Dakota	0	0	4	2	31	13	1	24	24	0	0	0
South Dakota	0	1	1	1	8	------	6	269	15	0	0	0
Nebraska	0	2	2	5	43	------	8	335	154	0	0	0
Kansas	11	2	2	8	31	8	638	47	47	0	0	0
SO. ATL.												
Delaware	0	1	1	------	------	------	5	1	13	0	0	0
Maryland [2]	4	0	2	5	10	10	18	458	255	1	2	4
Dist. of Col	0	2	4	2	4	1	4	357	96	0	0	2
Virginia	9	14	11	224	505	------	131	682	617	1	2	7
West Virginia [2]	1	4	7	44	119	37	14	10	108	2	2	4
North Carolina [3]	14	21	12	3	43	18	218	761	226	2	2	2
South Carolina [3]	10	6	5	416	623	299	8	32	39	1	2	1
Georgia [3]	12	7	4	55	475	131	140	91	------	1	0	0
Florida [3]	0	2	2	8	7	2	107	232	81	0	0	0
E. SO. CEN.												
Kentucky	8	9	7	9	58	20	77	22	375	1	2	4
Tennessee	3	2	5	147	202	48	154	85	63	0	2	5
Alabama [3]	5	5	9	85	631	151	57	132	132	4	2	2
Mississippi [3]	2	7	2	------	------	------	------	------	------	0	1	1
W. SO. CEN.												
Arkansas	7	4	4	95	303	107	27	58	58	0	1	1
Louisiana [3]	5	11	13	9	15	15	9	206	35	1	0	3
Oklahoma	3	5	10	183	277	108	40	348	91	0	0	1
Texas [3]	16	18	34	555	909	564	1,140	313	313	6	1	4
MOUNTAIN												
Montana [4]	2	0	0	17	34	27	25	127	23	0	0	0
Idaho	1	0	0	------	27	7	42	225	19	0	0	0
Wyoming [4]	2	0	0	------	------	------	23	10	11	0	0	0
Colorado [4]	6	12	7	6	18	------	35	366	233	0	0	1
New Mexico	0	3	3	------	19	6	41	27	49	1	1	1
Arizona	2	0	1	122	149	51	151	10	29	0	1	0
Utah [3]	0	0	0	10	75	------	638	146	31	0	0	0
PACIFIC												
Washington	2	0	0	------	------	------	836	856	342	0	1	1
Oregon	5	1	1	8	70	33	678	96	96	0	0	1
California	19	13	24	41	69	69	504	3,364	1,413	1	2	4
Total	238	288	445	2,243	5,143	2,117	10,309	15,568	15,568	40	48	154
16 weeks	5,723	7,530	8,902	157,526	134,670	122,260	106,305	211,902	211,902	635	814	2,138

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended April 20, 1940, and comparison with corresponding week of 1939 and 5-year median—Continued

