PUBLIC HEALTH REPORTS

VOL. 39 APRIL 18, 1924 No. 16

SICKNESS AMONG 21,000 AUTOMOBILE WORKERS.

Morbidity Experience of the Flint and Pontiac (Michigan) Sick Benefit Associations in 1921 and 1922.[1]

By DEAN K. BRUNDAGE, Assistant Statistician, United States Public Health Service.

The morbidity statistics of the Industrial Mutual Association of Flint and the Pontiac Employees Mutual Benefit Association are of particular interest from a public health point of view because they cover a considerable proportion of the adult male population of the cities of Flint and Pontiac, and because the membership represents the personnel of practically all of the larger manufacturing establishments in these two communities.[2] These establishments, save for a few small exceptions, are all engaged in the production of automobiles or of automobile parts and accessories; hence for all practical purposes they relate to the automobile industry only.

PROVISIONS WHICH AFFECT THE STATISTICS.

The sickness claim experience of an industrial mutual association, of course, does not represent all the disabling sickness occurring among the persons belonging to such an organization. The frequency and severity rates of associations for sickness insurance have to be studied in the light of the rules and regulations which are found to affect the frequency of claims and the recorded duration of incapacitation. The more important limiting provisions of the Flint and Pontiac associations are as follows:

(1) Only those cases of illness and nonindustrial accidents are covered which cause disability for six working days or longer.

(2) Sick benefits are not paid for, and consequently no record is kept of any given disability beyond the thirteenth consecutive week of sickness, nor for the disabling illnesses of any member beyond an aggregate of 18 weeks in any 12 months.

(3) No benefits are paid for disability received while the member is under the influence of intoxicating liquors, through immorality, wilful misconduct, vice, violation of law, fighting or scuffling, venereal diseases, neuritis, lumbago, trachoma, lame back, straining of the lumbar muscles, or hernia; provided, however, that in cases of hernia, if a successful operation has been performed, benefits are paid from the date of such operation. The Pontiac association, in

[1] From the Statistical Office, United States Public Health Service, in cooperation with the Office of Industrial Hygiene and Sanitation, United States Public Health Service.

[2] The number of males in Flint, age 20 and over, in 1920, was 35,941; the average membership of the Flint association in 1921–22 was 16,773, or 47 per cent of the male population at these ages. In Pontiac the male population, age 20 and over, was 13,346 in 1920; the average number of members of the Pontiac association in 1921–22 was 4,480, or 34 per cent of this population.

addition, does not pay for any form of rheumatism unless authorized by the claims committee; and the Flint association, although paying for rheumatism, denies benefits for cases of sciatica.

(4) No benefits are paid to any member whose disability is found to be the result of causes existing prior to his becoming a member of the Flint or Pontiac association.

(5) Female members may receive benefits only for those disabilities which are common to both sexes.

(6) No member is entitled to receive sick benefits unless he or she has been a member in good standing for 21 consecutive days before such sickness begins.

In addition to eliminating from consideration many of the diseases which are difficult of verification, these associations have the following provisions for the purpose of safeguarding the funds against the malingerer or the person afflicted with "krankengelthunger":

(1) "It shall be the duty of the secretary or his representative to investigate all cases of disability of members in good standing at least once a week.

(2) "Any person detected in obtaining or attempting to obtain benefits fraudulently shall be expelled from the association.

(3) "No benefits shall be paid to any disabled member without the written certificate of a duly qualified medical practitioner or surgeon unless sick benefits are authorized by the claims committee."

The amount of the benefits varies from $1 to $2.50 per day, depending upon the class of membership. Each week for which benefits are paid consists of six secular days. Membership is voluntary. The percentage of women belonging to either organization is probably not above 5 per cent of the total membership, so that the rates of sickness can be considered as male rates for all practical purposes.

On account of the various provisions and limitations just recounted, the morbidity statistics presented in the accompanying tables probably are not comparable with any other group of industrial employees either within or without the automobile industry; nevertheless these rates of sickness are of interest from the standpoint of disease prevention, on account of the information they give concerning the relative frequency of different specific diseases and groups of diseases occurring among the population under consideration, and the days lost per person and per case of disability under the several "artificial" conditions mentioned; and because they afford a starting point for observation of the future trend of the more serious illnesses among a considerable proportion of the adult male population of two rapidly growing industrial communities.

RATES OF THE TWO ASSOCIATIONS COMPARED.

The sickness frequency and severity rates of the Pontiac association, it will be observed, were considerably lower than those for the Flint society. The possibility of a less favorable age distribution of

the membership of the Flint association is suggested by a tabulation of sickness claims according to age.[3] For the two years under review, the data from the Flint association were not available in such a way as to permit the computation of sickness rates according to age groups. From the information available it seems probable that age differences only partially explain the disparity in the illness rates of the two associations.

TABLE 1.—*Frequency and severity of specified diseases causing disability for six consecutive working days or longer among the members of the Flint and Pontiac sick benefit associations in the two years ending December 31, 1922.*[a]

Diseases causing disability (with corresponding title numbers in parentheses from the International List of the Causes of Sickness and Death—1920 revision). Disease groups arrayed according to their frequency in Flint.	Annual number of new cases per 1,000 persons.		Calendar days of disability per 1,000 persons.[b]		Calendar days per case.[b]	
	Flint.	Pontiac.	Flint.	Pontiac.	Flint.	Pontiac.
All diseases and conditions (1–205)	113.5	84.9	3,854	2,127	34.6	25.4
1. Respiratory illness	43.6	31.6	1,315	739	31.1	24.1
Pulmonary tuberculosis (31)	2.4	.8	181	65	78.1	82.4
Influenza and grippe (11)	13.2	10.3	313	193	24.9	19.5
Bronchitis (99)	8.8	6.5	275	141	31.8	22.6
Pneumonia (100, 101)	4.0	3.8	161	131	43.0	36.3
Pleurisy (102)	3.0	2.3	96	70	32.7	30.9
Diseases of the pharynx (109)	8.9	5.4	181	90	21.0	16.4
Other respiratory illness (97, 98, 103–107)	3.3	2.5	108	49	32.9	20.0
2. Diseases of the digestive system[c]	19.4	16.1	766	457	40.1	28.9
Diseases of the stomach (111, 112)	5.8	6.0	230	147	40.0	24.3
Diarrhea and enteritis (114)	2.5	1.1	81	22	32.3	22.0
Appendicitis (117)	4.9	3.7	217	124	47.0	35.7
Herniotomy (118)	1.9	1.7	106	86	55.6	49.1
Other diseases of the digestive system (108, 110, 115, 116, 119–127)	4.3	3.6	132	78	29.8	21.4
3. Diseases of the skin and cellular tissue (151–154)	6.7	4.0	185	65	27.3	16.1
4. Epidemic and infectious diseases	6.3	5.4	178	152	28.1	28.0
Typhoid fever (1)	.9	.3	46	18	48.3	54.3
Smallpox (6)	.8	.8	20	20	25.2	25.7
Measles (7)	.1	.3	2	6	21.0	17.3
Scarlet fever (8)	1.3	1.1	41	39	30.7	34.8
Diphtheria (10)	2.0	2.2	48	57	24.8	25.9
Mumps, German measles, chicken pox (13, 25)	1.2	.7	21	12	18.0	17.8
5. General diseases except epidemic and infectious	6.3	4.0	211	106	33.8	26.4
Purulent infection (41)	2.2	1.2	54	22	25.2	18.1
Lead poisoning (67)	.1	.8	4	16	48.0	19.7
All other general diseases (32–66 except 41)	4.0	2.0	153	68	38.5	34.0
6. Diseases of the nervous system[d]	6.0	4.0	275	110	45.6	28.6
Neuralgia and neuritis (82)	1.8	1.2	52	26	30.6	22.4
Other diseases of the nervous system (70–81, 83–86)	4.2	2.8	223	84	51.4	31.2
7. Rheumatism and myalgia[e] (51, 52, 158)	5.5	1.6	198	32	36.4	19.2
8. External causes[f] (165–203)	5.0	12.4	152	282	30.8	22.7
9. Nonvenereal diseases of the genito-urinary system and annexa (128–142)	4.9	2.2	207	62	41.9	27.7
10. Diseases of the circulatory system (87–96)	4.7	1.7	201	75	42.9	44.6
11. Ill-defined diseases (205)	2.9	1.1	82	28	28.4	23.6
12. Diseases of the bones and of the joints (155, 156)	2.2	.8	84	19	42.6	28.3
Average membership	16,773	4,480	.....	.....	.....	.....

[a] For number of cases and days of disability see Appendix, Table A.

[b] Benefits are not paid for, and, consequently, no record is kept of, disability for more than 13 consecutive weeks for any given disability, nor for more than 18 weeks in any 12 months. The severity rates include the waiting period, i. e., the first five working days of disability.

[c] Except diseases of the pharynx, which have been included in the respiratory group as shown.

[d] Including organs of special sense (eyes, ears).

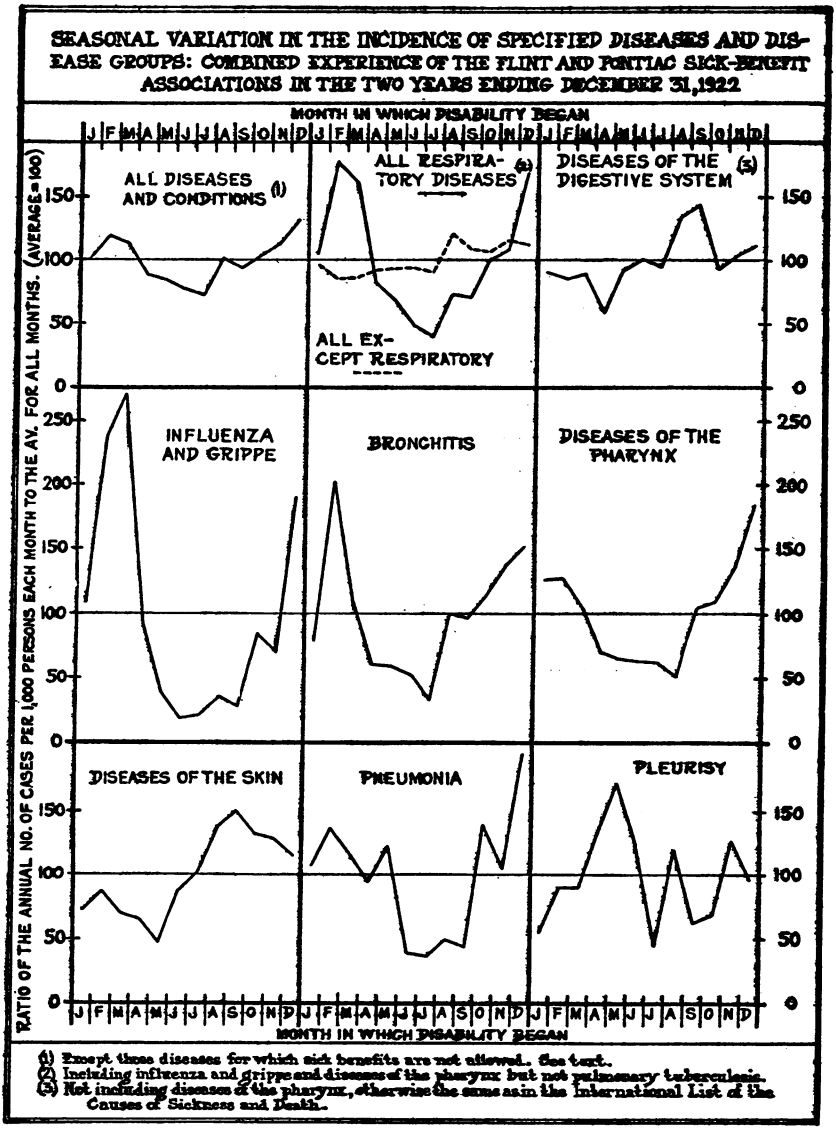
[e] Including lumbago, torticollis, etc.

[f] Mostly nonindustrial accidents.

[3] A discussion of the question of possible age differences in the membership of these associations is given in an article entitled "Can sick benefit associations profitably engage in disease prevention work?", published in the December (1923) issue of the Journal of Industrial Hygiene, Boston.

SEASONAL VARIATION IN DISEASE INCIDENCE.

In the accompanying chart of sickness frequency by month of onset, the incidence rates have been plotted as index numbers to show *relative changes* in the frequency of disease from month to month. On



this graph equal slopes mean equal rates of increase or decrease. The chart affords no conception of the comparative magnitude of the rates for different diseases, but does show the relative changes in these rates from month to month

From the graph for all diseases and conditions it is seen that disabling illness among the workmen of Flint and Pontiac tends to occur with greatest frequency in the month of December, and with lowest frequency in July. Respiratory diseases in this locality tend to have their highest incidence in February and lowest incidence in July. In contrast, the total for all diseases except respiratory was smallest in February and greatest in August. Diseases of the digestive system occurred with greatest frequency in late summer; at minimum frequency in the spring. Wide variations in the occurrence of influenza and grippe, notwithstanding a very definite seasonal tendency, are suggested by the graph. The abruptness of the peak of bronchitis frequency in February and its sharp decline in July indicate the seasonal tendency of this respiratory affection. Diseases of the pharynx (tonsillitis, pharyngitis, quinsy, etc.) exhibit less pronounced variation, though the seasonal trend is marked, the greatest relative increase occurring just after the low point is reached in August. Diseases of the skin, at least for this group of industrial employees, tend to increase steadily from May to September, and then to decrease almost as steadily through the winter and spring until the low point is reached in May. The relatively high incidence of pneumonia in May and October indicates that in these months, as well as in mid-winter, conditions may favor the spread of the disease. The frequency of pleurisy appears to be highest in late spring and relatively low in the three coldest months. The number of cases, however, of either pleurisy or pneumonia is not large enough to afford a satisfactory conception of the true seasonal variation of these diseases.

TABLE 2.—*Seasonal variation in the incidence of specified diseases and disease groups: Combined experience of the Flint and Pontiac sick-benefit associations in the two years ending December 31, 1922.*

Month of onset.	All diseases and conditions.[1]	Respiratory diseases.[2]	All diseases except respiratory.	Influenza and grippe.	Bronchitis.	Pneumonia.	Pleurisy.	Diseases of the pharynx.	Diseases of the digestive system.[3]	Diseases of the skin.
				Number of cases.						
January	272	107	165	37	17	11	4	26	42	11
February	345	191	154	86	46	15	7	28	42	14
March	382	200	182	114	29	15	8	27	51	13
April	318	110	208	41	17	13	13	19	36	13
May	324	98	226	19	18	18	18	19	61	10
June	303	72	231	9	16	6	13	19	68	19
July	304	63	241	11	11	6	5	20	69	24
August	445	118	327	19	34	8	14	17	99	33
September	407	112	295	15	33	7	7	34	106	36
October	453	160	293	46	39	23	8	36	69	32
November	459	164	295	37	44	16	14	42	71	29
December	557	262	295	100	50	31	11	59	80	27
				Annual number of cases per 1,000 persons.						
January	107.8	42.4	65.4	14.7	6.7	4.4	1.6	10.3	16.6	4.4
February	128.7	71.3	57.4	32.1	17.2	5.6	2.6	10.4	15.7	5.2
March	122.2	64.0	58.2	36.5	9.3	4.8	2.6	8.6	16.3	4.2
April	95.4	33.0	62.4	12.3	5.1	3.9	3.9	5.7	10.8	3.9
May	90.2	27.3	62.9	5.3	5.0	5.0	5.0	5.3	17.0	2.8
June	83.0	19.7	63.3	2.4	4.4	1.6	3.6	5.2	18.6	5.2
July	77.3	16.0	61.3	2.8	2.8	1.5	1.3	5.1	17.5	6.1
August	110.4	29.3	81.1	4.7	8.5	2.0	3.5	4.2	24.6	8.2
September	101.9	28.0	73.9	3.8	8.2	1.8	1.8	8.5	26.5	9.0
October	112.2	39.6	72.6	11.4	9.7	5.7	2.0	8.9	17.1	7.9
November	122.4	43.7	78.7	9.9	11.7	4.3	3.7	11.2	18.9	7.7
December	143.3	67.4	75.9	25.7	12.9	8.0	2.8	15.2	20.6	6.9
				Ratio of annual number of cases per 1,000 persons each month to the average for all months.						
Average	107.9	40.1	67.8	13.5	8.5	4.1	2.9	8.2	18.4	6.0
January	99.9	105.7	96.5	108.9	78.8	107.3	55.2	125.6	90.2	73.3
February	119.3	177.8	84.7	237.8	202.4	136.6	89.7	126.8	85.3	86.7
March	113.3	159.6	85.8	270.4	109.4	117.1	89.7	104.9	88.6	70.0
April	88.4	82.3	92.0	91.1	60.0	95.1	134.5	69.5	58.7	65.0
May	83.6	68.1	92.8	39.3	58.8	122.0	172.4	64.6	92.4	46.7
June	76.9	49.1	93.4	17.8	51.8	39.0	124.1	63.4	101.1	86.7
July	71.6	39.9	90.4	20.7	32.9	36.6	44.8	62.2	95.1	101.7
August	102.3	73.1	119.6	34.8	100.0	48.8	120.7	51.2	133.7	136.7
September	94.4	69.8	109.0	28.2	96.5	43.9	62.1	103.7	144.0	150.0
October	101.0	98.8	107.1	84.4	114.1	139.0	69.0	108.5	92.9	131.7
November	113.4	109.0	116.1	73.3	137.7	104.9	127.6	136.6	102.7	128.3
December	132.8	168.1	112.0	190.4	151.8	195.1	96.5	185.4	112.0	115.0

[1] Except those diseases for which sick benefits are not allowed. See text.
[2] Including influenza and grippe and diseases of the pharynx, but not pulmonary tuberculosis.
[3] Not including diseases of the pharynx, otherwise the same as in the International List of the Causes of Sickness and Death.

DISEASE FREQUENCY BY ESTABLISHMENTS.

In Table 3, giving data for the Pontiac association, the highest rate (121.1 cases per 1,000 persons per year) is for a group of small plants classed as "All other plants," and the lowest rate (62.1 cases per 1,000 persons per year) occurred in plant F. The highest rate is approximately twice the magnitude of the lowest rate. In Table 4, giving data for the Flint association, the highest rate, 151.1, is not quite twice as high as the lowest (85.8). The range appears to be considerable, and might suggest the existence of certain conditions reacting unfavorably upon health in the establishments having the highest disease incidence rates. It is possible, however, that certain plants have a relatively larger proportion of older men on their pay roll than

other plants have, and therefore more sickness in accordance with the well-known fact that the frequency of disabling illness increases with age. The sickness rate of a given establishment may also be influenced to some extent by the races or nationalities composing the personnel, possibly even by the proportion of the workers who are married or single, or by certain other factors that we do not yet know of. Without information about these questions we can not conclude that establishment G, for example, in Flint, and "All other plants" in Pontiac are especially hazardous places in which to work.

The relative frequency of specific diseases and groups of diseases in different plants usually affords some clue as to the conditions causing disability. When a high rate is found to be due to the excessive frequency of one or two specific diseases, the existence of a specific health hazard or hazards in the plant is at least suggested. Thus a high incidence for diseases of the nervous system would suggest that perhaps the employees were being speeded up or for some reason working under tension. When, however, an establishment's sickness rates are high for all or nearly all groups of diseases, it is well to look into the age distribution of the personnel, the class of persons employed, and possibly other factors before concluding that specific health hazards exist in the factory.

In plant D at Pontiac there were 6 cases of lead poisoning causing inability to work for a period longer than five consecutive working days, and there were 1 and 2 such cases, respectively, in plants L and J in Flint. Aside from lead poisoning, however, the case rates for specific diseases in the different plants do not indicate unhygienic working conditions. The rates for some of the diseases, it is true, appear to be high in certain plants, but can not be claimed as such until the degree of accuracy in diagnosis, the age distribution of the personnel, and certain other facts are known. Nevertheless, high indicated rates for specific diseases in different plants are arrows which point to those establishments in which the conditions of work may be causing or aggravating ill health. They indicate the factories which should be placed under further observation.

In Tables 3 and 4 a comparison is afforded of the disease rates in each establishment with the average rate of all establishments, and with the frequency of sickness in the plants having the lowest illness rates. Probably the best standard for comparison would be the plant which experienced the lowest disease frequency, but in both Flint and Pontiac the factory having the lowest illness rate did not have enough persons to make the rate trustworthy; consequently, for Pontiac the average of the lowest and the next to the lowest rate plants was taken as the standard, and for Flint the average of the four plants which had the least sickness in proportion to the number employed, namely, plants L to O. This procedure afforded a plant population of 1,726 for the standard at Pontiac, and 3,015 for Flint, numbers large enough to afford fairly reliable sickness rates for comparative purposes.

TABLE 3.—*Frequency of specified diseases among the employees of each of the larger manufacturing establishments in Pontiac, Mich., during the two years ending December 31, 1922.*[1]

Diseases and conditions causing disability (with corresponding title numbers in parentheses from the International List of the Causes of Sickness and Death, 1920 revision).	Plants.								
	All plants.	Low rate plants.[2]	A	B	C	D	E	F	All others.
	Number of cases.								
All diseases and conditions [3]	761	253	17	105	16	284	211	42	86
Total respiratory	283	101	7	37	7	101	88	13	30
Pulmonary tuberculosis (31)	7	1	1	1	.....	3	1	.....	1
Influenza and grippe (11)	92	32	3	10	2	30	27	5	15
Bronchitis (99)	58	18	1	12	.....	22	17	1	5
Pneumonia (100, 101)	34	10	2	4	2	14	8	2	2
Diseases of the pharynx (109)	49	24	.....	3	1	18	20	4	3
Other respiratory (97, 98, 102–107)	43	16	.....	7	2	14	15	1	4
Diarrhea and enteritis and diseases of the stomach (111–114)	64	13	3	16	2	24	7	6	6
Other diseases of the digestive system (108, 110, 115–127)	80	26	1	11	.....	31	23	3	11
Diseases of the nervous system (70–86) [4]	33	11	.....	3	.....	21	10	1	1
Diseases of the circulatory system (87–96)	15	7	.....	1	1	4	7	.....	2
Diseases of the genito-urinary system (128–142) [5]	20	6	.....	3	.....	8	5	1	3
Diseases of the skin (151–154)	35	12	.....	5	.....	13	7	5	6
Purulent infection (41)	11	3	.....	4	.....	3	2	1	1
Lead poisoning (67)	7	.....	.....	.....	.....	6	.....	.....	1
Epidemic and infectious diseases (1, 6–8, 10, 13, 25) [6]	49	14	.....	5	.....	24	9	5	6
External causes (165–203)	111	44	5	9	4	38	41	3	11
Ill-defined diseases (205)	10	8	.....	.....	.....	1	7	1	1
All other diseases and conditions	39	8	1	11	2	10	5	3	7
	Annual number of cases per 1,000 persons.								
All diseases and conditions [3]	84.9	73.3	116.4	92.1	90.9	85.1	76.0	62.1	121.1
Total respiratory	31.6	29.3	47.9	32.5	39.8	30.3	31.7	19.2	42.2
Pulmonary tuberculosis (31)	.8	.3	6.9	.9	.....	.9	.4	.....	1.4
Influenza and grippe (11)	10.3	9.3	20.5	8.8	11.4	9.0	9.7	7.4	21.1
Bronchitis (99)	6.5	5.2	6.8	10.5	.....	6.6	6.1	1.5	7.1
Pneumonia (100, 101)	3.8	2.9	13.7	3.5	11.4	4.2	2.9	2.9	2.8
Diseases of the pharynx (109)	5.4	7.0	.....	2.6	5.7	5.4	7.2	5.9	4.2
Other respiratory (97, 98, 102–107)	4.8	4.6	.....	6.2	11.3	4.2	5.4	1.5	5.6
Diarrhea and enteritis and diseases of the stomach (111–114)	7.1	3.8	20.5	14.0	11.4	7.2	2.5	8.9	8.5

Other diseases of the digestive system (108, 110, 115–127)	8.9	7.5	6.9	9.6	.....	9.3	8.3	4.4	15.5
Diseases of the nervous system (70–86) [4]	4.0	3.2	.....	2.6	.....	6.3	3.6	1.5	1.4
Diseases of the circulatory system (87–96)	1.7	2.0	.....	.9	5.7	1.2	2.5	.....	2.8
Diseases of the genito-urinary system (128–142) [5]	2.2	1.7	.....	2.6	.....	2.4	1.8	1.5	4.5
Diseases of the skin (151–154)	4.0	3.5	.....	4.4	.....	3.9	2.5	7.4	8.2
Purulent infection (41)	1.2	.9	.....	3.5	.....	.9	.7	1.5	1.4
Lead poisoning (67)	.8	.....	.....	.....	.....	1.8	.....	.....	1.4
Epidemic and infectious diseases (1, 6–8, 10, 13, 25) [6]	5.5	4.1	.....	4.4	.....	7.2	3.3	7.4	8.5
External causes (165–203)	12.4	12.7	34.2	7.9	22.7	11.4	14.8	4.4	15.5
Ill-defined diseases (205)	1.1	2.3	.....	.....	.....	.3	2.5	1.5	1.4
All other diseases and conditions	4.4	2.3	6.9	9.7	11.3	2.9	1.8	4.4	9.8
Average membership	4,480	1,726	73	570	88	1,668	1,388	338	355

[1] Includes only those cases of illness and nonindustrial accidents which disable for 6 working days or longer.
[2] The average for plants E and F taken as a standard for comparison.
[3] Except those diseases for which sick benefits are not allowed. See text.
[4] Including organs of special sense (eyes and ears).
[5] Nonvenereal diseases of the genito-urinary system and annexa.
[6] Typhoid fever, smallpox, measles, scarlet fever, diphtheria, mumps, German measles, and chicken pox.