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
	Apr. 20, 1940	Apr. 22, 1939		Apr. 20, 1940	Apr. 22, 1939		Apr. 20, 1940	Apr. 22, 1939		Apr. 20, 1940	Apr. 22, 1939	
NEW ENG.												
Maine	0	0	0	9	23	23	0	0	0	0	0	0
New Hampshire	0	0	0	4	14	7	0	0	0	0	0	0
Vermont	0	0	0	21	13	9	0	0	0	3	0	0
Massachusetts	0	0	0	173	181	245	0	0	0	0	1	1
Rhode Island	0	0	0	29	19	19	0	0	0	1	0	0
Connecticut	0	0	0	94	94	110	0	0	0	0	1	1
MID. ATL.												
New York	0	6	0	918	519	965	0	1	0	2	9	7
New Jersey	0	0	0	478	156	173	0	0	0	4	3	3
Pennsylvania	1	0	0	379	327	589	0	0	0	11	3	3
E. NO. CEN.												
Ohio	1	9	1	220	401	401	0	13	3	3	2	6
Indiana	0	0	0	181	223	168	1	85	19	1	0	1
Illinois	0	0	0	875	487	705	1	17	17	5	4	4
Michigan [2]	0	0	0	323	454	454	3	15	1	4	0	2
Wisconsin	0	0	0	128	169	305	6	5	9	1	0	2
W. NO. CEN.												
Minnesota	1	0	0	80	90	158	3	9	10	0	1	0
Iowa	1	1	0	54	107	179	38	42	34	0	0	0
Missouri	0	0	0	85	71	86	1	42	27	2	2	2
North Dakota	0	0	0	11	7	32	2	12	12	2	0	0
South Dakota	0	0	0	19	20	20	4	8	8	0	1	0
Nebraska	0	0	0	10	16	57	0	1	11	0	0	0
Kansas	1	0	0	50	97	111	1	5	20	1	2	2
SO. ATL.												
Delaware	0	0	0	15	10	7	0	0	0	0	0	0
Maryland [3]	0	0	0	22	37	69	0	0	0	1	4	4
Dist. of Col.	0	0	0	19	15	18	0	0	0	0	0	0
Virginia	0	1	0	49	33	31	0	0	0	1	1	2
West Virginia [3]	1	0	0	29	26	47	0	0	0	0	3	3
North Carolina [3]	0	1	1	20	27	24	0	1	1	2	3	2
South Carolina [3]	2	6	0	5	4	3	0	0	0	1	4	1
Georgia [3]	0	0	0	10	15	6	0	0	0	2	4	6
Florida [3]	0	1	0	5	5	5	0	0	0	1	4	4
E. SO. CEN.												
Kentucky	0	2	0	83	53	53	0	7	1	5	4	4
Tennessee	0	0	0	99	51	25	0	8	0	1	2	1
Alabama [3]	1	0	0	15	10	8	6	0	0	5	4	1
Mississippi [3]	0	1	1	7	0	3	1	2	1	3	0	0
W. SO. CEN.												
Arkansas	1	0	0	1	7	7	2	1	1	1	5	3
Louisiana [3]	0	0	0	6	16	9	1	0	0	3	13	13
Oklahoma	0	2	0	16	0	23	0	44	3	3	1	2
Texas [3]	1	2	2	35	35	59	6	12	8	10	7	7
MOUNTAIN												
Montana [4]	0	0	0	31	22	22	0	2	5	0	0	0
Idaho	0	0	0	11	3	6	0	3	3	0	0	0
Wyoming [4]	0	0	0	3	7	7	0	0	2	0	0	0
Colorado [5]	0	0	0	30	47	47	7	6	4	0	1	1
New Mexico	0	0	0	12	16	16	0	0	0	2	1	2
Arizona	0	1	0	8	5	16	0	2	0	2	0	1
Utah [3]	0	0	0	11	18	60	0	1	1	0	0	0
PACIFIC												
Washington	0	0	0	46	39	39	0	0	14	1	0	1
Oregon	0	0	0	11	18	53	0	11	11	0	1	1
California	2	1	2	141	173	202	3	11	11	6	7	7
Total	13	34	16	4,881	4,180	7,018	86	366	368	90	98	107
16 weeks	399	264	326	76,587	81,915	110,251	1,159	5,787	5,097	1,255	1,839	1,839

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended April 20, 1940, and comparison with corresponding week of 1939 and 5-year median—Continued

Division and State	Whooping cough	
	Week ended—	
	Apr. 20, 1940	Apr. 22, 1939
NEW ENG.		
Maine	19	53
New Hampshire	5	1
Vermont	23	37
Massachusetts	116	156
Rhode Island	7	75
Connecticut	25	73
MID. ATL.		
New York	442	369
New Jersey	105	327
Pennsylvania	265	273
E. NO. CEN.		
Ohio	187	123
Indiana	36	57
Illinois	104	247
Michigan [2]	181	148
Wisconsin	77	154
W. NO. CEN.		
Minnesota	38	48
Iowa	32	9
Missouri	22	13
North Dakota	2	6
South Dakota	4	3
Nebraska	2	10
Kansas	20	31
SO. ATL.		
Delaware	14	10
Maryland [2]	147	19
Dist. of Col	7	29
Virginia	91	51
West Virginia [2]	38	9
North Carolina [3]	92	216
South Carolina [3]	33	62
SO. ATL.—continued		
Georgia [3]	23	29
Florida [3]	6	45
E. SO. CEN.		
Kentucky	80	10
Tennessee	33	16
Alabama [3]	22	33
Mississippi [2]	----	----
W. SO. CEN.		
Arkansas	11	11
Louisiana [3]	9	36
Oklahoma	22	4
Texas [3]	293	100
MOUNTAIN		
Montana [4]	5	6
Idaho	10	12
Wyoming [4]	4	1
Colorado [5]	18	52
New Mexico	21	20
Arizona	36	24
Utah [3]	97	51
PACIFIC		
Washington	67	6
Oregon	53	30
California	418	241
Total	3,362	3,336
16 weeks	48,330	65,233