TABLE 4.—*Frequency of specified diseases among the employees of each of the larger manufacturing establishments in Flint, Mich., during the two years ending December 31, 1922.*[1]

Diseases and conditions causing disability (with corresponding title numbers in parentheses from the International List of the Causes of Sickness and Death, 1929 revision).	Plants.											
	All plants.	Low rate plants.[2]	G	H	I	J	K	L	M	N	O	All others.
	Number of cases.											
All diseases and conditions[3]	3,808	615	120	190	37	2,783	28	506	36	33	40	35
Total respiratory	1,462	243	50	68	9	1,075	8	208	5	14	16	9
Pulmonary tuberculosis (31)	81	13	5	6	.....	57	.....	9	2	2	.....	.....
Influenza and grippe (11)	442	67	15	23	1	332	3	60	.....	3	4	1
Bronchitis (99)	296	43	4	8	2	234	2	33	2	4	4	3
Pneumonia (100, 101)	135	22	4	5	1	102	.....	19	.....	2	1	1
Diseases of the pharynx (109)	297	60	15	12	2	205	1	55	1	2	2	2
Other respiratory (97, 98, 102-107)	211	38	7	14	3	145	2	32	.....	1	5	2
Diarrhea and enteritis and diseases of the stomach (111-114)	279	35	4	17	4	217	.....	25	5	1	4	2
Other diseases of the digestive system (108, 110, 115-127)	371	53	15	14	6	277	2	42	2	3	6	4
Diseases of the nervous system (70-86)[4]	202	30	5	13	1	147	2	26	1	1	2	4
Diseases of the circulatory system (87-96)	158	19	5	8	1	124	1	18	1	.....	.....	.....
Diseases of the genito-urinary system (128-142)[5]	165	33	8	10	3	107	2	27	2	3	1	2
Diseases of the skin (151-154)	225	34	4	13	.....	171	2	24	6	2	2	1
Purulent infection (41)	75	13	3	6	.....	51	.....	9	4	.....	.....	2
Lead poisoning (67)	3	1	.....	.....	.....	2	.....	1	.....	.....	.....	.....
Epidemic and infectious diseases (1, 6-8, 10, 13, 25)[6]	213	39	14	10	7	137	1	33	3	2	1	5
External causes (165-203)	167	34	6	5	.....	113	5	29	1	2	2	1
Ill-defined diseases (205)	95	7	3	5	1	77	.....	6	.....	1	.....	2
All other diseases and conditions	393	74	3	21	5	282	5	58	6	4	6	3
	Annual number of cases per 1,000 persons.											
All diseases and conditions[3]	113.5	102.0	151.1	139.9	119.4	113.5	107.7	103.5	102.3	101.2	85.8	130.6
Total respiratory	43.6	40.3	63.0	50.0	29.0	43.8	30.8	42.6	14.2	42.9	34.3	33.6
Pulmonary tuberculosis (31)	2.4	2.2	6.3	4.4	.....	2.3	.....	1.8	5.7	6.1	.....	.....
Influenza and grippe (11)	13.2	11.1	18.9	16.9	3.2	13.5	11.5	12.3	.....	9.2	8.6	3.7
Bronchitis (99)	8.8	7.1	5.0	5.9	6.4	9.5	7.7	6.8	5.7	12.3	8.6	11.2
Pneumonia (100, 101)	4.0	3.6	5.1	3.7	3.2	4.2	.....	3.9	.....	6.1	2.1	3.7
Diseases of the pharynx (109)	8.9	10.0	18.9	8.8	6.5	8.4	3.9	11.3	2.8	6.1	4.3	7.5
Other respiratory (97, 98, 102-107)	6.3	6.3	8.8	10.3	9.7	5.9	7.7	6.5	.....	3.1	10.7	7.5
Diarrhea and enteritis and diseases of the stomach (111-114)	8.3	5.8	5.0	12.5	12.9	8.8	.....	5.1	14.2	3.1	8.6	7.5
Other diseases of the digestive system (108, 110, 115-127)	11.1	8.8	18.9	10.3	19.4	11.3	7.7	8.6	5.7	9.2	12.9	14.9

Diseases of the nervous system (70–86) [4]	6.0	5.0	6.3	9.6	3.2	6.0	7.7	5.3	2.8	3.1	4.3	14.9
Diseases of the circulatory system (87–96)	4.7	3.1	6.3	5.9	3.2	5.1	3.8	5.7	2.8	.....	.....	.....
Diseases of the genito-urinary system (128–142) [5]	4.9	5.5	10.1	7.4	9.7	4.4	7.7	5.5	5.7	9.2	2.1	7.5
Diseases of the skin (151–154)	6.7	5.6	5.0	9.6	.....	7.0	7.7	4.9	17.1	6.1	4.3	3.7
Purulent infection (41)	2.2	2.1	3.8	4.4	.....	2.1	.....	1.8	11.4	.....	.....	7.5
Lead poisoning (67)	.1	.2	.....	.....	.....	.1	.....	.2	.....	.....	.....	.....
Epidemic and infectious diseases (1, 6–8, 10, 13, 25) [6]	6.4	6.5	17.6	7.4	22.6	5.6	3.9	6.8	8.5	6.1	2.1	18.6
External causes (165–203)	5.0	5.6	7.5	3.7	.....	4.7	19.2	5.9	2.8	6.1	4.3	3.7
Ill-defined diseases (205)	2.8	1.2	3.8	3.7	3.2	3.1	.....	1.2	.....	3.1	.....	7.5
All other diseases and conditions	11.7	12.3	3.8	15.4	16.2	11.5	19.2	11.9	17.1	12.3	12.9	11.2
Average membership	16,773	3,015	397	679	155	12,263	130	2,443	176	163	238	134

[1] Includes only those cases of illness and nonindustrial accidents which disable for 6 working days or longer.
[2] The average for plants L to O taken as a standard for comparison.
[3] Except those diseases for which sick benefits are not allowed. See text.
[4] Including organs of special sense (eyes and ears).
[5] Nonvenereal diseases of the genito-urinary system and annexa.
[6] Typhoid fever, smallpox, measles, scarlet fever dipht, heria, mumps, German measles, and chicken pox.

A rate which may or may not be actually excessive, but which suggests at least the desirability of investigation, is the frequency of 14 cases per 1,000 persons per year from diarrhea and diseases of the stomach in plant B, as compared with the average of 7.1 for all plants in the association, and with an incidence of 3.8 in the low rate plants (E and F). If these diseases in plant B had occurred at the rate of 3.8 cases per 1,000 persons per year instead of 14, there would have been only 4 cases of diarrhea and diseases of the stomach instead of 16, or an excess of 12 cases. Similarly, the rate of 6.3 in plant D for diseases of the nervous system appears high when compared with a frequency of 3.2 in plants E and F combined. The membership in factory D experienced 21 nervous illnesses instead of 11, the number that would have occurred if the frequency of this disease group in plant D had been the same as in factories E and F.

In plant J, at Flint, the rate for diseases of the digestive system (Nos. 111–127) was 20.1 annual cases per 1,000 persons, in comparison with the average rate of 14.6 in plants L to O, inclusive. Expressed in number of cases this means that among the 12,263 members of the association employed in factory J, there were 494 cases of digestive disease instead of 358, the number which would have occurred in plant J if the frequency there had been the same as in plants L to O, or an excess of 136 cases.

SUMMARY.

1. The sickness claim experience of the Flint and Pontiac sick benefit associations is of interest from a public health point of view on account of the knowledge afforded of the relative frequency of different specific diseases and groups of diseases, and the days of disability per member and per sick person from such illnesses.

2. These rates of sickness have to be considered in the light of the several "artificial" contributing factors existing, i. e., conditions imposed by the rules and regulations of the organization affecting the frequency of sickness claims and the recorded duration of incapacitation.

3. Seasonal tendencies in the incidence of certain specific diseases and groups of diseases are disclosed in the frequency rates by month of onset.

4. Except for lead poisoning, the sickness rates by plants do not indicate the existence of serious industrial diseases, although the relatively high frequency of certain diseases, such as diarrhea and diseases of the stomach in plant B (Pontiac), and of diseases of the nervous system in plant D (Pontiac), and of diseases of the digestive system (Nos. 111–127) in plant J (Flint), suggest the desirability of investigating the causes of these rates in the establishments mentioned.

Appendix.

TABLE A.—*Number of cases and days of disability from specified diseases causing inability to work for six consecutive working days or longer among the members of the Flint and Pontiac sick benefit associations in the two years ending December 31, 1922.*

Diseases causing disability (with corresponding title numbers in parentheses from the International List of the Causes of Sickness and Death, 1920 revision). Disease groups arrayed according to their frequency in Flint.	Number of new cases in 1921 and 1922.		Calendar days of disability in 1921 and 1922.[1]		Terminated cases.			
					Number.		Calendar days of disability.[1]	
	Flint.	Pontiac.	Flint.	Pontiac.	Flint.	Pontiac.	Flint.	Pontiac.
All diseases and conditions (1–205)	3,808	761	129,280	19,054	3,578	740	123,718	18,781
1. Respiratory illness	1,462	283	44,130	6,620	1,345	271	41,795	6,529
Pulmonary tuberculosis (31)	81	7	6,061	577	72	7	5,625	577
Influenza and grippe (11)	442	92	10,506	1,726	392	87	9,740	1,696
Bronchitis (99)	296	58	9,230	1,263	267	54	8,497	1,219
Pneumonia (100, 101)	135	34	5,421	1,177	116	32	4,993	1,162
Pleurisy (102)	101	21	3,207	630	102	21	3,334	649
Diseases of the pharynx (109)	297	49	6,062	806	288	48	6,053	785
Other respiratory (97, 98, 103–107)	110	22	3,643	441	108	22	3,553	441
2. Diseases of the digestive system [2]	650	144	25,681	4,093	611	139	24,518	4,019
Diseases of the stomach (111, 112)	195	54	7,714	1,315	186	52	7,435	1,265
Diarrhea and enteritis (114)	84	10	2,709	200	76	9	2,453	198
Appendicitis (117)	162	33	7,285	1,107	148	31	6,961	1,108
Herniotomy (118)	64	15	3,555	770	65	16	3,614	798
Other digestive diseases (108, 110, 115, 116, 119–127)	145	32	4,418	701	136	31	4,055	662
3. Diseases of the skin and cellular tissue (151–154)	225	36	6,201	580	220	36	6,011	580
4. Epidemic and infectious diseases	213	49	5,958	1,360	197	48	5,535	1,342
Typhoid fever (1)	31	3	1,533	163	29	3	1,402	163
Smallpox (6)	28	7	678	180	29	7	732	180
Measles (7)	4	3	72	52	3	3	63	52
Scarlet fever (8)	44	10	1,363	348	38	10	1,168	348
Diphtheria (10)	66	20	1,595	510	60	19	1,486	492
Mumps, German measles, chicken pox (13, 25)	40	6	717	107	38	6	684	107
5. General diseases except epidemic and infectious	213	36	7,063	949	205	36	6,920	949
Purulent infection (41)	75	11	1,806	199	75	11	1,886	199
Lead poisoning (67)	3	7	144	138	3	7	144	138
All other general diseases (32–66, except 41)	135	18	5,113	612	127	18	4,890	612
6. Diseases of the nervous system [3]	202	36	9,221	981	193	34	8,795	972
Neuralgia and neuritis (82)	61	11	1,746	231	54	10	1,654	224
Other diseases of the nervous system (70–81, 83–86)	141	25	7,475	750	139	24	7,141	748
7. Rheumatism and myalgia [4] (51, 52, 158)	185	14	6,633	284	185	15	6,744	288
8. External causes [5] (165–203)	167	111	5,114	2,529	148	110	4,556	2,495
9. Nonvenereal diseases of the genito-urinary system and annexa (128–142)	165	20	6,931	554	157	20	6,576	554
10. Diseases of the circulatory system (87–96)	158	15	6,745	675	161	14	6,911	624
11. Ill-defined diseases (205)	95	10	2,766	256	91	11	2,585	259
12. Diseases of the bones and of the joints (155, 156)	73	7	2,837	173	65	6	2,771	170

[1] Benefits are not paid for, and, consequently, no record is kept of, disability for more than 13 consecutive weeks for any given disability, nor for more than 18 weeks in any 12 months. The days lost during the waiting period, i. e., the first 5 working days of disability, are included.

[2] Except diseases of the pharynx, which have been included in the respiratory group as shown.

[3] Including organs of special sense (eyes, ears).

[4] Including lumbago, torticollis, etc.

[5] Mostly nonindustrial accidents.

STUDIES ON OXIDATION-REDUCTION.

VI. A PRELIMINARY STUDY OF INDOPHENOLS: (A) DIBROMO SUBSTITUTION PRODUCTS OF PHENOL INDOPHENOL; (B) SUBSTITUTED INDOPHENOLS OF THE ORTHO TYPE; (C) MISCELLANEOUS.

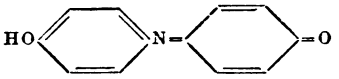
By BARNETT COHEN, Chemist, H. D. GIBBS, Senior Chemist, and W. MANSFIELD CLARK, Chief of Division of Chemistry, Hygienic Laboratory, United States Public Health Service.

The task of completing a series of oxidation-reduction indicators for use in the study of oxidation-reduction equilibria, whether of simple or of biological solutions, involves not only the establishment of data on systems situated at more or less even intervals along the oxidation-reduction scale, but also the selection of indicators with favorable general properties. Considerable exploration, with the guidance of previous data, must be done; and, in the course of this exploration, material of interest to other phases of the general problem may accumulate. The preceding paper described more or less complete data on the oxidation-reduction potentials of certain simple indophenols. In this we shall briefly record explorations where we may later develop more complete data.

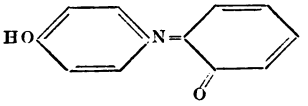
None of the indophenols treated in the previous paper has, in neutral or acid solutions, the brilliant blue color of the solutions of the salts. This impairs their usefulness in solutions of physiological pH range. However, it was shown that the substitution of one halogen for a hydrogen considerably increases the acid dissociation constant of the oxidant, and it seemed probable that two halogens as in phenol indo 2–6 dibromo phenol would so increase the dissociation constant that in mildly acid solutions there would be gained the full brilliancy of color. This proved to be the case.

Having the 2–6 dibromo quinone chloroimide, we combined it with various phenols and made a few measurements which are of suggestive value to the problem of substitution.

It was also of interest to learn whether any important differences would be found by comparing para and ortho quinone structures of types I and II,



(I)



(II)

Accordingly, three compounds of the ortho quinone series (II) were studied.

Compounds of the 2–6 dibromo series were made by combining 2–6 dibromo quinone chloroimide with various phenols in alkaline solution. Compounds of the ortho indophenol series were made by combining ortho quinone chloroimide with several phenols in alkaline solution. An outline of the general procedure of synthesis and purification was given in the previous paper. For the reasons stated in that paper, detailed description will be postponed.

In addition to the compounds of the two series mentioned above, guaiacol indophenol, α–naphthol indophenol, and 1–naphthol–2–sulphonate indo o–cresol are given brief attention here.

The methods of measurement and the symbols used have been described in previous papers. The present series of measurements was made in conjunction with the series described in the previous paper, and the comments there given apply to the data here described.

In Tables 1–26 are given the experimental data. Complete measurements were made only with phenol indo 2–6 dibromo phenol and m–cresol indo orthophenol.

The data on the first allow the comparison shown in Figure 1 between (1) phenol indophenol; (2) o-bromo phenol indophenol; (3) 2–6 dibromo phenol indophenol.

The data for the first two systems are described in the previous paper. An interesting feature of this comparison is the 1–2–3 order in the more alkaline and more acid solutions and the apparently confusing, yet definite, way in which successive decreases of pK values reverse this order within the intermediate zone of pH. The pronounced influence of bromine upon the dissociation constants is shown as follows:

	E_o	pK_o	pK_r	pK_2
Phenol indophenol	0.649	8.1	9.4	10.1
o-Bromo phenol indophenol	.659	7.1	8.5	10.2
2-6 dibromo phenol indophenol	.668	5.7	7.0	10.05

The influence of bromine is so much more marked in the case of K_o and K_r than in the case of K_2 that we may tentatively assume the first hydrogen to ionize chiefly from a phenolic group adjacent to the bromine. This should be considered a statistical tendency and is in harmony with the concept expressed in the previous paper that the drawing in of electron pairs by the bromine permits easier escapement of the hydrion. If, then, the predominating position of the phenolic group in the oxidant is adjacent to the bromines, there must be tautomerism in the dye synthesized from 2–6 dibromo quinone-chloroimide and phenol.

The above reasoning upon the predominant tautomer, is, of course, by no means conclusive, but it strengthens the suggestion that the observed effects of substitution can be quantitatively accounted for only when the influence of the substitution upon the proportions of tautomers is taken into account.

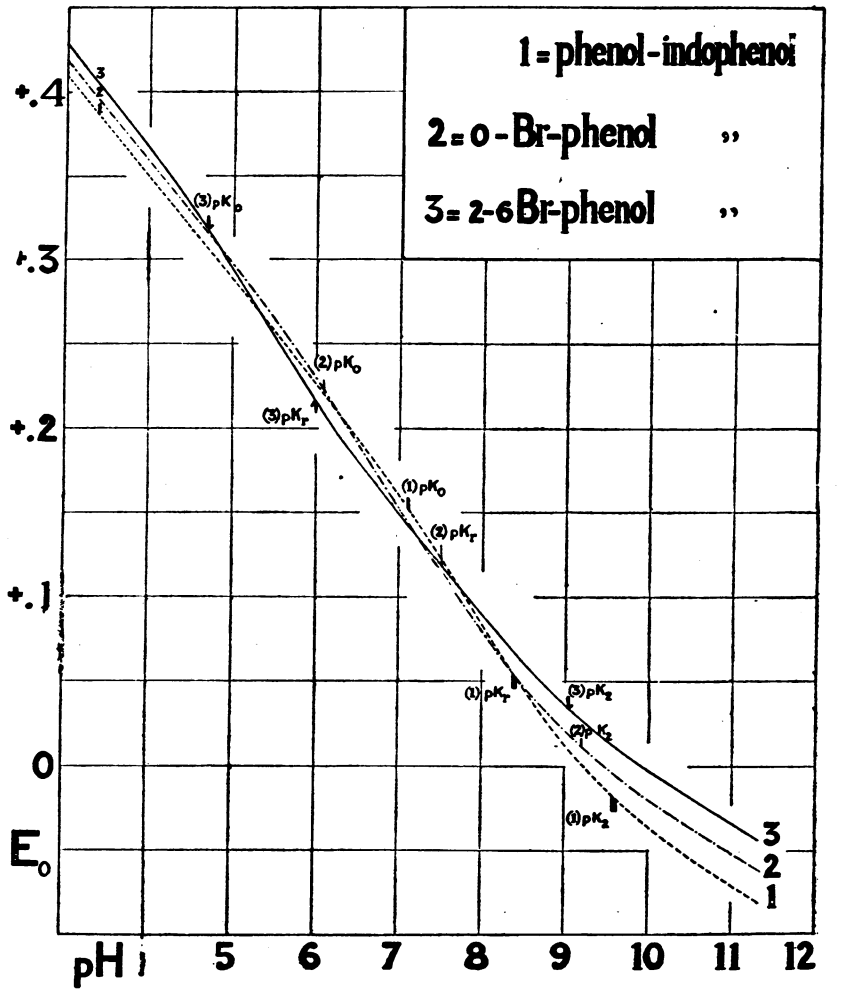


FIG. 1.

The difficulty can be shown more clearly as follows: Let two tautomers, T' and T'', with acid dissociation constants K' and K'', respectively, be in equilibrium, as defined by $\frac{T''}{T'} = K_T$. Using Noyes's (1910) treatment, it is shown that K_o, the "apparent dissociation constant," is defined as follows:

$$K_o = \frac{K' + K''K_T}{1 + K_T}, \text{ or } pK_o = \log \frac{1}{K' + K''K_T} + \log (1 + K_T)$$

If K_T is very small, pK_o approaches pK'. If K_T is very large, pK_o approaches pK''; but as K_T approaches 1 in value, K_o approaches the average of K' and K''. Since in phenol indophenol the tautomers are identical, $K_T = 1$ and $K_o = K' = K''$. Substitution may now run the gamut of changes in K', K'' and K_T. In the above illustration only two tautomers are considered. Others are possible.

In the previous paper we tacitly assumed that substitution of alkyl or halogen was made in *analogous positions of the same ring* and found characteristic changes revealing qualitatively in dissociation constants and in "normal potentials" the characteristic tenden-

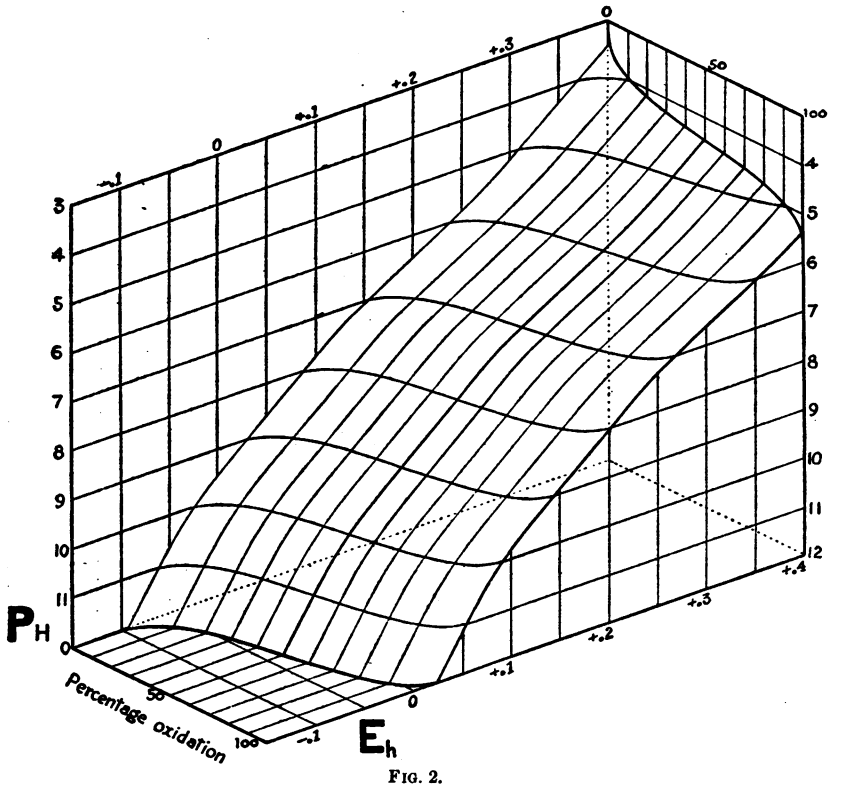


FIG. 2.

cies. We also noted the inherent difficulty in comparing the effects of the same group substituted in *different* positions. We now find in the K_o values listed in Table 27 most curious effects following substitution in *both* rings. These K_o values were determined colorimetrically and *may be in error because of impurity of the compounds*, but they suggest surprising tendencies.

The dissociation constants of phenol indo 2–6 dibromo phenol are sufficiently far apart to reveal clearly the several slopes of the E'_o: pH curves. The system is, therefore, a favorable one with which to show the E'_o: pH: percentage-oxidation diagram in three dimensions. Figure 2 is an isometric drawing of the relations. E_h values

are plotted from left to right, percentage oxidation from back to front, and *pH* values from top to bottom. The surface that cuts these coordinates is shown intercepting the plane of constant *pH* (12) at the bottom and the plane of constant potential (+0.4 volts) at the upper right; and, as an aid to visualization, there are shown the E_H: *pH* curves for 1, 10, 20, 30, 40, 50, 60, 70, 80, 90, and 99 per cent oxidation.

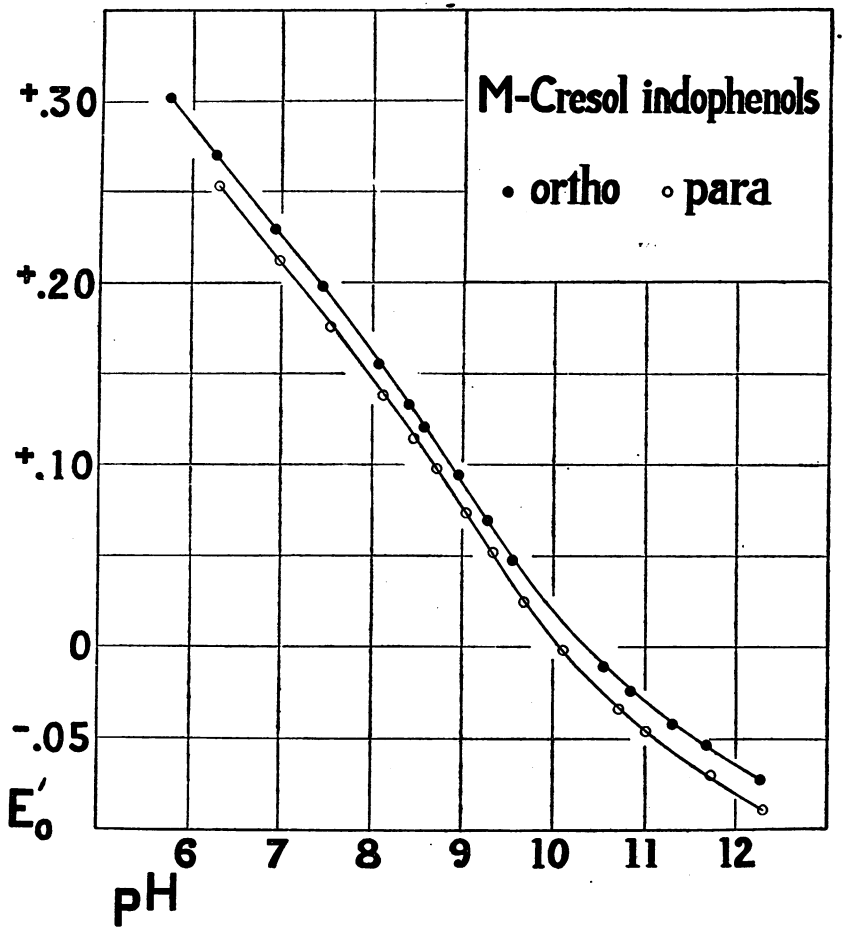


FIG. 3.

The intercept at constant potential has the same general form as the intercept at constant *pH*, but, of course, has different dimensions.

The four sections of the E'_o: *pH* curve having $\frac{-dE_h}{dpH}$ values of 0.03, 0.06, 0.09, and 0.06, successively, from high to low values of *pH*, are seen in Figures 1 and 2.

Between the ortho and para series of indophenols there may be expected distinct but not great differences, as suggested by Figure 3.

The E'_0: pH curves of m-cresol indophenol (para) and m-cresol ortho indophenol show a remarkable parallelism and a distinctly more positive position of the ortho system. The constants taken from the previous paper and from Table 22 of this paper are compared below.

	E_0	K_0	K_1	K_2
m-Cresol indophenol	0.632	2.8×10^{-9}	2.7×10^{-10}	2.2×10^{-11}
m-Cresol ortho indophenol	.647	4.2×10^{-9}	4.5×10^{-10}	2.0×10^{-11}

As was noted in the preceding paper and as clearly shown in Figure 1, it is not fair to make comparisons of E'_0 values at one pH level, especially if this pH level falls near any pK value. In Table 27 are tabulated the E'_0 values measured, but they are comparable only in so far as they reveal the several systems to be within a comparatively narrow zone of oxidation-reduction intensity.

Alpha napthol indophenol is of theoretical interest when compared with the sulphonated derivative described in the third paper of this series. Very unsatisfactory data were obtained, owing to the difficulties of purification and the very low solubility of the material. A suspension in 50 c. c. of water was alkalinized with 1 c. c. N/5 NaOH and shaken for an hour or two, then filtered, and a 5 c. c. aliquot added to 50 c. c. of solution No. 22½. The mixture partially precipitated, so that the ratio of oxidant to reductant could not be accurately determined during titration with leuco indigo carmine. The graphically estimated mid-point of the titration curve was -0.091. The estimated pH was 9.61. For the same pH there is calculated, by use of the constants given in the third paper, the value of -0.042 for 1-naphthol-2-sulphonate indophenol. Here again it seems that sulphonation tends to make comparable potentials more positive, as was shown for the sulphonation of indigo (see paper IV).

In Table 26 is shown a measurement of E'_0 at pH 8.679 for 1-naphthol-2-sulphonate indo o-cresol. The value 0.0182 is close to the value 0.0179 calculated for 1-naphthol-2-sulphonate indophenol by the data of the third paper, suggesting that, within the limits imposed by comparison at only one value of pH, the two systems differ but slightly.

The data reported in this paper confirm our previous conclusion that great changes in equilibrium potentials can not be brought about by simple substitutions of the type employed.

On the other hand, certain other properties can be modified by simple substitutions, and to great practical advantage. Substitutions by two bromines to give phenol indo 2-6 dibromo phenol bring

about such an increase in the acid dissociation of the oxidant that this dye preserves its deep blue color in mildly acid solutions. Whether it will be stable enough for general purposes remains to be seen; but, if used with caution, it should be a valuable indicator for physiological studies because of the relatively high positive electropotential at which it is reduced.

It is significant that many biochemical fluids reduce this compound in the presence of air.

Of 15 fresh urines tested with no precautions for exclusion of air, all reduced the dye. One of these very active samples of urine, after having been heated to the boiling point and cooled, still reduced the dye.

Neutralized suspensions of the macerated tissue of apple, potato, banana, orange, and onion reduce the dye. A neutralized sample of orange juice, having reduced the dye, was spread in a layer about one-third of 1 centimeter deep. It maintained the reduction one and one-half days. The water had then evaporated. The residue was taken up in water and revealed the blue color of the oxidized dye only after the still reduced solution was treated with ferricyanide.

Doctor Sullivan finds that the roots of wheat seedlings exhibit a reductive action over and above adsorption effects. The macerated roots reduce the dye rapidly.

From previous experience we can say that most of the bacteria ordinarily found among laboratory cultures will reduce phenol indo 2–6 dibromo phenol.

Samples of freshly drawn milk and suspensions of milk powder induce partial reduction at varying rates. A sample of pasteurized market milk, even when evacuated, failed to reduce; but a heavily contaminated milk reduced rapidly under air exposure.

Professor Voegtlin finds that while necrotic tissue fails to reduce, all living tissues of the rat so far tried not only reduce the dye but keep it reduced for a time in the presence of air and residual quantities of blood. On testing one of these suspensions of tissue we find the dye still present as revealed by ferricyanide oxidation.

In some of the cases cited it is evident that the rate of reduction exceeded the rate at which the atmospheric oxygen was activated, and there is some suggestion that the ability of the systems to utilize oxygen is not sufficient to produce the potential necessary to reconvert the dye to its oxidized form.

If, for the sake of general discussion, we use the *rH* scale of oxidation-reduction defined in the second paper of this series, we find that the hypothetical possible range is from *rH* 0 to *rH* 41. Zero on this scale represents a reduction intensity sufficient to liberate hydrogen at atmospheric pressure. At *rH* 41, oxygen would be liberated at

one atmosphere pressure and hydrogen would be "eliminated" at 10^{-41} atmospheres. On this scale the dye under consideration is half reduced at $rH = 22$. In other words, this system is about in the middle of the theoretically possible range.

The fact that all the living cells tested reduce this dye indicates not that we have reached one limit of endurance but that we are perhaps approaching one limit of normal physiological oxidation-reduction intensity; and it is of very considerable importance that this limit lies midway in the possible range.

In the first place it simplifies very much the task of completing a series of indicators for physiological purposes. If the first crude survey has shown correctly that all living tissues reduce this indophenol, and if our experience that certain bacterial cultures produce a hydrogen overvoltage is considered, the physiological range to be covered lies between *rH* 22 and a value slightly negative to *rH* 0.

In the second place it would appear that the activation of atmospheric oxygen is not sufficiently rapid or results in oxidants of insufficient intensive action to keep the potential of the system at an *rH* value higher than 22. This revives several questions of the conduct of oxygen which are of great importance. But at this point speculation had best await further experimentation.

Summary.

There are presented preliminary data on the equilibrium potentials found with mixtures of the oxidant and reductant of the following compounds: o-Cresol indo 2-6 dibromo phenol, m-cresol indo 2-6 dibromo phenol, thymol indo 2-6 dibromo phenol, guaiacol indo 2-6 dibromo phenol, o-bromo phenol indo 2-6 dibromo phenol, m-bromo phenol indo 2-6 dibromo phenol, o-chloro phenol indo 2-6 dibromo phenol, phenol ortho indophenol, o-bromophenol ortho indophenol, guaiacol indophenol, naphthol indophenol, and 1 naphthol-2 sulphonate indo o-cresol.

Complete data are given for phenol indo 2-6 dibromo phenol and are compared with those of phenol indophenol and o-bromophenol indophenol to show the effects of successive bromine substitution. The effect most important for the development of useful indicators is the increase of the acid dissociation constant of the dibromo compound in the oxidized state. Since it is 2×10^{-6}, the blue color of the oxidant persists in mildly acid solutions, as is not the case with the simple indophenols.

Complete data are given for m-cresol ortho indophenol and are compared with the corresponding para indophenol. A distinct but slight shift to more positive potentials is observed in the ortho compound.

While most of the indophenols in the present series are not of guaranteed purity, the indications are that substitution in the second ring causes peculiar changes in characteristic potentials and dissociation constants. The situation has been analyzed, and it is believed that the difficulties of interpretation are due to unknown proportions of tautomers, the existence of which certain quantitative data show to be probable.

References.

Previous papers of the series, Studies on Oxidation-Reduction:

I. Introduction. W. Mansfield Clark. Public Health Reports, 1923, **38**, 443. (Reprint No. 823.)

II. An analysis of the theoretical relations between reduction potentials and *pH*. W. Mansfield Clark and Barnett Cohen. Public Health Reports, 1923, **38**, 666. (Reprint No. 826.)

III. Electrode potentials of mixtures of 1-naphthol-2-sulphonic acid indophenol and the reduction product. W. Mansfield Clark and Barnett Cohen. Public Health Reports, 1923, **38**, 933. (Reprint No. 834.)

IV. Electrode potentials of indigo sulphonates, each in equilibrium with its reduction product. M. X. Sullivan, Barnett Cohen, and W. Mansfield Clark, Public Health Reports, 1923, **38**, 1669. (Reprint No. 848.)

V. Electrode potentials of simple indophenols, each in equilibrium with its reduction product. Barnett Cohen, H. D. Gibbs, and W. Mansfield Clark. Public Health Reports, 1924, **39**, 381. (Reprint No. 904.)

Noyes, A. A. (1910): Quantitative application of the theory of indicators to volumetric analysis. J. Am. Chem. Soc., **32**, 815.

Tables.

TABLE 1.—*Phenol indo 2-6 dibromo phenol: Relation of E'_0 to pH.*

[E_0=0.6677; $K_0=2\times10^{-6}$; $K_1=1\times10^{-7}$; $K_2=8.9\times10^{-11}$.]

Solution No.	*pH*	E'_0 calculated.	E'_0 found.	Deviation.
14	6.97	+0.2184	+0.2194	+0.0010
15	7.51	.1803	.1799	−.0004
19	7.79	.1621	.1606	−.0015
21	8.69	.1070	.1066	−.0004
22	9.31	.0711	.0709	−.0002
25	9.97	.0373	.0388	+.0015
26	10.86	+.0019	+.0019	.0000
27	11.71	−.0253	−.0253	.0000
28	12.29	−.0431	−.0439	−.0008

TABLE 2.—*Phenol indo 2-6 dibromo phenol (GI 18) titrated with leuco indigo carmine at pH 8.706.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.1048.
c. c.	*Per cent.*					
1	3.99	−0.0415	+0.1464	+0.1049	+0.1050	+0.0002
2	7.98	−.0319	.1365	.1046	.1048	.0000
3	11.98	−.0260	.1306	.1046	.1048	.0000
4	15.97	−.0216	.1262	.1046	.1049	+.0001
5	19.96	−.0181	.1226	.1045	.1049	+.0001
6	23.95	−.0151	.1194	.1043	.1047	−.0001
7	27.94	−.0124	.1166	.1042	.1047	−.0001
8	31.94	−.0099	.1141	.1042	.1048	.0000
9	35.93	−.0076	.1117	.1041	.1047	−.0001
10	39.92	−.0053	.1094	.1041	.1048	.0000
11	43.91	−.0032	.1073	.1041	.1049	+.0001
12	47.91	−.0011	.1051	.1040	.1048	.0000
13	51.90	+.0010	.1029	.1039	.1048	.0000
14	55.89	.0031	.1008	.1039	.1049	+.0001
15	59.88	.0052	.0986	.1038	.1048	.0000
16	63.88	.0074	.0962	.1036	.1047	−.0001
17	67.87	.0097	.0938	.1035	.1047	−.0001
18	71.86	.0122	.0913	.1035	.1047	−.0001
19	75.85	.0149	.0886	.1035	.1048	.0000
20	79.84	.0179	.0854	.1033	.1047	−.0001
21	83.84	.0215	.0819	.1034	.1049	+.0001
22	87.82	.0258	.0776	.1034	.1049	+.0001
23	91.82	.0315	.0718	.1033	.1049	+.0001
24	95.81	.0409	.0638	.1047	.1063	+.0015
25.05	100					

TABLE 3.—*Phenol indo 2-6 dibromo phenol (GI 19) titrated with leuco indigo carmine at pH 8.706.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.1048.
c. c.	*Per cent.*					
1	7.17	−0.0335	+0.1358	+0.1023	+0.1025	−0.0023
2	14.34	−.0233	.1273	.1043	.1047	−.0001
3	21.50	−.0169	.1211	.1042	.1046	−.0002
4	28.67	−.0119	.1160	.1041	.1047	−.0001
5	35.84	−.0076	.1116	.1040	.1048	.0000
6	43.01	−.0036	.1077	.1041	.1050	+.0002
7	50.18	+.0001	.1037	.1038	.1049	+.0001
8	57.35	.0038	.0998	.1036	.1048	.0000
9	64.52	.0078	.0956	.1034	.1048	.0000
10	71.68	.0121	.0911	.1032	.1048	.0000
11	78.85	.0172	.0859	.1031	.1048	.0000
12	86.02	.0237	.0786	.1023	.1042	−.0006
13	93.20	.0342	.0669	.1011	.1031	−.0017
13.95	100					

TABLE 4.—*Phenol indo 2–6 dibromo phenol (C) titrated with leuco indigo carmine at pH 8.706.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.1054.
c. c.	*Per cent.*					
1	4.37	−0.0403	+0.1456	+0.1053	+0.1053	−0.0001
2	8.73	−.0307	.1359	.1052	.1053	−.0001
3	13.10	−.0247	.1300	.1053	.1054	.0000
4	17.47	−.0202	.1255	.1053	.1055	+.0001
5	21.83	−.0167	.1218	.1051	.1053	−.0001
6	26.20	−.0135	.1186	.1051	.1054	.0000
7	30.57	−.0107	.1158	.1051	.1055	+.0001
8	34.93	−.0081	.1131	.1050	.1054	.0000
9	39.30	−.0057	.1107	.1050	.1055	+.0001
10	43.67	−.0033	.1084	.1051	.1056	+.0002
11	48.04	−.0010	.1061	.1051	.1057	+.0003
12	52.40	+.0012	.1036	.1048	.1054	.0000
13	56.77	.0035	.1012	.1047	.1054	.0000
14	61.12	.0059	.0988	.1047	.1054	.0000
15	65.50	.0084	.0963	.1047	.1055	+.0001
16	69.87	.0110	.0936	.1046	.1054	.0000
17	74.24	.0138	.0907	.1045	.1054	.0000
18	78.60	.0170	.0874	.1044	.1053	−.0001
19	82.96	.0206	.0835	.1041	.1051	−.0003
20	87.34	.0252	.0787	.1039	.1049	−.0005
21	91.70	.0314	.0727	.1041	.1051	−.0003
22.9	100					

TABLE 5.—*Phenol indo 2–6 dibromo phenol (C) titrated with leuco indigo carmine at pH 6.934.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o
c. c.	*Per cent.*			
1	4.44	−0.0401	0.2607	+0.2206
2	8.89	−.0304	.2515	.2211
3	13.33	−.0245	.2456	.2211
4	17.78	−.0200	.2411	.2211
5	22.22	−.0164	.2375	.2211
6	26.67	−.0132	.2343	.2211
7	31.11	−.0104	.2314	.2210
8	35.55	−.0078	.2288	.2210
9	40.00	−.0053	.2263	.2210
10	44.44	−.0029	.2239	.2210
11	48.89	−.0006	.2216	.2210
12	53.34	+.0018	.2192	.2210
13	57.78	.0041	.2168	.2209
14	62.22	.0065	.2142	.2207
15	66.66	.0090	.2115	(.2205)
16	71.12	.0118	.2087	(.2205)
17	75.56	.0147	.2055	(.2202)
18	80.00	.0181	.2019	(.2200)
19	84.44	.0221	.1977	(.2198)
20	88.89	.0271	.1922	(.2193)
21	93.34	.0345	.1850	(.2195)
22	97.78	.0535	.1711	(.2246)
22.5	100			
				Average=+0.2210

TABLE 6.—*o-Cresol indo 2-6 dibromo phenol (A) titrated with leuco indigo carmine at pH 6.934.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.1872.
c. c.	*Per cent.*					
1	4.72	−0.0393	+0.2275	+0.1882	0.1883	+0.0011
2	9.43	−.0296	.2171	.1875	.1877	+.0005
3	14.15	−.0236	.2107	.1871	.1874	+.0002
4	18.87	−.0190	.2059	.1869	.1873	+.0001
5	23.58	−.0153	.2020	.1867	.1873	+.0001
6	28.30	−.0121	.1986	.1865	.1872	.0000
7	33.02	−.0092	.1956	.1864	.1872	.0000
8	37.73	−.0065	.1928	.1863	.1871	−.0001
9	42.45	−.0040	.1901	.1861	.1871	−.0001
10	47.17	−.0015	.1875	.1860	.1871	−.0001
11	51.88	+.0010	.1851	.1861	.1873	+.0001
12	56.60	.0035	.1825	.1860	.1873	+.0001
13	61.32	.0060	.1798	.1858	.1872	.0000
14	66.04	.0087	.1771	.1858	.1873	+.0001
15	70.76	.0115	.1741	.1856	.1872	.0000
16	75.48	.0147	.1708	.1855	.1873	+.0001
17	80.19	.0182	.1671	.1853	.1872	.0000
18	84.91	.0225	.1627	.1852	.1872	.0000
19	89.62	.0282	.1569	.1851	.1872	.0000
20	94.34	.0368	.1479	.1847	.1869	−.0003
21.2	100					

TABLE 7.—*o-Cresol indo 2-6 dibromo phenol (G) titrated with leuco indigo carmine at pH 6.934.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.1874.
c. c.	*Per cent.*					
1	6.80	−0.0342	+0.2210	+0.1868	0.1869	−0.0005
2	13.60	−.0242	.2116	.1874	.1877	+.0003
3	20.41	−.0178	.2048	.1870	.1874	.0000
4	27.21	−.0128	.1998	.1870	.1875	+.0001
5	34.01	−.0087	.1954	.1867	.1874	.0000
6	40.82	−.0048	.1914	.1866	.1874	.0000
7	47.62	−.0012	.1876	.1864	.1874	.0000
8	54.42	+.0023	.1839	.1862	.1873	−.0001
9	61.22	.0059	.1802	.1861	.1874	.0000
10	68.02	.0098	.1761	.1859	.1873	−.0001
11	74.83	.0142	.1718	.1860	.1876	+.0002
12	81.64	.0195	.1664	.1859	.1878	+.0004
13	88.44	.0266	.1588	.1854	.1872	−.0002
14.7	100					

TABLE 8.—*o-Cresol indo 2-6 dibromo phenol (A) titrated with leuco indigo carmine at pH 8.679.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.0727.
c. c.	*Per cent.*					
1	5.05	−0.0382	+0.1145	+0.0763	0.0764	+0.0037
2	10.10	−.0285	.1024	.0739	.0741	+.0014
3	15.15	−.0225	.0956	.0731	.0734	+.0007
4	20.20	−.0179	.0906	.0727	.0731	+.0004
5	25.25	−.0142	.0866	.0724	.0729	+.0002
6	30.30	−.0109	.0830	.0721	.0727	.0000
7	35.35	−.0079	.0799	.0720	.0727	.0000
8	40.40	−.0051	.0771	.0720	.0727	.0000
9	45.45	−.0024	.0743	.0719	.0727	.0000
10	50.50	+.0002	.0715	.0717	.0726	−.0001
11	55.56	.0029	.0688	.0717	.0727	.0000
12	60.61	.0056	.0662	.0718	.0729	+.0002
13	65.66	.0085	.0632	.0717	.0729	+.0002
14	70.71	.0115	.0599	.0714	.0727	.0000
15	75.76	.0149	.0566	.0715	.0729	+.0002
16	80.81	.0188	0526	.0714	.0729	+.0002
17	85.86	.0235	.0476	.0711	.0727	.0000
18	90.92	.0299	.0411	.0710	.0727	.0000
19.8	100					