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Typhus fever, week ended Apr. 20, 1940, 15 cases, as follows: North Carolina, 1; South Carolina, 2; Georgia, 6; Florida, 2; Alabama, 1; Louisiana, 2; Texas, 1.
[4] Rocky Mountain spotted fever, week ended Apr. 20, 1940, 4 cases, as follows: Montana, 1; Wyoming, 3.
[5] Colorado tick fever, week ended Apr. 20, 1940, Colorado, 2 cases.

WEEKLY REPORTS FROM CITIES

City reports for week ended April 6, 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	145	359	91	7,869	799	2,391	24	399	21	1,235	----
Current week [1]	67	164	60	2,148	524	1,957	2	351	15	1,025	----
Maine:											
Portland	0	----	0	141	2	0	0	0	0	5	29
New Hampshire:											
Concord	0	----	0	1	0	0	0	0	0	0	12
Manchester	0	----	0	2	0	0	0	0	0	0	17
Nashua	0	----	0	59	0	1	0	0	0	0	9
Vermont:											
Barre	0	----	0	0	0	0	0	0	0	0	3
Burlington	0	----	0	0	0	0	0	0	0	0	8
Rutland	0	----	0	0	0	0	0	0	0	0	9
Massachusetts:											
Boston	0	----	1	84	25	59	0	11	0	39	262
Fall River	0	----	0	22	3	2	0	0	0	14	30
Springfield	0	----	0	2	0	5	0	0	0	14	39
Worcester	0	----	0	4	7	6	0	1	0	0	45
Rhode Island:											
Providence	0	----	0	118	3	12	0	2	0	8	78
Connecticut:											
Bridgeport	0	1	1	2	2	1	0	1	1	1	34
Hartford	0	1	0	0	4	6	0	3	1	3	52
New Haven	0	4	0	0	6	1	0	0	0	3	35
New York:											
Buffalo	0	----	0	1	13	11	0	3	0	6	157
New York	16	11	4	96	101	579	0	78	3	102	1,705
Rochester	0	2	0	3	5	15	0	1	0	11	66
Syracuse	1	----	0	0	2	15	0	1	0	9	42
New Jersey:											
Camden	0	1	1	0	3	12	0	2	0	1	33
Newark	0	1	0	210	4	24	0	5	0	12	109
Trenton	0	----	0	0	2	1	0	1	0	3	34
Pennsylvania:											
Philadelphia	0	3	3	43	25	126	0	19	1	35	582
Pittsburgh	2	3	2	5	15	25	0	9	0	11	191
Reading	1	----	0	2	1	1	0	0	0	10	30
Scranton	0	----	----	1	----	0	0	----	0	0	----
Ohio:											
Cincinnati	0	1	2	3	9	11	0	13	0	26	147
Cleveland	4	20	3	5	14	41	0	15	0	43	226
Columbus	1	----	0	2	8	9	0	1	0	8	103
Toledo	0	2	1	2	7	25	0	3	0	14	82
Indiana:											
Anderson	0	----	0	1	0	2	0	0	0	2	10
Fort Wayne	1	----	0	0	3	1	0	0	0	2	47
Indianapolis	2	----	1	2	11	31	0	3	0	5	133
Muncie	0	----	0	0	1	2	1	0	0	0	10
South Bend	----	----	----	----	----	----	----	----	----	----	----
Terre Haute	0	----	0	1	0	2	0	0	0	2	11
Illinois:											
Alton	1	----	0	0	1	0	0	0	0	1	11
Chicago	10	3	1	26	34	602	0	32	0	70	763
Elgin	1	----	0	1	0	2	0	0	0	1	10
Moline	0	----	0	2	0	2	0	0	0	0	17
Springfield	1	----	1	0	2	4	0	0	0	9	26
Michigan:											
Detroit	3	4	1	53	13	65	0	18	0	23	275
Flint	0	----	0	6	3	18	0	0	0	13	37
Grand Rapids	0	----	0	5	2	15	0	1	0	13	40
Wisconsin:											
Kenosha	0	----	0	18	0	2	0	0	0	0	15
Madison	0	----	0	1	0	1	0	0	0	3	8
Milwaukee	1	3	3	13	11	20	0	1	0	7	129
Racine	0	----	0	0	0	1	0	0	0	0	13
Superior	0	----	0	109	0	3	0	0	0	0	8

[1] Figures for South Bend and Boise estimated; reports not received.

City reports for week ended April 6, 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	72	2	1	0	0	0	0	32
Minneapolis	0	------	1	0	4	22	0	1	0	13	106
St. Paul	0	------	0	2	2	12	0	2	0	12	68
Iowa:											
Cedar Rapids	0	------	--------	54	-------	1	0	-------	0	0	--------
Davenport	1	------	--------	11	-------	4	0	-------	0	0	--------
Des Moines	0	------	0	16	0	4	3	0	0	0	36
Sioux City	1	------	--------	0	-------	0	0	-------	0	0	--------
Waterloo	0	------	--------	0	-------	4	0	-------	0	0	--------
Missouri:											
Kansas City	0	------	0	8	2	13	0	4	0	0	92
St. Joseph	0	------	0	0	2	1	0	1	0	1	38
St. Louis	2	------	0	2	8	30	0	3	0	17	209
North Dakota:											
Fargo	0	------	0	0	2	0	1	0	0	0	9
Grand Forks	0	------	--------	0	-------	1	0	-------	0	0	--------
Minot	0	------	0	0	0	1	0	0	0	0	8
South Dakota:											
Aberdeen	0	------	--------	1	-------	1	0	-------	0	1	--------
Sioux Falls	0	------	0	0	0	4	0	0	0	0	11
Nebraska:											
Lincoln	0	------	--------	4	-------	6	0	-------	0	0	--------
Omaha	2	------	0	7	8	0	0	2	0	0	54
Kansas:											
Lawrence	0	4	0	0	0	0	0	0	0	0	7
Topeka	0	1	1	1	7	0	0	2	0	0	38
Wichita	0	------	0	110	4	1	0	0	0	5	22
Delaware:											
Wilmington	1	------	0	1	8	3	0	0	0	5	28
Maryland:											
Baltimore	0	18	4	0	26	13	0	9	0	208	278
Cumberland	0	------	0	1	1	1	0	0	0	0	11
Frederick	0	------	0	0	0	0	0	0	0	0	6
Dist. of Col.:											
Washington	1	------	0	2	11	17	0	13	0	14	169
Virginia:											
Lynchburg	0	------	0	0	1	1	0	1	1	26	9
Norfolk	0	9	0	7	1	9	0	1	0	7	41
Richmond	1	------	0	1	2	5	0	0	0	2	48
Roanoke	0	------	0	4	0	1	0	0	0	1	13
West Virginia:											
Charleston	0	2	0	1	1	0	0	0	0	3	13
Huntington	0	------	--------	1	-------	5	0	-------	0	0	--------
Wheeling	0	------	0	0	3	0	0	0	0	0	21
North Carolina:											
Gastonia	0	------	--------	0	-------	0	0	-------	0	0	--------
Raleigh	0	------	0	0	0	0	0	0	0	0	4
Wilmington	0	------	0	1	1	0	0	0	0	0	15
Winston-Salem	0	------	0	0	1	0	0	2	0	0	18
South Carolina:											
Charleston	0	20	1	0	0	1	0	0	0	0	27
Florence	0	------	0	0	4	0	0	0	0	0	19
Greenville	0	------	0	0	0	0	0	0	0	1	12
Georgia:											
Atlanta	0	13	2	13	5	2	0	3	1	7	79
Brunswick	0	------	0	0	0	0	0	0	0	0	7
Savannah	0	6	1	0	3	4	0	0	0	0	28
Florida:											
Miami	0	6	0	0	5	1	0	1	1	0	46
Tampa	0	1	1	65	1	0	0	1	0	5	31
Kentucky:											
Ashland	0	3	0	0	1	0	0	0	0	7	7
Covington	0	------	0	4	1	4	0	0	0	0	13
Lexington	0	------	0	8	1	1	0	2	0	6	17
Louisville	0	2	0	4	5	37	0	1	0	59	42
Tennessee:											
Knoxville	0	6	0	3	3	12	0	1	0	0	31
Memphis	0	3	2	13	3	22	0	9	1	25	88
Nashville	0	------	0	2	2	1	0	0	0	0	61
Alabama:											
Birmingham	0	7	0	10	7	2	0	4	1	2	64
Mobile	0	2	1	2	2	1	0	0	0	0	22
Montgomery	0	2	--------	9	-------	1	0	-------	0	0	--------
Arkansas:											
Fort Smith	0	3	--------	0	-------	2	0	-------	0	0	--------
Little Rock	0	10	0	0	3	1	0	2	0	0	--------