TABLE 9.—*m-Cresol indo 2-6 dibromo phenol (A) titrated with leuco indigo carmine at pH 6.934.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.2103.
c. c	*Per cent.*					
1	5.48	−0.0372	+0.2481	+0.2109	0.2109	+0.0006
2	10.96	−.0274	.2378	.2104	.2105	+.0002
3	16.44	−.0212	.2316	.2104	.2105	+.0002
4	21.92	−.0166	.2268	.2102	.2104	+.0001
5	27.40	−.0127	.2228	.2101	.2103	.0000
6	32.88	−.0093	.2194	.2101	.2103	.0000
7	38.35	−.0062	.2162	.2100	.2103	.0000
8	43.83	−.0033	.2132	.2099	.2102	−.0001
9	49.31	−.0004	.2103	.2099	.2103	.0000
10	54.80	+.0025	.2074	.2099	.2103	.0000
11	60.28	.0055	.2045	.2100	.2104	+.0001
12	65.76	.0085	.2013	.2098	.2103	.0000
13	71.24	.0119	.1980	.2099	.2104	+.0001
14	76.72	.0156	.1942	.2098	.2103	.0000
15	82.20	.0200	.1897	.2097	.2103	.0000
16	87.68	.0257	.1840	.2097	.2103	.0000
17	93.15	.0341	.1755	.2096	.2103	.0000
18.25	100					

TABLE 10.—*m-Cresol indo 2-6 dibromo phenol (A) titrated with leuco indigo carmine at pH 8.679.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.0930.
c. c.	*Per cent.*					
1	6.18	−0.0355	+0.1307	+0.0952	+0.0953	+0.0023
2	12.37	−.0256	.1195	.0939	.0941	+.0011
3	18.55	−.0193	.1126	.0933	.0936	+.0006
4	24.73	−.0145	.1075	.0930	.0934	+.0004
5	30.92	−.0105	.1032	.0927	.0932	+.0002
6	37.10	−.0069	.0993	.0924	.0930	.0000
7	43.29	−.0035	.0959	.0924	.0931	+.0001
8	49.47	−.0003	.0927	.0924	.0932	+.0002
9	55.66	+.0030	.0892	.0922	.0930	.0000
10	61.84	.0063	.0858	.0921	.0930	.0000
11	68.02	.0098	.0821	.0919	.0929	−.0001
12	74.21	.0138	.0781	.0919	.0930	.0000
13	80.40	.0184	.0735	.0919	.0931	+.0001
14	86.58	.0244	.0673	.0917	.0929	−.0001
15	92.76	.0333	.0584	.0917	.0930	.0000
16.17	100					

TABLE 11.—*Thymol indo 2-6 dibromo phenol titrated with leuco indigo carmine at pH 8.679.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	Deviation from +0.0522.
c. c.	*Per cent.*				
0.5	5.68	−0.0367	+0.0914	+0.0547	+0.0025
1.0	11.36	−.0268	.0802	.0534	+.0012
1.5	17.05	−.0207	.0736	.0529	+.0007
2.0	22.73	−.0160	.0686	.0526	+.0004
2.5	28.42	−.0121	.0645	.0524	+.0002
3.0	34.09	−.0086	.0608	.0522	.0000
3.5	39.77	−.0054	.0576	.0522	.0000
4.0	45.46	−.0024	.0547	.0523	+.0001
4.5	51.14	+.0006	.0516	.0522	.0000
5.0	56.82	.0036	.0486	.0522	.0000
5.5	62.50	.0067	.0455	.0522	.0000
6.0	68.18	.0099	.0422	.0521	−.0001
6.5	73.86	.0135	.0387	.0522	.0000
7.0	79.54	.0177	.0345	.0522	.0000
7.5	85.24	.0229	.0293	.0522	.0000
8.0	90.91	.0301	.0220	.0521	−.0001
8.5	96.60	.0438	.0078	.0516	−.0006
8.8	100				

TABLE 12.—*Guaiacol indo 2-6 dibromo phenol titrated with leuco indigo carmine at pH 6.934.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.1634.
c. c.	*Per cent.*					
1	5.60	−0.0369	+0.2007	0.1638	+0.1638	+0.0004
2	11.20	−.0270	.1901	.1631	.1632	−.0002
3	16.81	−.0209	.1843	.1634	.1635	+.0001
4	22.41	−.0162	.1795	.1633	.1635	+.0001
5	28.01	−.0123	.1755	.1632	.1634	.0000
6	33.61	−.0089	.1720	.1631	.1634	.0000
7	39.21	−.0057	.1687	.1630	.1633	−.0001
8	44.81	−.0027	.1657	.1630	.1634	.0000
9	50.42	+.0002	.1628	.1630	.1634	.0000
10	56.02	.0032	.1597	.1629	.1634	.0000
11	61.62	.0062	.1568	.1630	.1635	+.0001
12	67.22	.0094	.1535	.1629	.1635	+.0001
13	72.83	.0129	.1499	.1628	.1634	.0000
14	78.43	.0169	.1459	.1628	.1635	+.0001
15.07	84.43	.0221	.1405	.1626	.1634	.0000
16	89.64	.0282	.1344	.1626	.1634	.0000
17	95.24	.0391	.1234	.1625	.1633	−.0001
17.85	100					

TABLE 13.—*Guaiacol indo 2-6 dibromo phenol titrated with leuco indigo carmine at pH 8.679.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.0496.
c. c.	*Per cent.*					
1	6.35	−0.0352	+0.0855	+0.0503	+0.0504	+0.0008
2	12.70	−.0252	.0747	.0495	.0496	.0000
3	19.05	−.0189	.0684	.0495	.0497	+.0001
4	25.40	−.0141	.0635	.0494	.0496	.0000
5	31.74	−.0100	.0592	.0492	.0495	−.0001
6	38.09	−.0063	.0555	.0492	.0495	−.0001
7	44.44	−.0029	.0521	.0492	.0496	.0000
8	50.79	+.0004	.0488	.0492	.0496	.0000
9	57.14	.0037	.0453	.0490	.0495	−.0001
10	63.49	.0072	.0419	.0491	.0496	.0000
11	69.84	.0110	.0382	.0492	.0498	+.0002
12	76.19	.0152	.0338	.0490	.0496	.0000
13	82.54	.0203	.0286	.0489	.0496	.0000
14	88.89	.0271	.0214	.0485	.0492	−.0004
15.75	100					

TABLE 14.—*o-Bromo phenol indo 2-6 dibromo phenol titrated with leuco indigo carmine at pH 6.934.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.2245.
c. c.	*Per cent.*					
1	6.62	−0.0345	+0.2592	+0.2247	+0.2247	+0.0002
2	13.24	−.0245	.2490	+.2245	.2246	+.0001
3	19.87	−.0182	.2427	+.2245	.2246	+.0001
4	26.49	−.0133	.2376	+.2243	.2245	.0000
5	33.11	−.0092	.2334	+.2242	.2244	−.0001
6	39.73	−.0054	.2296	.2242	.2245	.0000
7	46.35	−.0019	.2260	.2241	.2244	−.0001
8	52.98	+.0015	.2226	.2241	.2245	.0000
9	59.60	.0051	.2190	.2241	.2245	.0000
10	66.22	.0088	.2153	.2241	.2245	.0000
11	72.84	.0129	.2111	.2240	.2245	.0000
12	79.47	.0177	.2063	.2240	.2245	.0000
13	86.10	.0238	.2002	.2240	.2246	+.0001
14	92.71	.0332	.1907	.2239	.2245	.0000
15.1	100					

TABLE 15.—*o-Bromo phenol indo 2–6 dibromo phenol titrated with leuco indigo carmine at pH 8.679.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.1187.
c. c.	*Per cent.*					
1	6.50	−0.0348	+0.1539	+0.1191	0.1192	+0.0005
2	13.00	−.0248	.1435	.1187	.1189	+.0002
3	19.50	−.0185	.1370	.1185	.1188	+.0001
4	26.01	−.0136	.1320	.1184	.1188	+.0001
5	32.51	−.0095	.1277	.1182	.1187	.0000
6	39.01	−.0058	.1239	.1181	.1186	−.0001
7	45.51	−.0024	.1204	.1180	.1186	−.0001
8	52.01	+.0010	.1169	.1179	.1186	−.0001
9	58.51	.0045	.1134	.1179	.1187	.0000
10	65.02	.0081	.1097	.1178	.1187	.0000
11	71.52	.0120	.1058	.1178	.1188	+.0001
12	78.02	.0166	.1011	.1177	.1188	+.0001
13	84.52	.0222	.0953	.1175	.1187	.0000
14	91.02	.0303	.0870	.1173	.1186	−.0001
15.38	100					

TABLE 16.—*m-Bromo phenol indo 2–6 dibromo phenol titrated with leuco indigo carmine at pH 6.934.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.2563.
c. c.	*Per cent.*					
1	4.49	−0.0401	+0.2961	0.2560	0.2561	−0.0002
2	8.99	−.0302	.2864	.2562	.2563	.0000
3	13.48	−.0243	.2804	.2561	.2563	.0000
4	17.98	−.0198	.2759	.2561	.2563	.0000
5	22.47	−.0162	.2722	.2560	.2563	.0000
6	26.97	−.0130	.2689	.2559	.2562	−.0001
7	31.46	−.0101	.2660	.2559	.2563	.0000
8	35.95	−.0075	.2633	.2558	.2562	−.0001
9	40.45	−.0050	.2608	.2558	.2563	.0000
10	44.94	−.0026	.2583	.2557	.2563	.0000
11	49.44	−.0003	.2560	.2557	.2563	.0000
12	53.94	+.0020	.2536	.2556	.2563	.0000
13	58.43	.0044	.2511	.2555	.2563	.0000
14	62.96	.0069	.2485	.2554	.2563	.0000
15	67.42	.0095	.2458	.2553	.2562	−.0001
16	71.91	.0123	.2429	.2552	.2562	−.0001
17	76.40	.0153	.2398	.2551	.2561	−.0002
18	80.90	.0189	.2361	.2550	.2561	−.0002
19	85.39	.0230	.2319	.2549	.2560	−.0003
20	89.89	.0285	.2262	.2547	.2559	−.0004
21	94.38	.0368	.2178	.2546	.2559	−.0004
22.25	100					

TABLE 17.—*m-Bromo phenol indo 2–6 dibromo phenol titrated with leuco indigo carmine at pH 8.679.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.1494.
c. c.	*Per cent.*					
1	4.48	−0.0400	+0.1892	+0.1492	+0.1493	−0.0001
2	8.96	−.0303	.1795	.1492	.1493	−.0001
3	13.44	−.0243	.1736	.1493	.1494	.0000
4	17.92	−.0199	.1690	.1491	.1493	−.0001
5	22.40	−.0162	.1654	.1492	.1494	.0000
6	26.88	−.0131	.1622	.1491	.1494	.0000
7	31.36	−.0102	.1593	.1491	.1494	.0000
8	35.84	−.0076	.1566	.1490	.1494	.0000
9	40.32	−.0051	.1541	.1490	.1494	.0000
10	44.80	−.0027	.1517	.1490	.1494	.0000
11	49.28	−.0004	.1493	.1489	.1494	.0000
12	53.76	+.0020	.1469	.1489	.1494	.0000
13	58.24	.0043	.1445	.1488	.1494	.0000
14	62.72	.0068	.1420	.1488	.1494	.0000
15	67.20	.0094	.1395	.1489	.1496	+.0002
16	71.69	.0121	.1366	.1487	.1494	.0000
17	76.17	.0152	.1335	.1487	.1494	.0000
18	80.65	.0186	.1300	.1486	.1494	.0000
19	85.12	.0228	.1257	.1485	.1493	−.0001
20	89.60	.0281	.1202	.1483	.1492	−.0002
21	94.09	.0361	.1120	.1481	.1490	−.0004
22.32	100					

TABLE 18.—*o-Chloro phenol indo 2-6 dibromo phenol titrated with leuco indigo carmine at pH 6.934.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected. (β)	Deviation from +0.2249.
c. c.	*Per cent.*					
1	4.77	−0.0391	+0.2639	+0.2248	+0.2248	−0.0001
2	9.55	−.0294	.2542	+.2248	.2249	.0000
3	14.32	−.0234	.2481	.2247	.2248	−.0001
4	19.09	−.0189	.2437	.2248	.2250	+.0001
5	23.87	−.0151	.2398	.2247	.2249	.0000
6	28.64	−.0119	.2366	.2247	.2249	.0000
7	33.41	−.0090	.2336	.2246	.2249	.0000
8	38.19	−.0063	.2308	.2245	.2248	−.0001
9	42.96	−.0037	.2283	.2246	.2249	.0000
10	47.73	−.0012	.2257	.2245	.2249	.0000
11	52.50	+.0013	.2233	.2246	.2250	+.0001
12	57.28	.0038	.2206	.2244	.2248	−.0001
13	62.06	.0064	.2180	.2244	.2249	.0000
14	66.82	.0091	.2152	.2243	.2248	−.0001
15	71.60	.0121	.2122	.2243	.2248	−.0001
16	76.38	.0153	.2089	.2242	.2248	−.0001
17	81.15	.0191	.2052	.2243	.2249	.0000
18	85.92	.0236	.2006	.2242	.2248	−.0001
19	90.69	.0297	.1945	.2242	.2249	.0000
20	95.47	.0398	.1844	.2242	.2249	.0000
20.95	100					

TABLE 19.—*o-Chloro phenol indo 2-6 dibromo phenol (A) titrated with leuco indigo carmine at pH 8.679.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	Deviation from +0.1177.
c. c.	*Per cent.*				
1	4.76	−0.0392	+0.1569	+0.1177	0.0000
2	9.52	−.0294	.1470	.1176	−.0001
3	14.28	−.0234	.1411	.1177	.0000
4	19.05	−.0189	.1366	.1177	.0000
5	23.81	−.0152	.1328	.1176	−.0001
6	28.57	−.0120	.1296	.1176	−.0001
7	33.33	−.0090	.1266	.1176	−.0001
8	38.09	−.0063	.1240	.1177	.0000
9	42.86	−.0037	.1215	.1178	+.0001
10	47.62	−.0012	.1189	.1177	.0000
11	52.38	+.0012	.1164	.1177	.0000
12	57.14	.0037	.1140	.1177	.0000
13	61.91	.0063	.1113	.1176	−.0001
14	66.66	.0090	.1086	.1176	−.0001
15	71.43	.0120	.1056	.1176	−.0001
16	76.20	.0152	.1023	.1175	−.0002
17	80.96	.0189	.0986	.1175	−.0002
18	85.72	.0234	.0941	.1175	−.0002
19	90.47	.0294	.0881	.1175	−.0002
20	95.24	.0392	.0783	.1175	−.0002
21	100				

TABLE 20.—*Phenol ortho indo phenol (A) titrated with leuco indigo carmine at pH 8.666.*

Indigo.	Reduction.	$0.03606 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected (β)	Deviation from +0.1089.
c. c.	*Per cent.*					
1	3.83	−0.0421	0.1510	0.1089	0.1090	+0.0001
2	7.66	−.0325	.1416	.1091	.1093	+.0004
3	11.49	−.0267	.1353	.1086	.1088	−.0001
4	15.33	−.0223	.1310	.1087	.1090	+.0001
5	19.16	−.0188	.1274	.1086	.1089	.0000
6	22.99	−.0158	.1242	.1084	.1088	−.0001
7	26.82	−.0131	.1215	.1084	.1089	.0000
8	30.65	−.0107	.1190	.1083	.1088	−.0001
9	34.48	−.0084	.1167	.1083	.1089	.0000
10	38.31	−.0062	.1145	.1083	.1090	+.0001
11	42.53	−.0039	.1124	.1085	.1092	+.0003
12	45.98	−.0021	.1102	.1081	.1089	.0000
13	49.81	−.0001	.1082	.1081	.1089	.0000
14	53.64	+.0019	.1061	.1080	.1089	.0000
15	57.48	.0039	.1040	.1079	.1088	−.0001
16	61.31	.0060	.1019	.1079	.1089	.0000
17	65.14	.0082	.0997	.1079	.1090	+.0001
18	68.97	.0104	.0974	.1078	.1089	.0000
19	72.80	.0129	.0948	.1077	.1089	.0000
20	76.63	.0155	.0921	.0176	.1089	.0000
21	80.46	.0185	.0892	.1077	.1090	+.0001
22	84.29	.0219	.0856	.1075	.1089	.0000
23	88.13	.0262	.0814	.1076	.1090	+.0001
24	91.96	.0318	.0756	.1074	.1089	.0000
25	95.78	.0407	.0666	.1073	.1089	.0000
26.1	100					

TABLE 21.—*Leuco phenol ortho indo phenol titrated with ferricyanid at pH 8.652.*

K_3FeCy_6	Oxidation.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	E'_o corrected (α).	E'_o corrected (β).	Deviation from +0.1088.
c. c.	*Per cent.*						
1	5.67	+0.0367	+0.0726	+0.1093	+0.1092	0.1090	+0.0002
2	11.33	.0269	.0823	.1092	.1091	.1088	.0000
3	17.00	.0207	.0888	.1095	.1093	.1088	.0000
4	22.67	.0160	.0937	.1097	.1094	.1088	.0000
5	28.33	.0121	.0979	.1100	.1096	.1088	.0000
6	34.00	.0087	.1016	.1103	.1099	.1090	+.0002
7	39.67	.0055	.1051	.1106	.1100	.1089	+.0001
8	45.33	.0025	.1083	.1108	.1101	.1088	.0000
9	51.00	−.0005	.1115	.1110	.1102	.1088	.0000
10	56.67	−.0035	.1147	.1112	.1104	.1088	.0000
11	62.34	−.0066	.1183	.1117	.1108	.1091	+.0003
12	68.00	−.0098	.1216	.1118	.1108	.1089	+.0001
13	73.67	−.0134	.1253	.1119	.1108	.1088	.0000
14	79.34	−.0176	.1297	.1121	.1109	.1087	−.0001
15	85.01	−.0226	.1352	.1126	.1113	.1090	+.0002
16	90.67	−.0297	.1420	.1123	.1110	.1085	−.0003
17	96.34	−.0427	.1555	.1128	.1114	.1087	−.0001
17.65	100						

TABLE 22.—*m-Cresol ortho indo phenol: Relation of E'_o to pH.*

[E_o=0.6465; K_o=4.2×10^{-9}; K_r=4.5×10^{-16}; K_2=2×10^{-11}.]

Solution No.	*pH*	π_h	E'_o calculated.	E'_o found.	Deviation.
10	5.739	−0.3449	0.3015	0.3020	+0.0005
13	6.266	−.3766	.2698	.2701	+.0003
14	6.931	−.4166	.2295	.2293	−.0002
15	7.438	−.4470	.1982	.1980	−.0002
20	8.067	−.4848	.1554	.1553	−.0001
20½	8.414	−.5057	.1328	.1329	+.0001
21	8.576	−.5154	.1206	.1206	.0000
21½	8.947	−.5377	.0930	.0949	+.0019
22	9.272	−.5573	.0690	.0694	+.0004
22½	9.578	−.5756	+.0475	+.0480	+.0005
25½	10.552	−.6342	−.0097	−.0119	−.0022
26	10.862	−.6528	−.0237	−.0242	−.0005
26½	11.318	−.6802	−.0416	−.0420	−.0004
27	11.687	−.7014	−.0538	−.0531	+.0007
28	12.280	−.7380	−.0731	−.0726	+.0005

TABLE 23.—*m-Cresol ortho indo phenol (A) titrated with leuco indigo carmine at pH 8.664.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	Deviation from +0.1013.
c. c.	*Per cent.*				
1	3.29	−0.0442	0.1458	0.1016	+0.0003
2	6.59	−.0346	.1363	.1017	+.0004
3	9.89	−.0288	.1305	.1017	+.0004
4	13.18	−.0246	.1262	.1018	+.0005
5	16.47	−.0212	.1227	.1015	+.0002
6	19.77	−.0183	.1198	.1015	+.0002
7	23.06	−.0157	.1172	.1015	+.0002
8	26.36	−.0134	.1149	.1015	+.0002
9	29.65	−.0113	.1128	.1015	+.0002
10	32.95	−.0093	.1107	.1014	+.0001
11	36.25	−.0074	.1088	.1014	+.0001
12	39.54	−.0055	.1070	.1015	+.0002
13	42.84	−.0038	.1051	.1013	.0000
14	46.13	−.0020	.1033	.1013	.0000
15	49.43	−.0003	.1016	.1013	.0000
16	52.72	+.0014	.0998	.1012	−.0001
17	56.01	.0031	.0981	.1012	−.0001
18	59.31	.0049	.0963	.1012	−.0001
19	62.60	.0067	.0945	.1012	−.0001
20	65.90	.0086	.0926	.1012	−.0001
21	69.20	.0106	.0907	.1013	.0000
22	72.49	.0126	.0886	.1012	−.0001
23	75.78	.0149	.0864	.1013	.0000
24	79.08	.0174	.0839	.1013	.0000
25	82.37	.0201	.0811	.1012	−.0001
26	85.67	.0234	.0779	.1013	.0000
27	88.96	.0272	.0742	.1014	+.0001
28	92.26	.0323	.0691	.1014	+.0001
29	95.55	.0401	.0619	.1020	+.0007
30.35	100				

TABLE 24.—*o-Bromo phenol ortho indo phenol titrated with leuco indigo carmine at pH 8.666.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	Deviation from +0.1019.
c. c.	*Per cent.*				
1	6.13	−0.0356	+0.1375	+0.1019	0.0000
2	12.27	−.0257	.1276	.1019	.0000
3	18.40	−.0194	.1214	.1020	+.0001
4	24.54	−.0147	.1167	.1020	+.0001
5	30.67	−.0106	.1126	.1020	+.0001
6	36.81	−.0070	.1090	.1020	+.0001
7	42.94	−.0037	.1056	.1019	.0000
8	49.08	−.0005	.1024	.1019	.0000
9	55.21	+.0027	.0992	.1019	.0000
10	61.35	+.0060	.0958	.1018	−.0001
11	67.48	.0095	.0924	.1019	.0000
12	73.62	.0134	.0885	.1019	.0000
13	79.76	.0179	.0841	.1020	+.0001
14	85.89	.0236	.0780	.1016	−.0003
15	92.02	.0319	.0697	.1016	−.0003
16.3	100				

TABLE 25.—*Guaiacol indo phenol (Na_1) titrated with leuco indigo carmine at pH 9.62.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	Deviation from −0.0095
c. c.	*Per cent.*				
1	4.65	−0.0395	+0.0306	−0.0089	+0.0006
2	9.30	−.0297	+.0207	−.0090	+.0005
4	18.61	−.0193	+.0100	−.0093	+.0002
6	27.91	−.0124	+.0030	−.0094	+.0001
8	37.21	−.0068	−.0025	−.0093	+.0002
9	41.86	−.0043	−.0051	−.0094	+.0001
10	46.52	−.0018	−.0077	−.0095	.0000
11	51.17	+.0006	−.0101	−.0095	.0000
12	55.82	.0031	−.0126	−.0095	.0000
13	60.47	.0056	−.0151	−.0095	.0000
14	65.12	.0082	−.0177	−.0095	.0000
15	69.77	.0109	−.0205	−.0096	−.0001
16	74.42	.0139	−.0236	−.0097	−.0002
17	79.08	.0174	−.0270	−.0096	−.0001
18.02	83.81	.0215	−.0312	−.0097	−.0002
19	88.37	.0265	−.0361	−.0096	−.0001
20	93.03	.0338	−.0435	−.0097	−.0002
21.05	100				

TABLE 26.—*1-Naphthol-2-sulphonate indo o-cresol titrated with leuco indigo carmine at pH 8.679.*

Indigo.	Reduction.	$0.03006 \log \frac{[S_r]}{[S_o]}$	E_h	E'_o	Deviation from +0.0182.
c. c.	*Per cent.*				
2	5.60	−0.0369	+0.0557	+0.0188	+0.0006
4	11.20	−.0270	.0454	.0184	+.0002
6	16.81	−.0209	.0391	.0182	.0000
8	22.41	−.0162	.0344	.0182	.0000
10	28.01	−.0123	.0305	.0182	.0000
12	33.62	−.0089	.0271	.0182	.0000
14	39.22	−.0057	.0239	.0182	.0000
16	44.82	−.0027	.0208	.0181	−.0001
18	50.42	+.0002	.0179	.0181	−.0001
20	56.02	.0032	.0149	.0181	−.0001
22	61.62	.0062	.0119	.0181	−.0001
24	67.23	.0094	.0088	.0182	.0000
26	72.83	.0129	.0053	.0182	.0000
28	78.43	.0169	+.0014	.0183	+.0001
30	84.04	.0217	−.0033	.0184	+.0002
32	89.64	.0282	−.0099	.0183	+.0001
34	95.24	.0391	−.0207	.0184	+.0002
35.7	100				

TABLE 27.—*Summary of E'_o and colorimetric pK_o values.*

Compound.	*pH*	E'_o	pK_o
Phenol indo 2-6 dibromo phenol [1]	6.93 8.71	0.221 0.105	5.7
o-Cresol indo 2-6 dibromo phenol	6.93 8.68	0.187 0.073	5.4
m-Cresol indo 2-6 dibromo phenol	6.93 8.68	0.210 0.093	5.9
Thymol indo 2-6 dibromo phenol	8.68	0.052	[2]
Guaiacol indo 2-6 dibromo phenol	6.93 8.68	0.163 0.050	5.6
o-Bromo phenol indo 2-6 dibromo phenol	6.93 8.68	0.225 0.119	5.1

[1] See Table 1.
[2] Compound too insoluble for accurate measurement

TABLE 27.—*Summary of E'_0 and colorimetric pK_0 values*—Continued.