City reports for week ended April 6, 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	2	0	0	0	0	1	7
New Orleans	3	2	2	11	9	10	0	15	1	4	145
Shreveport	0		0	0	3	1	0	3	0	0	27
Oklahoma:											
Oklahoma City	0		0	0	4	4	0	2	0	0	41
Tulsa	0			1		3	0		0	18	
Texas:											
Dallas	5	1	1	92	8	1	0	4	0	12	78
Fort Worth	0		0	5	2	0	0	0	0	43	23
Galveston	0		0	2	1	0	0	0	0	1	6
Houston	1		1	2	9	0	0	6	0	4	94
San Antonio	0	3	1	34	6	0	0	8	0	0	73
Montana:											
Billings	0		0	0	1	0	0	0	0	0	14
Great Falls	0		0	5	0	4	0	1	0	0	8
Helena	0		0	1	1	0	0	0	0	0	6
Missoula	0		0	0	0	1	0	0	0	1	3
Idaho:											
Boise											
Colorado:											
Colorado Springs	0		0	0	0	2	0	1	0	0	10
Denver	7		1	17	8	8	0	4	0	0	81
Pueblo	1		0	5	2	5	0	0	0	0	16
New Mexico:											
Albuquerque	0		0	0	3	1	0	3	0	7	15
Utah:											
Salt Lake City	0		0	268	2	5	1	2	0	56	34
Washington:											
Seattle	0		3	381	5	2	0	1	0	27	96
Spokane	0		0	6	0	4	0	0	1	1	26
Tacoma	0		0	10	0	4	0	0	0	0	23
Oregon:											
Portland	5	1	1	205	2	2	0	2	0	6	74
Salem	0			5		0	0		0	0	
California:											
Los Angeles	0	15	1	16	3	22	0	19	1	33	263
Sacramento	0	2	2	9	1	0	0	3	1	21	34
San Francisco	0		1	2	3	8	0	5	1	16	160

State and city	Meningitis, meningococcus		Poliomyelitis cases	State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
New York:				Michigan:			
Buffalo	1	1	0	Flint	0	1	0
New York	2	0	1	District of Columbia:			
Pennsylvania:				Washington	0	0	1
Pittsburgh	1	1	0	California:			
Ohio:				Los Angeles	1	0	0
Cleveland	1	0	1	Sacramento	0	0	1

Dengue.—Cases: Charleston, S. C., 2.
Encephalitis, epidemic or lethargic.—Cases: New York, 2; Pittsburgh, 1; St. Louis, 1; Great Falls, 2.
Pellagra.—Cases: Chicago, 1; Savannah, 1; Birmingham, 1; Los Angeles, 3.
Typhus fever.—Cases: Charleston, S. C., 2; Tampa, 1; Mobile, 1; Los Angeles, 1.

FOREIGN REPORTS

CUBA

Provinces—Notifiable diseases—4 weeks ended March 30, 1940.—During the 4 weeks ended March 30, 1940, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		3	1	2		6	12
Chickenpox	1	2	1	8	9		21
Diphtheria	3	18	1			5	27
Leprosy	2			1	1	3	7
Malaria	7	1		10	2	39	59
Measles		14	11	5		10	40
Poliomyelitis				1			1
Rabies		1					1
Scarlet fever		3	2			1	6
Trachoma					2		2
Tuberculosis	20	10	28	12	2	42	114
Typhoid fever	13	66	10	21	14	48	172

SWEDEN

Notifiable diseases—February 1940.—During the month of February 1940, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	6	Poliomyelitis	9
Diphtheria	20	Scarlet fever	3,089
Dysentery	15	Syphilis	33
Epidemic encephalitis	1	Typhoid fever	4
Gonorrhea	632	Undulant fever	3
Paratyphoid fever	8	Weil's disease	3

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

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

CHOLERA

NOTE.—Since many of the figures in the following tables are from weekly reports, the accumulated totals are for approximate dates.

[C indicates cases; D, deaths]

Place		Jan. 1–Dec. 31, 1939	January–February 1940	March 1940—week ended—				
				2	9	16	23	30
ASIA								
Afghanistan	D	578						
Ceylon: Batticaloa	C	7						
China	C	2,705						
Canton	C	9						
Hong Kong	C	684						
Shanghai	C	427						
Tientsin	C	34						
India	C	124,623	[1] 4,724					
Bassein	C	14						
Calcutta	C	3,927	258	37	50	59	65	71
Madras	C	6	1					
Negapatam	C	2						
Porto Novo	C		1					
Rangoon	C	18	20		2	1	4	2
India (French)	C	92	4					
India (Portuguese)	C	17						
Indochina (French)	C	1	315					
Iran	C	435						
Iraq: Basra	C	[2] 1						
Japan: Osaka	C	[3] 1						
Thailand	C	25	52	64		38		
Bangkok	C	7						

[1] For January 1940. [2] Suspected. [3] Imported.

PLAGUE

[C indicates cases: D, deaths]

AFRICA								
Algeria: Algiers	C	1						
Belgian Congo	C	58	3					
British East Africa:								
Kenya	C	4	6					
Nyasaland	C	2						
Uganda	C	316	35					
Egypt: Asyut Province	C	102	99	22	36	33	23	27
Madagascar	C	620	[1] 143					
Rhodesia (Northern)	C		1					
Senegal: Dakar	D					[2] 1		
Tunisia: Tunis	C	1						
Plague-infected rats		5						
Union of South Africa	C	80	4					
ASIA								
China:								
Fukien Province	D	[3] 753						
Manchuria	D	332						
Dutch East Indies:								
Java:								
Batavia	C	[2] 1						
Batavia Residency	D	[4] 86						
Java and Madura	C	1,575	[1] 51					
India	C	37,204	[1] 2,887					
Bassein	C	12	1	1	5		1	1
Calcutta	C	2						
Cochin	C	3	1					
Plague-infected rats		4	3					
Rangoon	C	[5] 8	[2] 1	1	1	1		
Indochina (French)	C	2	2					

[1] For January 1940.
[2] Imported.
[3] Includes 94 deaths from pneumonic plague.
[4] Pneumonic.
[5] Includes 1 imported case.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths]