Compound.	*pH*	E'_0	pK_0
m-Bromo phenol indo 2-6 dibromo phenol	6.93 8.68	0.256 0.149	6.3
o-Chloro phenol indo 2-6 dibromo phenol	6.93 8.68	0.225 0.118	5.4
Guaiacol indo phenol	9.62	−0.010	8.7
l-Naphthol-2-sulphonate indo-o-cresol	8.68	0.018	9.0
Phenol ortho indo phenol	8.67	0.109	8.4
m-Cresol ortho indo phenol [3]	8.66	0.101	8.8
o-Bromo phenol ortho indo phenol	8.67	0.102	7.1

[3] See Table 22.

A CONVICTION OF GREAT IMPORTANCE.

Under the above caption, the following appeared on the editorial page of the New York Times for April 10, 1924:

Ernest G. H. Meyer, one of the too many men who, without a medical education, have engaged in the practice of medicine, was convicted of manslaughter in a Brooklyn court this week and may receive a maximum sentence of from 10 to 20 years in jail. As the jury recommended clemency, it is not likely that his punishment will be severe, but the conviction will stand as a precedent and shows that convictions can be obtained in spite of that absence of intention to do harm which always counts so heavily with jurors—and with judges, too, for that matter.

Meyer, who calls himself a "chiropractor" was summoned by misguided parents to treat a sick child. He performed some of the spinal manipulations which constitute the whole stock in trade of his class. Whatever the result of his exertions may have been, he did not discover that the child was suffering from diphtheria, a disease which almost any sane adult ought at least to suspect before it is far advanced, and a real doctor was not called in until just before the fatal termination. Then there was administered the antitoxin which in all probability would have saved the child's life if resort to it had been timely, but it was too late and the little girl died, a victim of a double ignorance. This to the jurors was manslaughter.

One comment on the verdict heard in the court room was that if it is to stand, any "chiropractor" unlucky enough to lose a patient can be sent to jail. The statement will excite neither dissatisfaction nor apprehension among people fairly well informed as to the preparation necessary for the practice of medicine and who have sense enough to know that there is more in it than surgery and the giving of drugs, to which all the "irregulars"—euphemism for "quacks"—desperately try to confine its definition.

A CENSUS OF PUBLIC HEALTH NURSING.

A census of public health nursing is being taken by the National Organization for Public Health Nursing, in cooperation with the State organizations for public health nursing and the public health nursing section of the State graduate nurses associations. When this census is completed, data will be available relative to the number or organizations throughout the country employing public health nurses and the number of nurses employed by them as of January 1, 1924. Other data, such as the number of nurses engaged in school nursing, the number of negro nurses, and similar information are also being secured.

The plans for this first census of public health nursing do not include nurses employed by industrial concerns, and the National Organization for Public Health Nursing states that the reasons for not including them at the present time are that, so far, private industrial organizations have not cooperated in giving the information requested, and that it is difficult to locate industrial nurses because they have no organization.

Hospital social service departments are not included, as information relative to those departments is secured by the Bureau of the Census in its census of institutions.

The information to be gathered in the census of this branch of public health work should be of interest and value, not only to public health nurses themselves, but also to public health departments and organizations, health officers, social workers, and others; and the National Organization of Public Health Nursing urges the cooperation of all persons concerned in furnishing promptly and accurately the information requested in the census forms.

DEATHS DURING WEEK ENDED APRIL 5, 1924.

Summary of information received by telegraph from industrial insurance companies for week ended April 5, 1924, and corresponding week of 1923. (From the Weekly Health Index, April 8, 1924, issued by the Bureau of the Census, Department of Commerce.)

	Week ended April 5, 1924.	Corresponding week, 1923.
policies in force	57, 128, 572	52, 833, 721
Number of death claims	10, 454	12, 213
Death claims per 1,000 policies in force, annual rate	9. 5	12. 1

Deaths from all causes in certain large cities of the United States during the week ended April 5, 1924, infant mortality, annual death rate, and comparison with corresponding week of 1923. (From the Weekly Health Index, April 8, 1924, issued by the Bureau of the Census, Department of Commerce.)

City.	Week ended Apr. 5, 1924.		Annual death rate per 1,000, corresponding week, 1923.	Deaths under 1 year.		Infant mortality rate, week ended Apr. 5, 1924.[2]
	Total deaths.	Death rate.[1]		Week ended Apr. 5, 1924.	Corresponding week, 1923.	
Total (65 cities)	7,608	14.7	[3] 15.0	1,011	[3] 987	
Akron	38			11	2	116
Albany [4]	37	16.3	21.3	5	3	110
Atlanta	102	23.4	18.7	13	13	
Baltimore [4]	219	14.5	17.5	29	28	84
Birmingham	76	19.7	17.3	7	14	
Boston	245	16.4	17.2	37	37	103
Bridgeport	37			4	10	63
Buffalo	159	15.2	18.0	24	33	102
Cambridge	25	11.6	18.2	2	2	35
Camden	36	14.9	21.4	9	8	142
Canton	23	11.7	10.5		1	
Chicago [4]	748	13.3	13.9	120	115	111
Cincinnati	136	17.4	19.4	9	10	57
Cleveland	188	10.7	12.9	27	34	71
Columbus	81	15.8	16.4	11	8	105
Dallas	26	7.2	16.3	10	10	
Dayton	44	13.6	11.3	19	2	318
Denver	108			15	5	
Des Moines	42	15.1	9.6	4	1	
Detroit	283			52	34	97
Duluth	24	11.5	10.3	4	5	86
Erie	26			3	3	62
Fall River [4]	31	13.4	19.8	5	8	70
Flint	24			9	3	155
Fort Worth	34	12.0	8.3	7	1	
Grand Rapids	51	17.9	15.0	8	6	125
Houston	29			4	5	
Indianapolis	108	16.1	13.4	14	11	106
Jacksonville, Fla	32	16.3	17.7	3	4	
Jersey City	76	12.7	14.5	13	16	94
Kansas City, Kans	43	19.0	8.6	5	5	100
Kansas City, Mo	132	19.1	15.3	20	14	
Los Angeles	237			28	18	87
Lowell	37	16.7	19.0	9	9	161
Lynn	29	14.6	15.2	6	2	152
Memphis	80	24.2	25.1	8	5	
Milwaukee	102	10.8	13.2	16	22	73
Minneapolis	102	12.7	14.4	7	17	38
Nashville [4]	45	19.0	25.5	5	6	
New Bedford	20	7.9	15.6	6	9	94
New Haven	57	16.9	21.4	12	10	157
New Orleans	172	21.9	15.1	15	10	
New York	1,605	13.9	14.4	197	205	80
Bronx Borough	178	10.6	10.9	16	15	56
Brooklyn Borough	529	12.6	13.5	88	62	95
Manhattan Borough	719	16.6	17.5	76	115	74
Queens Borough	129	12.1	10.2	15	8	82
Richmond Borough	50	19.9	15.5	2	5	36
Newark, N. J	101	11.8	12.5	19	19	89
Norfolk	37	11.8	10.8	6	6	109
Oakland	57	12.0	10.4	5	2	63
Oklahoma City	20	10.0		1		
Omaha	50	12.5	11.2	4	4	43
Paterson	45	16.7	14.9	5	1	81
Philadelphia	595	15.9	16.9	68	77	86
Pittsburgh	271	22.6	15.7	41	35	139
Portland, Oreg	65	12.2	13.5	5	6	52
Providence	76	16.3	18.3	16	12	130
Richmond	66	18.7	15.3	5	6	59
Rochester	83	13.3	10.6	11	10	86
St. Louis	244	15.7	14.3	21	20	
St. Paul	56	12.0	14.4	8	3	69
Salt Lake City [4]	42	17.0	16.5	5	4	83

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births—an annual rate based on deaths under 1 year for the week and estimated births for 1923. Cities left blank are not in the registration area for births.
[3] Data for 64 cities.
[4] Deaths for week ended Friday, April 4, 1924.

Deaths from all causes in certain large cities of the United States during the week ended April 5, 1924, infant mortality, annual death rate, and comparison with corresponding week of 1923. (From the Weekly Health Index, April 8, 1924, issued by the Bureau of the Census, Department of Commerce)—Continued.

City	Week ended Apr. 5, 1924.		Annual death rate per 1,000, corresponding week, 1923.	Deaths under 1 year.		Infant mortality rate, week ended Apr. 5, 1924.
	Total deaths.	Death rate.		Week ended Apr. 5, 1924.	Corresponding week, 1923.	
San Antonio	62	16.9	22.3	7	10	----
San Francisco	181	17.2	14.1	18	16	108
Schenectady	26	13.5	13.2	4	5	113
Seattle	69	----	----	6	4	58
Somerville	17	8.8	10.0	3	2	82
Spokane	33	----	----	3	1	63
Springfield, Mass	34	11.9	16.3	5	3	84
Syracuse	58	16.1	12.7	12	7	149
Tacoma	22	11.1	12.8	2	3	46
Toledo	81	15.3	12.0	10	7	95
Trenton	41	16.5	22.1	7	4	115
Utica	35	17.3	14.1	5	5	108
Washington, D. C	145	15.5	17.0	17	16	98
Waterbury	18	----	----	2	6	45
Wilmington, Del	18	7.8	16.4	1	5	22
Worcester	50	13.3	14.1	4	6	48
Yonkers	21	10.0	11.6	3	3	66
Youngstown	42	14.1	12.8	7	6	101

PREVALENCE OF DISEASE.

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

UNITED STATES.

CURRENT STATE SUMMARIES.

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

Reports for Week Ended April 12, 1924.

ALABAMA.	Cases.
Chicken pox	65
Diphtheria	10
Influenza	95
Malaria	20
Measles	338
Mumps	96
Pellagra	7
Pneumonia	173
Scarlet fever	7
Smallpox	66
Tuberculosis	39
Typhoid fever	10
Whooping cough	89

ARIZONA.	
Chicken pox	5
Diphtheria	5
Measles	157
Mumps	3
Scarlet fever	16
Smallpox	2
Trachoma	5
Tuberculosis	11
Typhoid fever	1
Whooping cough	1

ARKANSAS.	
Chicken pox	53
Diphtheria	2
Influenza	79
Malaria	35
Measles	354
Mumps	68
Paratyphoid fever	1
Pellagra	2
Scarlet fever	6
Smallpox	10
Trachoma	1
Tuberculosis	27
Typhoid fever	5
Whooping cough	49

CALIFORNIA.	Cases.
Cerebrospinal meningitis—Bakersfield	1
Diphtheria	227
Influenza	32
Leprosy—Los Angeles	1
Measles	1,468
Poliomyelitis—Redlands	1
Scarlet fever	236
Smallpox:	
Burbank	9
Corona	12
Compton	9
Long Beach	18
Los Angeles	163
Los Angeles County	76
Orange County	16
Redondo	8
San Bernardino	15
Scattering	73
Typhoid fever:	
Santa Ana	8
Scattering	10

COLORADO. (Exclusive of Denver.)	
Chicken pox	12
Diphtheria	11
Lethargic encephalitis	1
Measles	162
Mumps	47
Pneumonia	2
Scarlet fever	22
Tuberculosis	54
Typhoid fever	2
Whooping cough	2

CONNECTICUT.	
Chicken pox	61
Conjunctivitis (infectious)	1
Diphtheria	48
Dysentery (amebic)	1

CONNECTICUT—continued.	Cases.
German measles	13
Influenza	6
Lethargic encephalitis	1
Measles	129
Mumps	157
Pneumonia (lobar)	32
Poliomyelitis	2
Scarlet fever	218
Smallpox	1
Trichinosis	1
Tuberculosis (all forms)	36
Typhoid fever	1
Whooping cough	27

DELAWARE.	
Chicken pox	7
Diphtheria	4
Measles	7
Mumps	2
Pneumonia	2
Scarlet fever:	
Wilmington	11
Scattering	7
Tuberculosis	1
Whooping cough	3

DISTRICT OF COLUMBIA.	
Chicken pox	9
Diphtheria	7
Influenza	1
Lethargic encephalitis	1
Measles	19
Pellagra	1
Poliomyelitis	1
Scarlet fever	38
Smallpox	3
Tuberculosis	21
Whooping cough	12

FLORIDA.	
Cerebrospinal meningitis	1
Diphtheria	6
Malaria	6
Pneumonia	6
Scarlet fever	10
Smallpox	4
Typhoid fever	10

GEORGIA.	
Chicken pox	43
Conjunctivitis (infectious)	3
Dengue	1
Diphtheria	20
Dysentery (amebic)	1
Dysentery (bacillary)	5
Hookworm disease	28
Influenza	239
Malaria	11
Measles	128
Mumps	85
Pellagra	3
Pneumonia	82
Scarlet fever	17
Smallpox	179
Tuberculosis (pulmonary)	33
Typhoid fever	6
Whooping cough	55

ILLINOIS.	Cases.
Cerebrospinal meningitis:	
Cook County	3
St. Clair County	1
Diphtheria:	
Cook County	89
Iroquois County	11
Madison County	9
Scattering	51
Influenza	28
Lethargic encephalitis—Cook County	2
Measles	773
Pneumonia	383
Poliomyelitis—Cook County	1
Scarlet fever:	
Cook County	144
De Kalb County	23
Kane County	17
Macon County	9
Sangamon County	11
Vermilion County	8
Scattering	78
Smallpox	20
Tuberculosis	356
Typhoid fever	22
Whooping cough	148

INDIANA.	
Cerebrospinal meningitis:	
Madison County	1
White County	1
Chicken pox	61
Diphtheria:	
Marion County	10
Scattering	34
Influenza	16
Measles	648
Pneumonia	16
Scarlet fever:	
Dekalb County	9
Lake County	22
Marion County	8
St. Joseph County	14
Scattering	56
Smallpox:	
Clark County	13
Dekalb County	10
Marion County	58
Scattering	54
Tuberculosis	38
Typhoid fever:	
Lake County	9
Scattering	2
Whooping cough	49

IOWA.	
Diphtheria	14
Scarlet fever	58
Smallpox	8

KANSAS.	
Cerebrospinal meningitis	1
Chicken pox	97
Diphtheria	27
German measles	10
Influenza	3
Measles	1,012

KANSAS—continued.	Cases.
Mumps	335
Pneumonia	32
Poliomyelitis	1
Scarlet fever	86
Septic sore throat	1
Smallpox	59
Tuberculosis	33
Typhoid fever	3
Whooping cough	132

LOUISIANA.	
Diphtheria	20
Malaria	6
Measles	194
Pneumonia	53
Scarlet fever	16
Smallpox	12
Tuberculosis	40
Typhoid fever	7
Whooping cough	6

MAINE.	
Cerebrospinal meningitis	1
Chicken pox	24
Conjunctivitis (infectious)	1
Diphtheria	6
German measles	13
Measles	109
Mumps	33
Pneumonia	13
Scarlet fever	11
Tuberculosis	20
Typhoid fever	1
Vincent's angina	1
Whooping cough	30

MARYLAND.[1]	
Cerebrospinal meningitis	1
Chicken pox	129
Diphtheria	48
Dysentery	1
German measles	106
Influenza	35
Lethargic encephalitis	2
Malaria	1
Measles	381
Mumps	40
Paratyphoid fever	2
Pneumonia (all forms)	111
Scarlet fever	157
Smallpox	3
Tetanus	1
Tuberculosis	67
Typhoid fever	9
Whooping cough	44

MASSACHUSETTS.	
Anthrax	1
Chicken pox	191
Conjunctivitis (suppurative)	11
Diphtheria	144
German measles	85
Influenza	11
Lethargic encephalitis	4
Malaria	2

MASSACHUSETTS—continued.	Cases.
Measles	956
Mumps	377
Ophthalmia neonatorum	25
Pneumonia (lobar)	146
Poliomyelitis	2
Scarlet fever	418
Septic sore throat	2
Trachoma	1
Tuberculosis (all forms)	150
Typhoid fever	9
Whooping cough	95

MICHIGAN.	
Diphtheria	103
Measles	867
Pneumonia	179
Scarlet fever	310
Smallpox	124
Tuberculosis	82
Typhoid fever	18
Whooping cough	70

MINNESOTA.	
Chicken pox	136
Diphtheria	43
Influenza	1
Measles	171
Pneumonia	10
Poliomyelitis	1
Scarlet fever	248
Smallpox	49
Tuberculosis	76
Typhoid fever	16
Whooping cough	3

MISSISSIPPI.	
Diphtheria	14
Scarlet fever	4
Smallpox	17
Typhoid fever	4

MISSOURI. (Exclusive of Cape Girardeau.)	
Chicken pox	59
Diphtheria	58
Influenza	74
Measles	571
Mumps	233
Opthalmia neonatorum	1
Pneumonia	57
Scarlet fever	151
Septic sore throat	4
Smallpox	58
Trachoma	6
Tuberculosis	44
Typhoid fever	5
Whooping cough	62

MONTANA.	
Diphtheria	4
Rocky Mountain spotted fever—	
Glasgow	1
Scarlet fever	18
Smallpox	14

[1] Week ended Friday.

NEBRASKA.	Cases.
Chicken pox	9
Diphtheria	16
Lethargic encephalitis	1
Measles	175
Mumps	14
Scarlet fever	14
Smallpox	4
Tuberculosis	2
Typhoid fever	1
Whooping cough	15

NEW JERSEY.	
Cerebrospinal meningitis	4
Chicken pox	250
Diphtheria	103
Influenza	17
Measles	900
Pneumonia	175
Poliomyelitis	1
Scarlet fever	184
Smallpox	6
Trachoma	2
Typhoid fever	3
Whooping cough	150

NEW MEXICO.	
Chicken pox	22
Conjunctivitis	1
Diphtheria	21
Influenza	3
Measles	363
Mumps	30
Paratyphoid fever	1
Pellagra	1
Pneumonia	15
Scarlet fever	11
Tuberculosis	10
Typhoid fever	2
Whooping cough	6

NEW YORK. (Exclusive of New York City.)	
Diphtheria	91
Influenza	42
Lethargic encephalitis	2
Measles	1,381
Pneumonia	370
Scarlet fever	509
Smallpox	6
Typhoid fever	8
Whooping cough	305

NORTH CAROLINA.	
Chicken pox	236
Diphtheria	23
German measles	6
Measles	1,486
Scarlet fever	35
Septic sore throat	5
Smallpox	136
Typhoid fever	3
Whooping cough	350

OREGON.	Cases.
Cerebrospinal meningitis	1
Chicken pox	25
Diphtheria	20
Influenza	2
Lethargic encephalitis	2
Measles	156
Mumps	12
Pneumonia	6
Poliomyelitis	1
Scarlet fever:	
Portland	9
Scattering	14
Smallpox	13
Tuberculosis	10
Typhoid fever	8
Whooping cough	16

SOUTH DAKOTA.	
Chicken pox	5
Diphtheria	8
Measles	231
Mumps	1
Pneumonia	12
Scarlet fever	42
Smallpox	5
Typhoid fever	1
Whooping cough	3

TEXAS.	
Cerebrospinal meningitis	1
Chicken pox	86
Diphtheria	22
Influenza	19
Measles	539
Mumps	97
Pneumonia	49
Rabies	1
Scarlet fever	15
Smallpox	75
Tuberculosis	32
Typhoid fever	5
Whooping cough	66

VERMONT.	
Chicken pox	7
Diphtheria	2
Measles	75
Mumps	5
Scarlet fever	8
Whooping cough	49

WASHINGTON.	
Chicken pox	53
Diphtheria	24
Measles	178
Mumps	7
Pneumonia	3
Scarlet fever:	
Spokane	12
Scattering	37
Smallpox:	
Spokane	17
Scattering	16
Tuberculosis	33
Typhoid fever	3
Whooping cough	24

WEST VIRGINIA.	Cases.
Diphtheria	2
Measles	22
Scarlet fever	6
Smallpox	2

WISCONSIN.	
Milwaukee:	
Chicken pox	76
Diphtheria	16
Measles	21
Pneumonia	10
Scarlet fever	32
Smallpox	1,
Tuberculosis	8
Whooping cough	39
Scattering:	
Cerebrospinal meningitis	1
Chicken pox	130
Diphtheria	37
German measles	34

WISCONSIN—continued.	Cases.
Scattering—Continued.	
Influenza	23
Measles	301
Ophthalmia neonatorum	1
Pneumonia	19
Scarlet fever	234
Smallpox	38
Tuberculosis	23
Typhoid fever	8
Whooping cough	99

WYOMING.	
Chicken pox	32
Diphtheria	7
Influenza	3
Measles	158
Mumps	8
Pneumonia	6
Typhoid fever	2
Whooping cough	13

Reports for Week Ended April 5, 1924.

NORTH DAKOTA.	Cases.
Chicken pox	14
Diphtheria	6
Measles	204
Mumps	1

NORTH DAKOTA—continued.	Cases.
Pneumonia	15
Scarlet fever	40
Smallpox	15
Tuberculosis	2

SUMMARY OF CASES REPORTED MONTHLY BY STATES.

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

State.	Cerebrospinal meningitis.	Diphtheria.	Influenza.	Malaria.	Measles	Pellagra.	Poliomyelitis.	Scarlet fever.	Smallpox.	Typhoid fever.
January, 1924.										
Tennessee	4	64	454	-------	1,203	30	1	41	338	30
February, 1924.										
California	12	1,059	173	5	5,013	1	4	1,176	1,436	111
March, 1924.										
Arkansas	1	22	609	140	1,829	16	0	20	37	12
Florida	5	53	41	38	652	10	-------	32	11	34
Indiana	7	222	135	-------	2,964	-------	2	510	526	19
New Mexico	4	49	34	0	1,212	0	0	35	6	5
Vermont	-------	11	0	0	762	0	0	51	14	1
Wyoming	-------	5	5	-------	513	-------	-------	23	-------	6

Number of Cases of Certain Communicable Diseases Reported for the Month of January, 1924, by State Health Officers.

State.	Chicken pox.	Diphtheria.	Measles.	Mumps.	Scarlet fever.	Smallpox.	Tuberculosis.	Typhoid fever.	Whooping cough.
Alabama	301	71	2,102	109	51	[1] 107	146	47	183
Arizona	19	11	206	12	59	7	76	3	2
Arkansas	-------	54	542	-------	36	50	-------	70	-------
California	1,819	1,575	3,250	147	1,625	1,442	879	306	203
Colorado	248	127	1,696	352	254	13	227	19	81
Connecticut	517	274	810	379	741	2	186	10	313
Delaware	58	46	6	3	88	-------	32	7	33
District of Columbia	265	50	35	-------	130	18	94	6	51
Florida	35	57	1,081	22	7	37	42	33	17
Georgia	194	49	785	66	34	293	29	10	193
Idaho	-------	14	-------	-------	33	12	-------	2	-------
Illinois	2,000	1,007	2,475	1,183	1,428	37	1,328	158	579
Indiana	401	555	2,492	-------	537	367	-------	42	362
Iowa	156	153	834	137	268	52	1	[2]	100
Kansas	691	213	2,182	580	420	119	340	6	497
Kentucky [3]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Louisiana	20	122	1,008	2	28	70	-------	32	25
Maine	-------	57	-------	-------	120	-------	-------	12	-------
Maryland	934	226	393	51	482	3	214	43	218
Massachusetts	1,747	1,095	2,335	1,246	2,084	2	641	31	547
Michigan	1,595	961	2,247	607	1,617	543	322	27	291
Minnesota	884	473	1,275	-------	1,349	242	327	25	63
Mississippi	812	90	4,144	215	29	20	247	101	962
Missouri	303	354	2,685	126	502	33	282	25	367
Montana	115	29	1,986	6	155	212	58	8	40
Nebraska [4]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Nevada	10	-------	14	1	6	1	-------	-------	-------
New Hampshire [5]	-------	-------	-------	-------	-------	-------	-------	-------	-------
New Jersey	1,403	607	1,417	-------	746	101	427	28	528
New Mexico	51	80	203	35	38	3	77	15	15
New York	3,730	1,815	7,739	1,474	2,755	24	1,922	206	2,202
North Carolina	1,002	202	6,014	-------	245	569	-------	20	2,228
North Dakota	70	64	1,028	2	225	44	68	7	35
Ohio [4]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Oklahoma	-------	57	973	-------	59	334	-------	49	-------
Oregon	90	138	2,172	15	101	95	75	7	23
Pennsylvania	3,935	1,712	2,366	1,810	2,210	18	509	105	1,325
Rhode Island	46	106	26	22	432	-------	40	8	54
South Carolina	63	124	954	75	22	68	-------	5	67
South Dakota	193	42	637	36	323	15	10	8	123
Tennessee	295	64	1,203	-------	41	338	-------	30	356
Texas [3]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Utah [5]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Vermont	209	36	548	143	65	31	-------	2	464
Virginia	1,039	298	2,305	-------	290	25	-------	50	2,144
Washington	256	143	11,407	172	323	341	149	17	65
West Virginia	-------	141	77	-------	183	32	47	55	-------
Wisconsin	1,152	367	1,308	33	1,375	104	191	17	663
Wyoming	68	11	555	-------	53	-------	-------	-------	86

[1] In addition an outbreak of smallpox occurred during January in Cleburne County—about 100 cases found; no deaths.
[2] Reports not required by law.
[3] Reports received weekly.
[4] Reports not received at time of going to press.
[5] Reports received annually

Case Rates per 1,000 Population (Annual Basis) for the Month of January, 1924.

State.	Chickenpox.	Diphtheria.	Measles.	Mumps.	Scarlet fever.	Smallpox.	Tuberculosis.	Typhoid fever.	Whooping cough.
Alabama	1.45	0.34	10.15	0.53	0.25	.....	0.70	0.23	0.88
Arizona	.57	.33	6.17	.36	1.77	0.21	2.28	.09	.06
Arkansas	.....	.35	3.49	.....	.23	.32	.....	.45	.....
California	5.49	4.75	9.81	.44	4.90	4.35	2.65	.92	.61
Colorado	2.91	1.49	19.93	4.14	2.98	.15	2.67	.22	.95
Connecticut	4.06	2.15	6.36	2.98	5.82	.02	1.46	.08	2.46
Delaware	2.94	2.33	.30	.15	4.47	.....	1.62	.36	1.68
District of Columbia	7.15	1.35	.94	.....	3.51	.49	2.54	.16	1.38
Florida	.39	.63	11.94	.24	.08	.41	.46	.36	.19
Georgia	.76	.19	3.06	.26	.13	1.14	.11	.04	.75
Idaho	.....	.34	.....	.....	.81	.29	.....	.05	.....
Illinois	3.43	1.73	4.25	2.03	2.45	.06	2.28	.27	.99
Indiana	1.56	2.16	9.69	.....	2.09	1.43	.....	.16	1.41
Iowa	.74	.73	3.96	.65	1.27	.25	.00	(1)	.47
Kansas	4.52	1.39	14.27	3.79	2.75	.78	2.22	.04	3.25
Kentucky [2]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Louisiana	.13	.77	6.38	.01	.18	.44	.....	.20	.16
Maine	.....	.86	.....	.....	1.82	.....	.....	.18	.....
Maryland	7.25	1.75	3.05	.40	3.74	.02	1.66	.33	1.69
Massachusetts	5.06	3.17	6.76	3.61	6.03	.01	1.86	.09	1.58
Michigan	4.63	2.79	6.52	1.76	4.69	1.58	.93	.08	.84
Minnesota	4.12	2.21	5.95	.....	6.29	1.13	1.53	.12	.29
Mississippi	5.35	.59	27.32	1.42	.19	.13	1.63	.67	6.34
Missouri	1.04	1.21	9.17	.43	1.72	.11	96	.09	1.25
Montana	2.16	.54	37.28	.11	2.91	3.98	1.09	.15	.75
Nebraska [3]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nevada	1.53	.....	2.14	.15	.92	.15	.....	.....	.....
New Hampshire [4]	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Jersey	4.81	2.08	4.86	.....	2.56	.35	1.46	.10	1.81
New Mexico	1.60	2.51	6.38	1.10	1.19	.09	2.42	.47	.47
New York	4.01	1.95	8.33	1.59	2.96	.03	2.07	.22	2.37
North Carolina	4.35	.88	26.08	.....	1.06	2.47	.....	.09	9.66
North Dakota	1.22	1.11	17.87	.03	3.91	.76	1.18	.12	.61
Ohio [3]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma	.....	.31	5.22	.....	.32	1.79	.....	.26	.....
Oregon	1.27	1.95	30.72	.21	1.43	1.34	1.06	.10	.33
Pennsylvania	5.05	2.19	3.03	2.32	2.83	.02	.65	.13	1.70
Rhode Island	.86	1.98	.48	.41	8.06	.....	.75	.15	1.01
South Carolina	.42	.83	6.39	.50	.15	.46	.....	.03	.45
South Dakota	3.45	.75	11.38	.64	5.77	.27	.18	.14	2.20
Tennessee	1.45	.31	5.90	.....	.20	1.66	.....	.15	1.74
Texas [3]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Utah [4]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vermont	7.00	1.21	18.36	4.79	2.18	1.04	.....	.07	15.54
Virginia	5.06	1.45	11.23	.....	1.41	.12	.....	.24	10.44
Washington	2.08	1.16	92.49	1.39	2.62	2.76	1.21	.14	.53
West Virginia	.....	1.06	.58	.....	1.37	.24	.35	.41	.....
Wisconsin	4.91	1.56	5.57	.14	5.86	.44	.81	.07	2.83
Wyoming	3.70	.60	30.22	.....	2.89	.....	.....	.....	4.68

[1] Reports not required by law.
[2] Reports received weekly.
[3] Reports not received at time of going to press.
[4] Reports received annually.

OUTBREAK OF TYPHOID FEVER AT HAMMOND, IND.

The State Health Department of Indiana, under date of April 7, 1924, reported an outbreak of typhoid fever at Hammond, Ind., with 25 cases and 2 deaths.

MORBIDITY REPORTS FROM CITIES.

The outstanding feature of the morbidity reports from cities in all parts of the United States for the week ended March 29, 1924, is the continued rise in the number of cases of smallpox. This is remarkable in view of the fact that the means of controlling this disease is well known. One hundred and two cities reported 598 cases of smallpox for the week. Last year the same cities reported 122 cases for the corresponding week, while the estimated expectancy,

based on reports for the past nine years, excluding epidemics, was 194 cases. The disease has been mild in form, and very few deaths from smallpox have been reported since January 1, 1924.

Although there has been an increase in the number of cases of measles since the first of the year, the number reported by the cities for the week ended March 29, 1924, was smaller than that for the corresponding week of last year. The figures for 102 cities are: Week ended March 29, 1924, 6,593 cases; week ended March 31, 1923, 7,870 cases.

Since January 1, 1924, the reports from cities have indicated an unusual prevalence of scarlet fever. For the week ended March 29, 1924, 102 cities reported 1,942 cases. These cities reported 1,581 cases for the corresponding week last year. The estimated expectancy was 1,054 cases.

The number of deaths from influenza and pneumonia reported by the cities during the first three months of this year is considerably smaller than the number reported for the corresponding period of last year.

City reports for week ended March 29, 1924.

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence how many cases of the disease under consideration may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding week of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded and the estimated expectancy is the mean number of cases reported for the week during non-epidemic years.

If reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1915 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviations from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city.	Chicken pox, cases reported.	Diphtheria.		Influenza.		Measles, cases reported.	Mumps, cases reported.	Pneumonia, deaths reported.	Scarlet fever.	
		Cases, estimated expectancy.	Cases reported.	Cases reported.	Deaths reported.				Cases, estimated expectancy.	Cases reported.
NEW ENGLAND.										
Maine:										
Lewiston	0	1	2	0	0	13	0	1	2	2
Portland	15	1	2	----	1	0	44	2	3	1
New Hampshire:										
Concord	0	0	0	0	0	73	0	2	1	0
Manchester	0	3	1	0	0	9	0	2	2	5
Vermont:										
Barre	0	0	0	0	0	0	0	0	1	1
Burlington	----	1	0	0	0	1	----	1	1	2
Massachusetts:										
Boston	65	62	59	3	0	198	33	18	58	124
Fall River	9	4	2	1	1	12	0	5	2	16
Springfield	18	3	2	1	0	107	6	1	6	18
Worcester	----	4	----	----	----	----	----	----	7	----
Rhode Island:										
Pawtucket	5	2	1	0	0	0	9	0	1	3
Providence	0	11	8	----	1	0	0	6	8	90
Connecticut:										
Bridgeport	1	7	8	0	0	2	2	3	5	18
Hartford	----	9	10	0	0	42	----	4	5	45
New Haven	4		4	0	0	6	52	12	5	15

City reports for week ended March 29, 1924—Continued.

Division, State, and city.	Chicken pox, cases reported.	Diphtheria.		Influenza.		Measles, cases reported.	Mumps, cases reported.	Pneumonia, deaths reported.	Scarlet fever.	
		Cases, estimated expectancy.	Cases reported.	Cases reported.	Deaths reported.				Cases, estimated expectancy.	Cases reported.
MIDDLE ATLANTIC.										
New York:										
Buffalo	0	13	7	2	1	24	0	15	19	24
New York	296	283	215	78	19	1,980	275	282	202	278
Rochester	6	8	0	0	0	9	8	9	12	16
Syracuse	30	7	9	0	0	52	30	6	14	48
New Jersey:										
Camden	----	4	9	0	0	0	----	10	3	5
Newark	----	20	17	14	1	107	----	18	24	33
Trenton	5	5	3	1	1	36	1	3	3	1
Pennsylvania:										
Philadelphia	117	71	99	6	9	125	239	86	64	78
Pittsburgh	75	19	31	15	13	17	103	94	16	46
Reading	0	4	1	----	1	4	0	2	4	3
Scranton	11	3	1	----	1	2	2	6	3	3
E. NORTH CENTRAL.										
Ohio:										
Cincinnati	16	13	8	10	4	122	20	11	9	9
Cleveland	93	25	16	14	0	68	436	36	32	20
Columbus	8	4	5	----	1	1	2	6	7	19
Toledo	57	4	3	0	0	38	0	13	13	22
Indiana:										
Fort Wayne	----	2	1	0	0	6	----	2	3	5
Indianapolis	21	9	11	0	0	52	222	25	13	3
South Bend	----	0	7	0	0	2	----	3	3	12
Terre Haute	3	1	0	0	0	4	0	4	3	1
Illinois:										
Chicago	126	89	72	27	5	168	135	95	113	131
Cicero	----	2	----	----	----	----	----	----	2	----
Peoria	11	1	2	0	0	2	4	1	3	2
Springfield	18	1	1	0	0	0	2	5	1	0
Michigan:										
Detroit	65	63	51	7	1	213	92	53	69	105
Flint	6	4	3	1	0	25	39	3	7	17
Grand Rapids	3	3	2	0	0	1	28	7	8	5
Saginaw	1	1	0	0	0	18	3	2	3	48
Wisconsin:										
Madison	15	1	1	0	0	1	0	0	4	6
Milwaukee	78	13	16	1	0	11	11	0	34	16
Racine	7	1	4	0	0	0	0	4	4	16
Superior	----	1	2	0	0	0	----	0	2	5
W. NORTH CENTRAL.										
Minnesota:										
Duluth	----	1	0	0	0	4	----	6	5	17
Minneapolis	113	14	14	0	0	54	15	10	26	60
St. Paul	----	15	9	0	0	30	----	6	24	56
Iowa:										
Davenport	----	1	3	0	----	0	----	----	3	1
Des Moines	0	2	2	0	----	9	0	----	9	10
Sioux City	0	2	4	0	----	0	0	----	2	1
Waterloo	5	0	0	0	----	6	18	----	2	3
Missouri:										
Kansas City	5	9	4	3	3	104	34	19	10	20
St. Joseph	0	2	0	0	0	0	0	11	3	0
St. Louis	39	49	25	10	1	61	58	----	28	85
North Dakota:										
Fargo	0	1	0	0	0	0	0	1	3	0
Grand Forks	0	0	0	0	----	51	0	----	1	2
South Dakota:										
Aberdeen	1	----	0	0	0	45	----	0	----	4
Sioux Falls	3	0	0	0	0	1	----	2	4	1
Nebraska:										
Lincoln	----	1	5	0	0	27	----	1	5	1
Omaha	8	4	1	0	0	149	2	13	13	2
Kansas:										
Topeka	7	1	4	0	0	185	1	1	3	2
Wichita	1	1	5	0	0	121	157	3	3	5

City reports for week ended March 29, 1924—Continued.

Division, State, and city.	Chicken pox, cases reported.	Diphtheria.		Influenza.		Measles, cases reported.	Mumps, cases reported.	Pneumonia, deaths reported.	Scarlet fever.	
		Cases, estimated expectancy.	Cases reported.	Cases reported.	Deaths reported.				Cases, estimated expectancy.	Cases reported.
SOUTH ATLANTIC.										
Delaware:										
Wilmington	----	1	3	0	1	4	----	2	2	15
Maryland:										
Baltimore	88	23	27	21	1	204	31	31	33	91
Cumberland	----	1	0	0	0	0	----	1	1	1
Frederick	----	1	0	0	0	10	----	0	0	6
District of Col.:										
Washington	70	11	3	6	0	14	0	13	19	35
Virginia:										
Lynchburg	1	1	0	0	0	1	0	2	0	2
Norfolk	9	1	0	0	0	97	1	6	1	0
Richmond	14	3	3	----	4	59	0	9	2	2
Roanoke	3	1	0	0	1	1	2	2	1	4
West Virginia:										
Charleston	1	1	1	0	0	0	2	3	1	0
Huntington	0	0	1	----	1	0	0	2	0	0
Wheeling	----	1	2	0	0	7	----	3	1	2
North Carolina:										
Raleigh	5	0	0	0	0	7	0	3	0	2
Wilmington	17	1	0	0	0	45	8	0	0	0
Winston-Salem	6	0	0	0	0	45	11	5	0	24
South Carolina:										
Charleston	2	1	0	0	0	0	0	3	0	0
Columbia	7	1	0	0	0	27	17	1	0	0
Greenville	0	0	0	0	0	34	0	2	0	0
Georgia:										
Atlanta	1	3	2	1	0	8	9	20	3	9
Brunswick	10	0	0	0	1	33	0	1	0	0
Savannah	----	1	0	4	2	17	----	2	0	1
Florida:										
St. Petersburg	0	----	0	0	0	3	0	0	----	8
Tampa	2	2	1	0	0	5	0	2	0	0
EAST SOUTH CENTRAL.										
Kentucky—										
Covington	0	1	0	0	0	5	0	1	1	0
Louisville	7	6	4	6	1	8	6	16	4	3
Tennessee:										
Memphis	44	5	5	0	0	51	39	10	3	26
Nashville	2	1	0	----	2	4	0	8	2	0
Alabama:										
Birmingham	14	1	0	4	2	89	34	9	1	0
Mobile	1	1	1	----	2	5	1	2	0	1
Montgomery	----	0	0	----	1	11	----	1	1	0
WEST SOUTH CENTRAL.										
Arkansas:										
Fort Smith	3	0	0	0	----	193	2	----	1	1
Little Rock	1	1	1	0	----	55	7	----	1	0
Louisiana:										
New Orleans	3	8	18	10	6	179	0	25	3	10
Shreveport	0	----	1	0	0	0	0	5	----	
Oklahoma:										
Tulsa	3	1	3	0	----	9	0	----	1	3
Texas:										
Dallas	6	2	5	3	3	56	6	8	2	0
Galveston	0	1	0	0	1	15	0	2	0	0
Houston	----	2	3	0	0	34	----	8	0	3
San Antonio	3	1	4	0	0	58	2	13	1	2
MOUNTAIN.										
Montana:										
Billings	1	0	0	0	0	6	0	1	1	0
Great Falls	2	1	0	0	0	29	0	4	1	4
Helena	0	----	0	0	0	0	0	2	----	0
Missoula	0	0	8	0	0	39	0	0	1	0
Idaho:										
Boise	----	0	0	0	0	58	----	0	1	0
Colorado:										
Denver	26	9	10	----	2	93	3	17	9	21
Pueblo	1	1	9	0	0	30	11	8	1	3

City reports for week ended March 29, 1924—Continued.

Division, State, and city.	Chicken pox, cases reported.	Diphtheria. Cases, estimated expectancy.	Diphtheria. Cases reported.	Influenza. Cases reported.	Influenza. Deaths reported.	Measles, cases reported.	Mumps, cases reported.	Pneumonia, deaths reported.	Scarlet fever. Cases, estimated expectancy.	Scarlet fever. Cases reported.
MOUNTAIN—contd.										
New Mexico:										
Albuquerque	6	1	2	0	0	38	0	9	3	0
Utah:										
Salt Lake City		3							3	
Nevada:										
Reno	0	0	0	0	0	9	0	1	1	0
PACIFIC.										
Washington:										
Seattle	5	4	11	0		45	2		9	12
Spokane	39	1	8	0		23	0		4	23
Tacoma	2	1	2	0		26	10		3	3
Oregon:										
Portland		3	10	0	0	2		0	6	4
California:										
Los Angeles		29	80	5	2	337		32	14	62
Sacramento	0	1	6	0	0	7	0	4	2	4
San Francisco	62	21	56	2	1	87	14	2	16	66

Division, State, and city.	Population July 1, 1923, estimated.	Smallpox. Cases, estimated expectancy.	Smallpox. Cases reported.	Smallpox. Deaths reported.	Tuberculosis, deaths reported.	Typhoid fever. Cases, estimated expectancy.	Typhoid fever. Cases reported.	Typhoid fever. Deaths reported.	Whooping cough, cases reported.	Deaths, all causes.
NEW ENGLAND.										
Maine:										
Lewiston	33,790	0	0	0	1	0	0	0	5	14
Portland	73,129	0	0	0	0	0	0	0	0	14
New Hampshire:										
Concord	22,408	0	0	0	0	0	0	0	0	5
Manchester	81,383	0	0	0	0	0	0	0	0	17
Vermont:										
Barre	[1] 10,008	0	0	0	2	0	0	0	0	3
Burlington	23,613	0	0	0	0	0	0	0		10
Massachusetts:										
Boston	770,400	0	0	0	21	2	1	1	16	231
Fall River	120,912	0	0	0	0	1	0	0	17	27
Springfield	144,227	0	0	0	4	0	0	0	0	44
Worcester	191,927	0				0				
Rhode Island:										
Pawtucket	68,799	0	0	0	0	0	0	0	0	15
Providence	242,378	0	0	0	1	0	0	0	0	70
Connecticut:										
Bridgeport	[1] 143,555	0	0	0	1	0	0	0	5	40
Hartford	[1] 138,036	0	0	0	0	0	0	0		32
New Haven	172,967	0	0	0	1	0	2	0	0	51
MIDDLE ATLANTIC.										
New York:										
Buffalo	536,718	0	0	0	8	1	3	0	25	140
New York	5,927,625	1	0	0	[2] 112	7	14	1	146	1,699
Rochester	317,867	0	0	0	3	0	0	0	14	87
Syracuse	184,511	0	0	0	3	0	0	0	2	53
New Jersey:										
Camden	124,157	0	0	0	1	0	3	0		42
Newark	438,699	0	0	0	15	1	0	0		132
Trenton	127,390	0	0	0	2	0	0	0	1	37
Pennsylvania:										
Philadelphia	1,922,788	0	3	0	47	5	5	0	54	599
Pittsburgh	613,442	0	3	0	12	1	1	0	59	266
Reading	110,917	0	0	0	1	0	0	0	3	45
Scranton	140,636	0	0	0	1	0	0	0	1	

[1] Population Jan. 1, 1920.

[2] Pulmonary only.

City reports for week ended March 29, 1924—Continued.

Division, State, and city.	Population July 1, 1923, estimated.	Smallpox.			Tuberculosis, deaths reported.	Typhoid fever.			Whooping cough, cases reported.	Deaths, all causes.
		Cases, estimated expectancy.	Cases reported.	Deaths reported.		Cases, estimated expectancy.	Cases reported.	Deaths reported.		
EAST NORTH CENTRAL.										
Ohio:										
Cincinnati	406,312	3	2	0	6	1	1	0	20	139
Cleveland	888,519	1	4	0	16	2	0	0	37	227
Columbus	261,082	1	2	0	3	0	0	0	4	89
Toledo	268,338	5	25	0	7	1	1	1	21	80
Indiana:										
Fort Wayne	93,573	2	2	0	0	0	0	0	----	21
Indianapolis	342,718	4	73	0	5	1	0	0	17	112
South Bend	76,709	0	0	0	0	0	0	0	----	13
Terre Haute	68,939	0	0	0	1	0	0	0	1	32
Illinois:										
Chicago	2,886,121	3	15	0	53	4	5	1	34	749
Cicero	55,958	0	----	----	----	0	----	----	----	----
Peoria	79,675	2	0	0	4	0	0	0	3	21
Springfield	61,833	2	1	0	2	0	0	0	4	22
Michigan:										
Detroit	995,668	3	53	0	26	2	1	0	22	281
Flint	117,968	2	4	0	2	0	0	0	10	24
Grand Rapids	145,947	2	1	0	1	0	0	1	1	40
Saginaw	69,754	0	7	0	1	1	0	0	9	21
Wisconsin:										
Madison	42,519	2	0	0	----	0	0	0	5	----
Milwaukee	484,595	4	0	0	3	1	0	0	45	96
Racine	64,393	0	2	0	0	0	0	0	0	16
Superior	[1] 39,671	2	3	0	1	0	0	0	----	6
WEST NORTH CENTRAL.										
Minnesota:										
Duluth	106,289	2	21	1	2	0	2	0	----	28
Minneapolis	409,125	18	0	0	3	1	0	0	----	96
St. Paul	241,891	10	24	0	7	1	0	0	----	64
Iowa:										
Davenport	61,262	4	7	----	----	0	0	----	----	----
Des Moines	140,923	5	6	----	----	0	0	----	0	----
Sioux City	79,662	2	0	----	----	0	0	----	3	----
Waterloo	39,667	0	0	----	----	0	0	----	3	----
Missouri:										
Kansas City	351,819	7	2	0	4	0	0	0	15	104
St. Joseph	78,232	3	0	0	6	0	0	0	0	46
St. Louis	803,853	5	2	0	11	1	3	1	31	256
North Dakota:										
Fargo	24,841	0	0	0	0	0	0	0	0	5
Grand Forks	14,547	1	0	----	----	0	0	----	0	----
South Dakota:										
Aberdeen	15,829	0	0	0	0	0	0	0	1	----
Sioux Falls	29,206	2	0	0	1	0	0	0	6	9
Nebraska:										
Lincoln	58,761	2	1	0	0	0	0	0	----	12
Omaha	204,382	9	5	0	5	0	0	0	0	68
Kansas:										
Topeka	52,555	2	1	0	3	0	0	0	1	18
Wichita	79,261	6	17	0	2	0	0	0	18	35
SOUTH ATLANTIC.										
Delaware:										
Wilmington	117,728	0	0	0	2	1	0	0	----	30
Maryland:										
Baltimore	773,580	0	4	0	27	4	2	0	17	274
Cumberland	32,361	0	0	0	0	0	0	0	----	12
Frederick	11,301	0	0	0	0	0	0	0	----	4
District of Columbia:										
Washington	[1] 437,571	1	3	0	13	1	4	0	15	126
Virginia:										
Lynchburg	30,277	1	0	0	1	0	0	0	10	13
Norfolk	159,089	0	0	0	6	0	0	0	12	----
Richmond	181,044	0	0	0	3	0	0	0	9	59
Roanoke	55,502	1	0	0	2	0	0	0	1	20
West Virginia:										
Charleston	45,597	1	0	0	4	0	0	0	1	18
Huntington	57,918	0	1	0	3	0	0	0	0	17
Wheeling	[1] 56,208	0	0	0	0	1	3	0	----	19

[1] Population Jan. 1, 1920.