Place		Jan. 1–Dec. 31, 1939	January–February 1940	March 1940—week ended—				
				2	9	16	23	30
Thailand:								
Bangkok	C		3					
Bichitr Province	C	4						
Bisnulok Province	C	35	3					
Dhonpuri Province	C		1					
Jayanad Province	C		3					
Kamphaeng Bair Province	C		28		1			
Kanchanapuri Province	C		8	3		1		
Lampang Province	C	1						
Nagara Svarga Province	C		22		5	2		
Prae Province	C	6						
Sukhodaya Province	C		15		4			
Svargalok Province	C	30						
Tak Province	C	10						
EUROPE								
Portugal: Azores Islands	C		2					
SOUTH AMERICA								
Argentina:								
Jujuy Province	C	1						
Mendoza Province	C	1						
Salta Province	C	1	1					
San Luis Province	C	1						
Santiago del Estero Province.[6]								
Tucuman Province	C	1						
Bolivia	C	2						
Brazil:								
Alagoas State	C	43						
Bahia State	C	1						
Parahiba State	C	1						
Pernambuco State	C	32						
Sao Paulo State	C	1						
Ecuador:								
Chimborazo Province	C	24						
Riobamba	C	[4] 16						
Guayaquil	C	3						
Plague-infected rats		45						
Loja	C	4						
Pueblo Viejo	C	3						
Peru:								
Ancash Department	C	1						
Cajamarca Department	C	10						
Lambayeque Department	C	12	[1] 5					
Libertad Department	C	36	[1] 25					
Lima Department	C	39	[1] 11					
Piura Department	C	35	[1] 3					
Venezuela [7]	C	3						
OCEANIA								
Hawaii Territory:								
Paauhau	C	[8] 1						
Plague-infected rats		54	6			2	1	

[1] For January 1940.
[4] Pneumonic.
[6] Information dated Apr. 13, 1940, states that 5 cases of glandular plague, with 2 deaths, have occurred in Santiago del Estero Province, Argentina.
[7] For the period Dec. 7, 1939, to Jan. 4, 1940, 11 cases of plague with 8 deaths were reported from the interior of Venezuela.
[8] Pneumonic plague; proved fatal.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths]

Place		Jan. 1–Dec. 31, 1939	January–February 1940	March 1940—week ended— 2	9	16	23	30
AFRICA								
Algeria	C	6						
Angola	C	112						
Belgian Congo	C	1,651	615					
British East Africa	C	688	2					
Dahomey	C	68	17					
Eritrea	C	2						
French Equatorial Africa	C	45						
French Guinea	C	40						
Gibraltar	C						[1] 1	
Gold Coast	C	141						
Ivory Coast	C	370	66					
Morocco	C	10						
Mozambique	C	102						
Nigeria	C	4,620	393					
Niger Territory	C	134	146					
Nyasaland	C		5					
Portuguese East Africa	C	24						
Portuguese Guinea	C	122						
Rhodesia:								
Northern	C	34						
Southern	C	219	80					
Senegal	C	257	14		6			
Sierra Leone	C	51						
Sudan (Anglo-Egyptian)	C	552	103	29	11	20	28	13
Sudan (French)	C	27						
Union of South Africa	C	209		1				
ASIA								
Arabia	C	1	95					
Ceylon	C	1						
China	C	1,593	240	14	11	30		
Chosen	C	574						
Dutch East Indies—Sabang	C					4		
India	C	113,943	[2] 17,199					
India (French)	C	59	4					
Indochina (French)	C	3,643	516					
Iran	C	87	54					
Iraq	C	91	57	5			8	
Japan	C	229						[3] 262
Straits Settlements	C	1	1					
Syria	C	1						
Thailand	C	155						
EUROPE								
France	C	4						
Great Britain	C	1	2					
Greece	C	69	16					
Portugal	C	950	44			2		
Spain	C	747	144					
Canary Islands	C	3						
Turkey	C	428						
NORTH AMERICA								
Canada	C	160						
Guatemala	C	9	1					
Mexico	D	1,264	2					
Salvador	C	1						
SOUTH AMERICA								
Argentina	C	3						
Bolivia	C	247						
Brazil	C	26	1					
Colombia	C	2,784	99					
Ecuador	C	8						
Uruguay	C	5						
Venezuela (alastrim)	C	109	54			18		

[1] Imported.
[2] For January 1940.
[3] For the period Jan. 1 to Mar. 25, 1940.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths]

Place		Jan. 1–Dec. 31, 1939	January–February 1940	March 1940—week ended—				
				2	9	16	23	30
AFRICA								
Algeria	C	1,833	313	----	108	----	----	----
Belgian Congo	C	----	1,188	----	----	----	----	----
British East Africa	C	2	1	----	----	----	----	----
Egypt	C	4,239	670	187	235	199	----	193
Eritrea	C	9	----	----	----	----	----	----
Libya	C	37	----	----	----	----	----	----
Morocco	C	901	44	12	----	----	----	10
Nigeria	C	3	----	----	----	----	----	----
Portuguese East Africa	C	2	----	----	----	----	----	----
Southern Rhodesia	C	3	----	----	----	----	----	----
Swaziland	C	1	----	----	----	----	----	----
Tunisia	C	6,104	----	----	----	----	----	----
Union of South Africa	C	1,148	[1] 35	----	----	----	----	----
ASIA								
China	C	308	66	22	19	----	----	----
Chosen	C	734	1	----	----	----	----	----
India	C	17	1	----	----	----	----	----
Iran	C	86	112	----	----	----	----	----
Iraq	C	49	3	8	1	1	10	11
Palestine	C	198	13	2	4	----	1	----
Straits Settlements	C	16	----	----	----	----	----	----
Sumatra	C	1	----	----	----	----	----	----
Syria	C	5	----	----	----	----	----	----
Trans-Jordan	C	19	13	----	----	----	----	----
EUROPE								
Bulgaria	C	108	41	----	----	----	----	----
Greece	C	45	2	----	----	----	----	[2] 4
Hungary	C	57	13	----	----	7	7	9
Irish Free State	C	5	----	----	----	----	----	----
Latvia	C	3	----	----	----	----	----	----
Lithuania	C	153	----	----	----	----	----	----
Poland	C	3,140	----	----	----	----	----	----
Portugal	C	27	----	----	----	----	----	----
Rumania	C	942	566	65	48	61	78	50
Spain	C	62	3	----	----	----	----	----
Turkey	C	471	320	----	----	----	----	----
Yugoslavia	C	404	91	10	----	----	----	----
NORTH AMERICA								
Cuba	C	4	----	----	----	----	----	----
Guatemala	C	242	99	----	----	----	----	----
Mexico	D	344	15	----	----	----	----	----
Panama Canal Zone	C	3	----	----	----	----	----	----
SOUTH AMERICA								
Bolivia	C	162	----	----	----	----	----	----
Chile	C	1,244	----	----	----	----	----	----
Ecuador	C	----	----	----	----	----	----	1
Peru	C	596	----	----	----	----	----	----
Venezuela	C	10	3	----	----	----	----	----
OCEANIA								
Australia	C	26	1	----	----	----	----	----
Hawaii Territory	C	36	4	1	1	----	1	----

[1] For January 1940.
[2] Suspected.

WORLD DISTRIBUTION OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths]

Place		Jan. 1-Dec. 31, 1939	January-February 1940	March 1940—week ended—				
				2	9	16	23	30
AFRICA								
Cameroon:								
Bafia	C	1						
Nkongsamba	C		[1] 1					
French Equatorial Africa:								
Bangui	C	[1] 1						
Chad—Fort Lamy	C	1						
Fort Archambault	C		[1] 1					
Gabon	D	1						
French Guinea	C	2						
Gold Coast	C	2						
Ivory Coast	C	[2] 25	1					
Nigeria	C	[2] 11						
Niger Territory:								
Dosso	C	3						
Konni Circle	C	3						
Tahua	C	[1] 1						
Senegal:								
Bambey	C	1						
Dakar	C	[1] 1						
Diourbel	C	6						
Louga	C	[1] 1						
Ziguinchor	C	10						
Sudan (French): Bandiagara	C	1						
Togo (French): Anecho	C	1						
SOUTH AMERICA								
Brazil:								
Amazonas State	D	[4] 1						
Bahia State	D	[4] 1						
Espirito Santo State	D	[5] 104	[4] 28					
Minas Geraes State	D	13						
Para State	D	3						
Rio de Janeiro State	D	3	[4] 1					
Colombia:								
Antioquia Department—								
Caracoli	D	3						
Jordan	D	1						
San Carlos	D	6						
San Luis	D		2					
Caldas Department—								
La Pradera	D		1					
Victoria	D		1					

[1] Suspected.
[2] Includes 8 suspected cases.
[3] Includes 3 suspected cases.
[4] Jungle type.
[5] Includes 8 deaths from the jungle type of yellow fever.

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