City reports for week ended March 29, 1924—Continued.

Division, State, and city.	Population July 1, 1923, estimated.	Smallpox.			Tuberculosis, deaths reported.	Typhoid fever.			Whooping cough, cases reported.	Deaths, all causes.
		Cases, estimated expectancy.	Cases reported.	Deaths reported.		Cases, estimated expectancy.	Cases reported.	Deaths reported.		
SOUTH ATLANTIC—continued.										
North Carolina:										
Raleigh	29,171	0	19	0	1	0	0	0	7	10
Wilmington	35,719	0	0	0	0	0	0	0	0	10
Winston-Salem	56,230	4	8	0	4	0	0	0	7	25
South Carolina:										
Charleston	71,245	0	2	0	1	0	0	0	0	26
Columbia	39,688	0	1	0	2	0	0	0	0	11
Greenville	25,789	2	2	0	1	0	0	0	6	11
Georgia:										
Atlanta	222,963	3	130	1	4	1	0	1	2	89
Brunswick	15,937	0	0	0	0	0	1	0	0	4
Savannah	89,448	0	0	0	2	0	0	0	----	41
Florida:										
St. Petersburg	24,403	----	2	0	1	----	1	0	0	14
Tampa	56,050	0	0	0	2	2	0	0	0	21
EAST SOUTH CENTRAL.										
Kentucky:										
Covington	57,877	0	0	0	4	1	1	0	1	17
Louisville	257,671	2	0	0	2	1	3	0	6	80
Tennessee:										
Memphis	170,067	3	0	0	9	0	1	0	8	70
Nashville	121,128	1	3	0	3	1	0	0	2	43
Alabama:										
Birmingham	195,901	2	35	0	1	1	5	1	4	63
Mobile	63,858	1	0	0	1	0	0	0	0	23
Montgomery	45,383	1	0	0	0	0	0	0	----	22
WEST SOUTH CENTRAL.										
Arkansas:										
Fort Smith	30,635	0	0	----	----	0	0	----	6	----
Little Rock	70,916	1	1	----	----	0	1	----	4	----
Louisiana:										
New Orleans	404,575	7	0	0	15	2	3	1	1	191
Shreveport	54,590	----	4	0	3	----	2	0	0	33
Oklahoma:										
Tulsa	102,018	3	0	----	----	0	1	----	1	----
Texas:										
Dallas	177,274	9	0	0	7	0	0	1	5	55
Galveston	46,877	1	0	0	2	1	1	0	0	16
Houston	154,970	0	1	0	2	0	0	0	----	46
San Antonio	184,727	0	1	0	8	0	1	0	2	58
MOUNTAIN.										
Montana:										
Billings	16,927	1	0	0	0	0	0	0	4	4
Great Falls	27,787	2	0	0	1	0	0	0	9	13
Helena	[1] 12,037	----	0	0	0	----	0	0	0	12
Missoula	[1] 12,668	1	3	0	0	0	0	0	0	11
Idaho:										
Boise	22,806	0	4	0	0	0	0	0	----	2
Colorado:										
Denver	272,031	14	0	0	14	0	0	0	14	88
Pueblo	43,519	0	0	0	2	0	0	0	1	15
New Mexico:										
Albuquerque	16,648	0	0	0	3	0	0	0	3	26
Utah:										
Salt Lake City	126,241	7	----	----	----	1	----	----	----	----
Nevada:										
Reno	12,429	1	0	0	0	0	0	0	0	3
PACIFIC.										
Washington:										
Seattle	[1] 315,685	6	0	----	----	0	0	----	2	----
Spokane	104,573	16	30	----	----	0	0	----	5	----
Tacoma	101,731	1	6	----	----	0	1	----	0	----
Oregon:										
Portland	273,621	5	12	0	0	0	2	0	----	72
California:										
Los Angeles	666,853	2	102	0	33	1	1	0	----	232
Sacramento	69,950	0	6	0	2	0	0	0	0	18
San Francisco	539,038	3	1	0	9	2	2	0	3	128

[1] Population Jan. 1, 1920.

City reports for week ended March 29, 1924—Continued.

Division, State, and city.	Cerebro-spinal meningitis.		Lethargic encephalitis.		Pellagra.		Poliomyelitis (infantile paralysis).			Typhus fever.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases, est. expectancy.	Cases.	Deaths.	Cases.	Deaths.
NEW ENGLAND.											
Massachusetts:											
Boston	0	0	1	0	0	0	1	0	0	0	0
MIDDLE ATLANTIC.											
New York:											
New York	5	5	8	3	0	0	1	0	0	0	0
Pennsylvania:											
Philadelphia	1	1	0	0	0	0	0	0	0	0	0
Pittsburgh	1	1	0	0	0	0	0	0	0	0	0
EAST NORTH CENTRAL.											
Ohio:											
Cleveland	0	0	1	1	0	0	0	0	0	0	0
Columbus	0	0	1	1	0	0	0	0	0	0	0
Illinois:											
Chicago	1	1	1	0	0	0	1	0	0	0	0
Michigan:											
Detroit	1	0	0	0	0	0	0	0	0	0	0
Wisconsin:											
Milwaukee	2	2	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL.											
Missouri:											
St. Joseph	0	0	0	1	0	0	0	0	0	0	0
St. Louis	0	1	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC.											
Maryland:											
Baltimore	0	0	2	1	0	0	0	0	0	0	0
North Carolina:											
Raleigh	0	0	0	0	0	1	0	0	0	0	0
South Carolina:											
Charleston	0	0	0	0	0	1	0	0	0	0	0
Georgia:											
Atlanta	0	0	0	0	0	2	0	0	0	0	0
EAST SOUTH CENTRAL.											
Alabama:											
Mobile	0	0	0	0	0	1	0	0	0	0	0
Montgomery	0	0	0	0	0	1	0	0	0	0	0
WEST SOUTH CENTRAL.											
Arkansas:											
Little Rock	0	0	1	0	0	0	0	0	0	0	0
Louisiana:											
New Orleans	0	0	1	1	1	1	0	0	0	0	0
Texas:											
Dallas	0	0	0	0	0	0	0	0	0	1	0
Houston	0	------	0	0	0	1	0	0	0	0	0
MOUNTAIN.											
New Mexico:											
Albuquerque	0	0	2	1	0	0	0	0	0	0	0
PACIFIC.											
Oregon:											
Portland	0	0	0	1	0	0	0	0	0	0	0
California:											
Los Angeles	0	0	0	0	0	0	0	1	0	0	0
San Francisco	0	0	1	0	0	0	0	0	0	0	0

The following table gives a summary of the reports from 105 cities for the nine-week period ended March 29, 1924. The cities included in this table are those whose reports have been published for all nine weeks in the Public Health Reports. Eight of these cities did not report deaths. The aggregate population of the cities reporting cases was estimated at nearly 29,000,000 on July 1, 1923, which is the latest date for which estimates are available. The cities reporting deaths had more than 28,000,000 population on that date. The number of cities included in each group and the aggregate population are shown in a separate table below.

Summary of weekly reports from cities, Jan. 27 to Mar. 29, 1924.

DIPHTHERIA CASES.

	1924, week ended—								
	Feb. 2.	Feb. 9.	Feb. 16.	Feb. 23.	Mar. 1.	Mar. 8.	Mar. 15.	Mar. 22.	Mar. 29.
Total	1,288	1,305	1,226	1,075	1,103	1,024	1,052	1,115	1,042
New England	161	136	115	109	125	86	110	135	[1] 109
Middle Atlantic	410	490	434	394	388	351	401	415	391
East North Central	291	284	247	225	230	218	234	229	[2] 201
West North Central	125	97	128	102	[3] 86	[3] 110	[2] 76	[4] 88	66
South Atlantic	59	50	57	31	54	43	37	61	42
East South Central	19	13	17	13	11	9	12	17	10
West South Central	38	33	37	34	34	34	18	21	32
Mountain	21	21	23	27	19	24	24	25	[5] 28
Pacific	164	181	168	140	156	149	[6] 140	124	163

MEASLES CASES.

Total	5,908	5,794	6,577	6,002	7,258	7,101	7,155	7,024	6,597
New England	227	265	334	294	469	353	460	430	[1] 448
Middle Atlantic	899	1,004	1,183	1,388	1,838	1,971	2,258	2,467	2,354
East North Central	330	292	378	322	476	541	604	659	[2] 674
West North Central	522	643	814	835	[3] 1,056	[3] 1,045	[3] 1,112	[4] 923	766
South Atlantic	556	508	655	578	683	801	579	675	621
East South Central	118	98	118	163	263	155	196	231	173
West South Central	564	511	710	738	781	693	410	514	590
Mountain	1,005	975	1,216	871	879	819	739	634	[5] 446
Pacific	1,687	1,498	1,169	813	813	723	[6] 797	491	525

SCARLET FEVER CASES.

Total	1,858	1,934	1,798	1,677	1,873	1,928	1,921	1,927	1,963
New England	368	307	276	301	330	388	413	337	[1] 357
Middle Atlantic	492	572	525	450	519	532	520	532	532
East North Central	405	426	383	317	380	347	349	376	[2] 372
West North Central	227	248	258	272	[3] 250	[3] 246	[3] 249	[4] 269	254
South Atlantic	145	183	157	142	188	209	175	221	202
East South Central	12	18	14	12	12	28	22	17	30
West South Central	19	19	12	8	9	11	19	13	17
Mountain	24	27	41	24	30	25	27	22	[5] 29
Pacific	166	134	132	151	155	142	[6] 147	140	170

[1] Figures for Worcester, Mass., estimated.
[2] Figures for Cicero, Ill., estimated.
[3] Figures for Kansas City, Mo., estimated. Report not received at time of going to press.
[4] Figures for Sioux City, Iowa, estimated.
[5] Figures for Salt Lake City, Utah, estimated.
[6] Figures for Seattle, Spokane, and Tacoma, Wash., estimated.

Summary of weekly reports from cities, Jan. 27 to March 29, 1924—Continued.

SMALLPOX CASES.

	1924, week ended—								
	Feb. 2.	Feb. 9.	Feb. 16.	Feb. 23.	Mar. 1.	Mar. 8.	Mar. 15.	Mar. 22.	Mar. 29.
Total	368	427	473	486	521	488	521	565	602
New England	0	0	0	0	0	0	0	0	[1] 0
Middle Atlantic	3	0	0	0	0	1	2	0	6
East North Central	74	87	143	101	145	160	125	186	[2] 162
West North Central	36	59	49	65	[3] 51	[3] 56	[3] 76	[4] 77	72
South Atlantic	58	118	117	117	121	117	144	123	171
East South Central	5	8	5	9	35	35	25	25	38
West South Central	12	6	12	14	4	2	5	6	7
Mountain	2	4	3	2	11	11	3	4	[5] 7
Pacific	178	145	144	178	154	106	[6] 141	144	139

TYPHOID FEVER CASES.

Total	78	76	74	52	49	46	57	60	74
New England	5	0	3	5	8	7	3	2	[1] 3
Middle Atlantic	26	24	23	8	11	16	20	19	26
East North Central	14	8	18	8	9	8	11	8	[2] 7
West North Central	5	7	2	0	[3] 1	[3] 3	[3] 1	[4] 5	5
South Atlantic	18	15	7	11	7	3	8	1	11
East South Central	1	2	2	4	4	1	7	13	10
West South Central	1	10	3	6	3	2	3	2	8
Mountain	1	1	4	2	1	2	0	1	[5] 0
Pacific	7	9	12	8	5	4	[6] 4	9	4

INFLUENZA DEATHS.

Total	82	100	92	99	96	119	107	85	97
New England	3	3	5	4	3	5	10	5	[1] 3
Middle Atlantic	29	33	30	36	33	45	37	28	45
East North Central	18	19	13	18	14	19	23	13	[2] 11
West North Central	5	6	6	4	[3] 2	[3] 2	[3] 3	[4] 3	4
South Atlantic	5	14	17	10	13	15	7	15	10
East South Central	7	13	6	12	10	15	16	9	8
West South Central	10	7	11	8	15	12	8	8	10
Mountain	0	2	0	2	2	4	1	2	[5] 3
Pacific	5	3	4	5	4	2	[6] 2	2	3

PNEUMONIA DEATHS.

Total	1,120	1,064	1,125	1,191	1,165	1,217	1,194	1,171	1,203
New England	73	73	79	87	84	73	85	67	[1] 59
Middle Atlantic	463	421	407	461	469	516	466	495	525
East North Central	222	216	255	226	235	221	240	226	[2] 254
West North Central	64	46	52	50	[3] 49	[3] 59	[3] 66	[4] 52	72
South Atlantic	123	134	146	171	166	177	161	152	111
East South Central	62	63	65	65	55	61	55	69	47
West South Central	64	53	59	71	55	62	61	56	61
Mountain	21	24	30	27	19	14	31	20	[5] 36
Pacific	28	34	32	33	33	34	[6] 29	34	38

[1] Figures for Worcester, Mass., estimated.
[2] Figures for Cicero, Ill., estimated.
[3] Figures for Kansas City, Mo., estimated. Report not received at time of going to press.
[4] Figures for Sioux City, Iowa, estimated.
[5] Figures for Salt Lake City, Utah, estimated.
[6] Figures for Seattle, Spokane, and Tacoma, Wash., estimated.

Number of cities included in summary of weekly reports and aggregate population of cities in each group, estimated as of July 1, 1923.

Group of cities.	Number of cities reporting cases.	Number of cities reporting deaths.	Aggregate population of cities reporting cases.	Aggregate population of cities reporting deaths.
Total	105	97	28,898,350	28,140,934
New England	12	12	2,098,746	2,098,746
Middle Atlantic	10	10	10,304,114	10,304,114
East North Central	17	17	7,032,535	7,032,535
West North Central	14	11	2,515,330	2,381,454
South Atlantic	22	22	2,566,901	2,566,901
East South Central	7	7	911,885	911,885
West South Central	8	6	1,124,564	1,023,013
Mountain	9	9	546,445	546,445
Pacific	6	3	1,797,830	1,275,841

FOREIGN AND INSULAR.

FOOT-AND-MOUTH DISEASE ON VESSEL.

Steamship "Kildonan Castle"—At Cape Town, South Africa, from Southampton, England.

Under date of February 29, 1924, information was received of the occurrence of a case of foot-and-mouth disease in a passenger on the mail steamship *Kildonan Castle* which arrived at Cape Town, South Africa, February 11, 1924, from Southampton, England. The patient was stated to be a veterinary surgeon recently employed on duty connected with that disease in England. The case was diagnosed ten days before the arrival of the vessel at Cape Town and was isolated in the ship's hospital. Precautions were taken on landing to prevent the spread of the infection.

BOLIVIA.

Communicable Diseases—La Paz—February, 1924.

Communicable diseases have been reported at La Paz, Bolivia, as follows:

February, 1924.

Disease.	Cases.	Deaths.	Disease.	Cases.	Deaths.
Cerebrospinal meningitis		4	Smallpox	5	6
Measles		1	Tuberculosis	16	4
Plague		6	Typhoid fever	2	
Scarlet fever		5	Typhus fever	12	

Dysentery—Influenza.

During the same period, seven cases of dysentery with five deaths and 24 cases of influenza were reported at La Paz.

CANADA.

Communicable Diseases—Ontario—March 1924 (Comparative).

Communicable diseases were reported in the Province of Ontario, Canada, during the month of March, 1924, as follows:

Disease.	March, 1924.		March, 1923.	
	Cases.	Deaths.	Cases.	Deaths.
Cerebrospinal meningitis	9	7	12	10
Chancroid	1			
Chicken pox	304		(1)	
Diphtheria	250	25	224	29
Gonorrhea	199		178	
Influenza	44	21		317
Lethargic encephalitis	5	4		
Measles	2,811	8	1,127	9
Mumps	1,578	2	(1)	
Pneumonia		251		540
Scarlet fever	1,134	28	343	17
Smallpox	166	28	26	
Syphilis	213		161	
Tuberculosis	155	100	187	128
Typhoid fever	25	2	557	22
Whooping cough	140	10	442	24

Population, estimated, 1919: 2,821,000.
[1] Not reported in 1923.

Goiter.

During the period under report, 13 cases of goiter with three deaths were reported in the Province of Ontario. The disease was not reported in the year 1923.

Smallpox—Locality of Greatest Occurrence—Morbidity.

The localities in which the greatest number of cases of smallpox were notified during March, 1924, were reported as follows: Amherstburg, 16 cases; Cochrane, 15 cases; Perth, 14 cases; Chapleau, 13 cases; Essex Border, 12, and Toronto 11 cases. The greatest numbers of deaths according to locality were as follows: Amherstburg, 8 deaths; Essex Border, 6 deaths; Cochrane, 5 deaths.

CHINA.

Campaign Against Smallpox—Amoy—Kulangsu.

Under date of March 5, 1924, a vigorous campaign against smallpox was stated to be in progress at Amoy and Kulangsu, China. At Kulangsu 75 per cent of the population (20,000) were stated to have been vaccinated.

CUBA.

Communicable Diseases—Habana.

Communicable diseases have been notified at Habana as follows:

Disease.	Mar. 21–31, 1924.		Remaining under treatment Mar. 31, 1924.
	New cases.	Deaths.	
Cerebrospinal meningitis	1		[1] 1
Chicken pox	25	1	21
Diphtheria	9		6
Leprosy			14
Malaria	23		[2] 25
Measles	8		7
Paratyphoid fever	1		1
Scarlet fever			1
Typhoid fever	9		[3] 23

[1] From the interior, 1. [2] From the interior, 17. [3] From the interior, 8.

Malaria—Santiago.

During the month of March, 1924, 29 cases of malaria with two deaths were reported at Santiago, Cuba. (Population, estimated, 70,000.)

ECUADOR.

Plague—Plague-Infected Rats—Guayaquil.

During the period March 1 to 15, 1924, six cases of plague with six deaths were reported at Guayaquil.

During the same period 17,916 rats were taken at Guayaquil, of which 57 were found plague infected.

LATVIA.

Communicable Diseases—January, 1924.

Communicable diseases have been reported for the month of January, 1924, as follows:

Disease.	Cases.	Disease.	Cases.
Chicken pox	5	Smallpox	4
Diphtheria	51	Typhoid fever	77
Measles	157	Typhus fever	35
Mumps	8	Whooping cough	18
Scarlet fever	136		

Anthrax—Dysentery—Influenza.

During the same period one case of anthrax, one case of dysentery, and 17 cases of influenza were reported in Latvia. (Population, officially estimated, 1,900,000.)

MADAGASCAR.

Plague—Tananarive—January 16–31, 1924.

During the period from January 16 to 31, 1924, 171 cases of plague with 154 deaths were reported in the Island of Madagascar, occurring in the city and Province of Tananarive. For distribution of occurrence and types of disease see page 849.

PARAGUAY.

Campaign Against Hookworm—Asuncion.

According to information dated March 8, 1924, a house-to-house campaign had been inaugurated at Asuncion, Paraguay, by the representative of the International Health Board in Paraguay to check the spread of hookworm infection in Asuncion.

PERU.

Plague—February, 1924.

Plague was reported in Peru during the month of February, 1924, at 14 localities, including country districts in the vicinity of the cities of Lima and Paita, with a total of 58 cases with 11 deaths. For distribution of occurrence according to localities see page 849.

POLAND.

Communicable Diseases, December 16, 1923–January 5, 1924.

Communicable diseases have been notified in Poland as follows:

December 16–22, 1923.

Disease.	Cases.	Deaths.	Districts showing the greatest number of deaths.
Cerebrospinal meningitis	8	5	Lublin.
Diphtheria	91	15	Warsaw.
Measles	412	16	Silesia.
Scarlet fever	368	24	Lwow.
Smallpox	11	1	Krakow.
Tuberculosis	84	185	Warsaw.
Typhoid fever	293	41	Lodz.
Typhus fever	126	11	Kielce.
Typhus fever, recurrent	9		
Whooping cough	23	6	Warsaw.

December 23–31, 1923.

Cerebrospinal meningitis	9	4	Bialystok.
Diphtheria	83	10	Kielce.
Measles	271	13	Do.
Scarlet fever	343	47	Lwow.
Smallpox	11	1	Krakow.
Tuberculosis	96	223	Warsaw.
Typhoid fever	246	34	Do.
Typhus fever	156	23	Tarnopol.
Typhus fever, recurrent	9		
Whooping cough	34	2	Lwow.

January 1–5, 1924.

Cerebrospinal meningitis	2	5	Lodz.
Diphtheria	60	4	Warsaw.
Measles	372	10	Lwow.
Scarlet fever	251	28	Do.
Smallpox	15	1	Krakow.
Tuberculosis	57	146	Lwow.
Typhoid fever	202	14	Do.
Typhus fever	129	11	Tarnopol.
Typhus fever, recurrent	6		
Whooping cough	36	6	Warsaw.

Dysentery—Malaria.

During the periods under report dysentery and malaria were reported in Poland as follows:

Disease.	Dec. 16-22, 1923.		Dec. 23-31, 1923.		Jan. 1-5, 1924.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Dysentery	16	1	21	4	11	
Malaria	6		10		6	

TUNIS.

Mediterranean Fever—Tunis.

During the week ended March 17, 1924, two cases of Mediterranean fever were reported at Tunis.

UNION OF SOUTH AFRICA.

Plague—Orange Free State.

During the week ended February 23, 1924, 25 new cases of plague (white, 1 case; native, 24 cases) with 15 deaths (white, 1; native, 14) were reported, occurring on farms, in the Orange Free State, Union of South Africa. Two deaths of cases previously notified were reported. From the beginning of the outbreak, December 16, 1923, to February 23, 1924, 91 cases (white, 19; native, 72) with 53 deaths (white, 8 deaths; native 45) have been reported in the infected area.

No cases of plague have been reported in cities, and the health authorities state that active preventive measures to check the spread of the infection are being carried out in the infected rural area of the State.

Smallpox—Typhus Fever—January, 1924.

During the month of January, 1924, smallpox and typhus fever were reported in the Union of South Africa as follows: *Smallpox*—cases, 2, occurring in the colored population. *Typhus fever*—cases, 196, deaths, 25, occurring among the colored population; in the white population, 3 cases. For distribution of occurrence according to States of the Union, see pages 850, 851.

VENEZUELA.

Smallpox—Margarita Island.

Information received under date of March 21, 1924, shows the presence of 60 cases of smallpox at Punta Piedra, Margarita Island, which is situated 20 miles from the mainland of Venezuela. The occurrence was stated to be in the southwest part of the island.

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

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.

Reports Received During Week Ended April 18, 1924.[1]

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
India				Jan. 27–Feb. 2, 1924: Cases, 1,349; deaths, 846.
Calcutta	Feb. 24–Mar. 1	33	26	
Madras	Mar. 2–8	1		
Siam:				
Bangkok	Feb. 17–23	1		

PLAGUE.

Bolivia:				
La Paz	Feb. 1–29		6	
Brazil:				
Bahia	Feb. 3–16	2	1	
British East Africa:				
Tanganyika Territory	Jan. 27–Feb. 2	3	2	
Ecuador:				
Guayaquil	Mar. 1–15	6	6	Rats taken, 17,916; found infected, 57.
India				Jan. 27–Feb. 2, 1924: Cases, 5,935; deaths, 4,630.
Bombay	Feb. 17–Mar. 1	32	27	
Karachi	Mar. 2–8	7	7	
Madras Presidency	do	31	24	
Iraq:				
Bagdad	Feb. 6–13	4	2	
Java:				
East Java—				
Soerabaya	Jan 13–Feb. 2	13	13	
Madagascar:				
Tananarive Province				Jan. 29–Feb. 4, 1924: Cases, 171; deaths, 154. Bubonic, pneumonic, septicemic.
Tananarive	Jan. 29–Feb. 4	18	18	
Peru				Feb. 1–29, 1924: Cases 58; deaths, 11.
Locality—				
Callao	Feb. 1–29	2	1	
Cañete	do	2		San Vicente.
Guadalupe	do	1		
Huaral	do	8	1	
Huarmey	do	14	3	
Huaxho	do	3	1	
Lima (city)	do	4	1	
Lima (country)	do	3		
Mollendo	do	2	1	
Paita (city)	do	1	1	
Paita (country)	do	8	1	
Reque	do	4		
Sullana	do	2		
Trujillo	do	4	1	Country.
Portuguese West Africa:				
Angola—				
Loanda	Dec. 2–29		6	
Do	Dec. 30–Feb. 2		4	
Union of South Africa:				
Orange Free State				Feb. 17–23, 1924: Cases, 25; deaths, 15 (white 1 case, 1 death). Total, Dec. 16, 1923–Feb. 23, 1924: Cases, 91; deaths, 53 (white, 19 cases, 8 deaths).

SMALLPOX.

Bolivia:				
La Paz	Feb. 1–29	5	6	
British East Africa:				
Tanganyika Territory	Jan. 6–12	2		
Canada:				
Alberta—				
Calgary	Mar. 23–29	1		

[1] From medical officers of the Public Health Service, American consuls and other sources.

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

Reports Received During Week Ended April 18, 1924—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Canada—Continued.				
Ontario				Mar. 1–31, 1924: Cases, 166; deaths, 28.
Amherstburg	Mar. 1–31	16	8	
Chapleau	do	13	1	
Cochrane	do	15	5	
Essex Border	do	12	6	
London	do	3		
Perth	do	14		
Toronto	do	11	1	
Chile:				
Valparaiso	Jan. 27–Mar. 15		6	
China:				
Amoy	Mar. 5			Present.
Chungking	Feb. 17–Mar. 1			Do.
Hongkong	Feb. 22–28	2		
Kulangsu	Mar. 5			Do.
Manchuria—				
Harbin	Feb. 26–Mar. 3	1		Do.
Nanking	Mar. 2–16			Do.
Egypt:				
Alexandria	Feb. 27–Mar. 18	2	7	
Greece:				
Saloniki	Feb. 4–24	2	2	
India				Jan. 27–Feb. 2, 1924: Cases, 2,132: deaths, 453.
Bombay	Feb. 17–Mar. 1	144	61	
Calcutta	Feb. 23–Mar. 1	2	2	
Karachi	Mar. 2–8	5	1	
Madras	do	42	3	
Japan:				
Kobe	Mar. 8–14	1		
Tokyo				To Mar. 7, 1924: Cases, 127.
Java:				
West Java—				
Batavia	Feb. 2–8	6		Province.
Latvia				Jan. 1–31, 1924: Cases, 4.
Mexico:				
Mexico City	Mar 2–8	7		Including municipalities in Federal District.
Tampico	Mar. 11–20	4		
Poland				Dec. 16–31, 1923: Cases, 22; deaths, 2. Jan. 1–5, 1924: Cases, 15; deaths, 1.
Portugal:				
Lisbon	Mar. 3–9	11	5	
Portuguese West Africa:				
Angola—				
Loanda	Dec. 2–29		5	
Spain:				
Barcelona	Mar. 6–12		1	
Valencia	Mar. 9–22	88	6	
Switzerland:				
Berne	Mar. 2–8	2		
Zurich	Mar. 2–8	1		
Syria:				
Beirut	Feb. 11–20	1		
Damascus	Feb. 26–Mar. 3	12		
Tunis:				
Tunis	Mar. 18–24	1		
Union of South Africa				Jan. 1–31, 1924. Cases, 2 (colored)
Cape Province	Feb. 17–23			Outbreaks.
Orange Free State	do			Outbreaks.
Transvaal—				
Johannesburg	do	1		Imported.
Venezuela:				
Margarita Island—				
Punta Piedra	Mar. 21	60		20 miles from mainland.

TYPHUS FEVER.

Bolivia:				
La Paz	Feb. 1–29	12		
Brazil:				
Porto Alegre	Feb. 24–Mar. 1		1	
Chile:				
Concepcion	Feb. 19–25		1	
Valparaiso	Feb. 3–Mar. 15		24	
Egypt:				
Alexandria	Mar. 12–18	2		

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

Reports Received During Week Ended April 18, 1924—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Finland				Feb. 15–29, 1924: Paratyphus, 7 cases.
Latvia				Jan. 1–31, 1924: Cases, 35.
Mexico:				
Guadalajara	Mar. 23–29	2	1	Feb. 1–29, 1924: Cases, 2; deaths, 1.
Mexico City	Mar. 2–8	10		Including municipalities in Federal district.
Poland				Dec. 16–31, 1924: Cases, 282; deaths, 34. Recurrent, cases, 18.
Do				Jan. 1–5, 1924: Cases, 129; deaths, 11. Recurrent, 6 cases.
Turkey:				
Constantinople	Feb. 17–23	2		
Union of South Africa				Jan. 1–31, 1924: Cases, 196, deaths, 25 (colored). Among white population 3 cases. Total, cases 199; deaths, 25.
Cape Province				Jan. 1–31, 1924: Cases, 93; deaths, 11.
Do	Feb. 17–23			Outbreaks.
Natal				Jan. 1–31, 1924: Cases, 81; deaths, 11.
Orange Free State				Jan. 1–31, 1924: Cases, 17; deaths, 3.
Transvaal				Jan. 1–31, 1924: Cases, 5.

Reports Received from December 29, 1923, to April 11, 1924.[1]

CHOLERA.

Place.	Date.	Cases.	Deaths.	Remarks.
China:				
Hongkong	Nov. 18–24	1		
India				Oct. 14–Dec. 22, 1923: Cases, 14,117; deaths, 9,148.
Do				Dec. 30, 1923–Jan. 26, 1924: Cases, 5,789; deaths, 3,848.
Bombay	Dec. 23–29	1	1	
Do	Feb. 3–16	17	17	
Calcutta	Nov. 11–Dec. 29	85	69	
Do	Dec. 30–Feb. 23	177	149	
Madras	Nov. 25–Dec. 29	15	5	
Do	Dec. 30–Feb. 16	22	10	
Rangoon	Nov. 11–Dec. 29	8	5	
Do	Feb. 3–16	3	3	
Indo-China:				
Saigon	Dec. 31–Jan. 5	1	1	Including 100 square kilometers in surrounding country.
Philippine Islands:				
Manila	Feb. 3–9	1	1	
Siam:				
Bangkok	Nov. 18–Dec. 8	4	2	
Do	Dec. 31–Jan. 19	6	4	
Turkey:				
Constantinople	Dec. 2–8		1	

PLAGUE.

Azores:				
St. Michael Island	Oct. 20–Nov. 10	9	5	At localities 3 to 9 miles from port of Ponta Delgada.
Bolivia:				
La Paz	Oct. 1–31		3	
Brazil:				
Bahia	Nov. 11–Dec. 22	5	3	
Do	Dec. 30–Jan. 19	4	5	
Porto Alegre	Feb. 10–16		1	
Rio de Janeiro	Jan. 20–26	1		

[1]From medical officers of the Public Health Service, American consuls, and other sources.

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

Reports Received from December 29, 1923, to April 11, 1924—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
British East Africa:				
Kenya—				
Mombasa	Oct. 14-20	1	1	Infected rats, 2. Dec. 9-15, 1923: Cases, 4; deaths, 2; removed from vessel arrived Dec. 11, 1923.
Do	Dec. 30-Jan. 5	1	1	
Nairobi	Nov. 1-21	40		In rural districts, several hundred.
Tanganyika				To Nov. 24, 1923: Cases, 39; deaths, 25.
Uganda	Aug. 1-Oct. 31	734	719	
Entebbe	Oct. 1-Nov. 30	191	183	
Canary Islands:				
Las Palmas	Oct. 15-Nov. 15	14	14	
Santa Cruz de Teneriffe	Feb. 19-Mar. 15	3		
San Juan de la Rambla	Dec. 11	1		Locality 52 km. from Teneriffe.
Celebes Island	Nov. 30			Epidemic.
Ceylon:				
Colombo	Nov. 11-Dec. 29	31	21	Plague rodents, 24.
Do	Dec. 30-Feb. 23	68	64	Plague rodents, 29.
China:				
Nanking	Dec. 16-29			Present.
Do	Dec. 30-Feb. 9			Do.
Ecuador:				
Guayaquil	Nov. 16-Dec. 31	45	13	Rats taken, 53,240; found infected, 133.
Do	Jan. 1-31	50	16	Rats taken, 36,650; found infected, 247.
Do	Feb. 1-15	21	7	Rats taken, 20,479; found infected, 90.
Do	Feb. 16-29	19	2	Rats taken, 18,409; found infected, 59.
Jipijapa	Nov. 16-Dec. 15			Present
Quevedo	Jan. 1-31	3	2	
Quito	Nov. 1-30	11	1	
Santa Rosa	Feb. 16-29			Do.
Vino del Milagro	Dec. 1-15	1		
Egypt				Jan. 1-Dec. 31, 1923: Cases, 1,519; deaths, 725. Jan. 1-Feb. 28, 1924; Cases, 39; deaths, 24.
City—				
Alexandria	Year 1923	65	33	
Cairo	do	2	2	
Port Said	do	51	29	
Suez	do	46	24	
Do	Jan. 2-Feb 16	6	3	
Province—				
Assiout	Year 1923	570	211	
Beni-Souef	do	63	23	
Charkieh	Jan. 31	1	1	
Dakhalieh	Year 1923	2	2	
Fayoum	do	34	9	
Do	Feb. 18	1	1	
Gharbieh	Year 1923	23	9	
Girgeh	do	337	193	
Do	Jan. 17-Feb. 11	3	2	
Gizah	Year 1923	3	4	
Kalioubiah	do	76	10	
Do	Jan. 6	1		
Kena	Year 1923	50	34	
Menoufieh	do	290	98	
Do	Jan. 2-Feb. 23	26	16	
Minia	Year 1923	106	44	
Do	Feb 5	1	1	
Hawaii:				
Honokaa				Jan. 8-Mar. 14, 1924: Four plague-infected rodents.
Paauhau				Dec. 14, 1923: One plague rat. Feb. 14, 1924: One plague rat.
India				Oct. 14-Dec. 29, 1923: Cases, 34,542; deaths, 23,778.
Do				Dec. 30, 1923-Jan. 26, 1924: Cases, 16,808; deaths, 12,315.
Bombay	Oct. 28-Dec. 22	5	5	
Do	Dec. 30-Feb. 2	6	5	
Calcutta	Dec. 23-29	1	1	
Do	Jan. 6-Feb. 23	2	2	
Karachi	Nov. 11-Dec. 29	42	33	
Do	Dec. 30-Mar. 1	9	3	

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

Reports Received from December 29, 1923, to April 11, 1924—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
India—Continued.				
Madras Presidency	Nov. 4-Dec. 29	1,657	1,021	
Do	Jan. 27-Mar. 1	551	343	
Rangoon	Jan. 27-Feb. 16	20	15	
Do	Dec. 30-Feb. 16	50	48	
Indo-China:				
Saigon	Oct. 28-Dec. 8	19	6	Including 100 square kilometers in surrounding country.
Do	Jan. 27-Feb. 2	1		Do.
Iraq:				
Bagdad	Nov. 11-Dec. 29	8	6	
Do	Jan. 6-Feb. 16	12	4	
Java				Oct. 1-Dec. 31, 1923: Deaths, 2,908.
Province—				
Djokjakarta	Oct. 1-Dec. 31		146	
Kedoe	do		1,287	
Pekalongan	do		150	
Samarang	do		430	
Soerabaya	do		9	
Do	Dec. 26-Jan. 19	23	23	
Soerakarta	do		886	
Madagascar:				
Tananarive Province	Oct. 1-Dec. 31	324	272	Bubonic, pneumonic, septicemic. July 1-Dec. 31, 1923—city and Province: Cases, 429; deaths, 367. Jan. 1-15, 1924—city and Province: Cases, 100; deaths, 88.
Tananarive town	do	74	74	
Do	Feb. 4			Country districts in vicinity stated to be plague infected.
Paraguay:				
Asuncion	Dec. 18	6	4	
Peru				Nov. 1-Dec. 31, 1923: Cases, 38; deaths, 24. Jan. 1-31, 1924: Cases, 37; deaths, 15.
Locality—				
Callao	Jan. 1-31	2		
Cañete	Nov. 1-30	1	1	
Chancay	Dec. 1-31	2		
Chepen	Nov. 1-30	1		
Chiclayo	Nov. 1-Dec. 31	2	1	
Chilca	Jan. 1-31	1		
Huarmey	do	6		
Lima (city)	Nov. 1-Dec. 31	22	15	
Do	Jan. 1-31	25	14	
Lima (country)	Nov. 1-Dec. 31	8	7	
Do	Jan. 1-31	3	1	
Lurin	do	2		
Portugal:				
Lisbon	Dec. 13-21	7		
Do	Dec. 31-Jan. 6		1	
Portuguese West Africa:				
Angola—				
Loanda	Oct.-Nov	50	23	
Russia:				
Bukeeve Province				Oct. 1, 1923-Feb. 4, 1924: Cases, 319; deaths, 294. 66 plague centers.
Ural Provinces				Oct. 1, 1923-Feb. 4, 1924: Cases, 441. 4 plague centers.
Siam:				
Bangkok	Nov. 4-Dec. 8	3	2	
Do	Jan. 13-19	1	1	
Siberia:				
Transbaikalia—				
Chita	Jan. 27	2	2	Pneumonic. Occurring in veterinary laboratory workers.
Spain:				
Malaga	Dec. 1-31	4		
Straits Settlements:				
Singapore	Nov. 11-Dec. 22	4	4	
Do	Dec. 30-Feb. 16	11	8	
Syria:				
Beirut	Nov. 1-Dec. 10	3		
Do	Jan. 1-10	1		
Turkey:				
Constantinople	Dec. 2-22	6	3	

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

Reports Received from December 29, 1923, to April 11, 1924—Continued.

PLAGUE—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Union of South Africa				Sept. 16, 1923–Feb. 16, 1924: Cases, 66; deaths, 36 (European cases, 18; deaths, 5.
Cape Province—				
Uitenhage district	Dec. 9–15			Plague rodent found in vicinity Haarhoff's Kraal farm.
Orange Free State				Jan. 27–Feb. 9, 1924: Cases, 30; deaths, 13. (White cases, 6; colored cases, 24; deaths, 13). Feb. 10: Death of case (white) previously reported. Total, Dec. 16, 1923–Feb. 9, 1924: Cases, 54; deaths, 29. (White cases, 17; deaths, 5. Colored cases, 37; deaths, 24.)
Hoopstad district	Feb. 3–9	1		
Kroonstad district	Dec. 16–27	7	3	Cases, 24; deaths, 15, reported since outbreak.
Do	Jan. 6–Feb. 9	43	20	
Winburg district	Feb. 3–9	1		
Wonderfontein farm	Dec. 2–8	4		Vicinity of Hoopstad. At Hoopstad, Dec. 9–15, 1923, one death of case previously reported.
West Africa				Apr. 2, 1924; Reported present in one locality.
On vessels:				
———	Dec. 11	4	2	At Mombasa, British East Africa.
———	Jan. 24	2		At Varna, Bulgaria, from Syrian port.

SMALLPOX.

Algeria:				
Algiers	Nov. 1–30	1		
Arabia:				
Aden	Dec. 16–22	1		Imported.
Do	Jan. 13–19	1		
Belgium:				
Brussels	do	10		
Bolivia:				
La Paz	Oct. 1–Dec. 31	45	15	
Do	Jan. 1–31	6	2	
Brazil:				
Bahia	Jan. 6–12	2		
Pernambuco	Nov. 4–Dec. 1	15	3	
Do	Jan. 6–Feb. 16		7	
Porto Alegre	Dec. 23–29		1	
Do	Dec. 30–Feb. 16		1	
Rio de Janeiro	Nov. 18–24	3	4	
Do	Jan. 6–26	3	1	
Sao Paulo	Sept. 3–9	1		
British East Africa:				
Tanganyika Territory	Sept. 30–Oct. 27	14	1	
Do	Nov. 25–Dec. 29	8	3	
Uganda	Sept. 1–30	6	1	
Entebbe	Oct. 1–Nov. 30	4	1	
Zanzibar	Sept. 1–Oct. 31	116	18	Sept. 1–30, 1923: In areas 27 miles from town of Zanzibar. Oct. 1–31, 1923: In vicinity, 1 case, 1 death. In Mikotoni district, 30 cases, 14 deaths reported.
Canada:				
Alberta—				
Calgary	Jan. 27–Mar. 22	35		
British Columbia—				
Vancouver	Dec. 22–29	10		
Do	Dec. 30–Feb. 23	54		
Victoria	Feb. 10–Mar. 1	2		
Manitoba—				
Winnipeg	Nov. 25–Dec. 29	21		
Do	Dec. 30–Mar. 29	71		
New Brunswick—				
Fredericton				Feb. 1–29, 1924: Cases, 8.
Gloucester County	Mar. 2–8	1		
Madawaska County	Dec. 8–15	1		
Restigouche County				Jan. 1–Feb. 29, 1924: Cases, 3.
Victoria County	Feb. 10–16	2		
Westmoreland County	do	3		

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

Reports Received from December 29, 1923, to April 11, 1924—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Canada—Continued.				
Ontario				Jan. 1-Feb. 29, 1924: Cases, 176.
Fort William and Port Arthur.	Dec. 16-29	3		Occurring at Fort William.
London	Feb. 3-Mar. 15	3		
North Bay	do	1		
Perth	Mar. 4	3		
Toronto	Jan. 17-Mar. 22	4		
Windsor	Feb. 1-Mar. 15	52	11	
Quebec—				
Montreal	Nov. 30-Feb. 23	7		
Saskatchewan—				
Regina	Dec. 9-15	1		
Do	Dec. 30-Feb. 23	6	1	
Ceylon:				
Colombo	Nov. 11-17	3	1	
Do	Jan. 20-Feb. 23	5	1	
Chile:				
Antofagasta	Jan. 6-19	4	1	
Concepcion	Oct. 1-Dec. 31		14	
Talcahuano	Nov. 26-Dec. 2	3		Dec. 22, 1923: Five cases present.
Valparaiso	Dec. 9-15		1	
Do	Jan. 13-19		2	
China:				
Amoy	Nov. 18-Dec. 8			Present.
Do	Jan. 6-Feb. 16		9	Including Kulangsu, 14 deaths; and in hospital, Feb. 9, 1924, more than 30 cases stated to be present.
Antung	Dec. 31-Feb. 3	2	2	
Canton	Dec. 23-Feb. 23			Present.
Chungking	Nov. 4-Dec. 29			Present and endemic.
Do	Dec. 30-Feb. 16			Present.
Foochow	Nov. 4-Dec. 15			Do.
Do	Dec. 31-Feb. 2			Do.
Hongkong	Oct. 28-Dec. 29	718	630	
Do	Dec. 30-Jan. 19	292	322	
Manchuria—				
Dairen	Dec. 31-Jan. 20	2		
Harbin	Nov. 12-Dec. 22	36		
Do	Jan. 1-Feb. 25	16	5	
Nanking	Dec. 2-15			Do.
Do	Dec. 30-Jan. 26			Do.
Shanghai	Dec. 29			Prevalent.
Do	Jan. 6-Mar. 1	27	65	Cases, foreign; deaths, Chinese and foreign.
Chosen (Korea):				
Chemulpo	Jan. 1-31	1		
Seoul	Nov. 1-30	1		
Colombia:				
Buenaventura	Nov. 18-Dec. 15	8		
Costa Rica:				
Port Limon	Feb. 18-24	1		
Czechoslovakia				Oct. 1-Dec. 31, 1923: Cases, 1; deaths, 1; occurring in Slovakia.
Dominican Republic:				
La Romana	Jan. 27-Mar. 1	9		
Ecuador:				
Esmeraldas	Nov. 16-30	4		
Guayaquil	Dec. 1-31	1		
Do	Jan. 1-Feb. 29	3		
Quito	Nov. 1-30	167	26	
Egypt:				
Cairo	Jan. 1-7	1	1	
Port Said	Nov. 24-Dec. 2	1		
Esthonia				Nov. 1-Dec. 31, 1923: Cases, 38. Jan. 1-31, 1924: Cases, 9.
France:				
Cherbourg	Feb. 9-15	1		British seaman.
Gibraltar	Mar. 3-9	1		
Great Britain:				
Liverpool	Mar. 2-8	1		In family of seaman recently returned from Oporto, Portugal.
Greece:				
Saloniki	Oct. 22-Dec. 30		11	
Do	Dec. 31-Jan. 27	2	1	

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

Reports Received from December 29, 1923, to April 11, 1924—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Guadeloupe (West Indies)				Jan. 2–16, 1924: Present.
Abymes	Feb. 16			Present. Vicinity of Point à Pitre.
Basse Terre	Dec. 18			Present.
Do	Jan. 12–Feb. 16			Do.
Marie Galante Island	Dec. 18			Off shore island; present.
Do	Feb. 16			Present. Estimated 60 cases.
Moule	Jan. 12–Feb. 16			Present.
Point à Pitre	Dec. 18			Present in vicinity.
Haiti:				
Cape Haitien	Feb. 3–9	3		
Hinche	Feb. 10–16	1		
Port au Prince	Feb. 17–Mar. 1	2	1	Developed at Limbe, Haiti.
India				Oct. 14–Dec. 29, 1923: Cases, 9,720; deaths, 2,241.
Do				Dec. 30, 1923–Jan. 26, 1924: Cases, 6,310; deaths, 1,810.
Bombay	Oct. 28–Dec. 29	55	25	
Do	Dec. 30–Feb. 16	210	98	
Calcutta	Dec. 16–29	4	4	
Do	Dec. 30–Feb. 9	5	5	
Karachi	Dec. 30–Mar. 1	24	5	
Madras	Nov. 4–Dec. 29	23	3	
Do	Dec. 30–Mar. 1	96	5	
Rangoon	Nov. 4–Dec. 29	12	4	
Do	Dec. 30–Feb. 16	7	1	
Indo-China:				
City—				
Saigon	Nov. 4–Dec. 29	133	74	Including 100 square kilometers of surrounding country.
Do	Dec. 31–Jan. 16	284	168	
Iraq:				
Bagdad	Oct. 24–Dec. 29	46	28	
Do	Dec. 30–Feb. 16	44	33	
Italy:				
Trieste	Feb. 17–23	4		
Turin	Feb. 18–24	1		
Jamaica				Nov. 25–Dec. 29, 1923: Cases, 115.
Do				Dec. 30, 1923–Feb. 16, 1924: Cases, 153. Reported as alastrim.
Kingston	Nov. 25–Dec. 29	3		
Do	Dec. 30–Feb. 2	6		
Japan:				
Kobe	Feb. 14–Mar. 9	9	2	
Taiwan	Jan. 1–Feb. 29	7		
Tokyo	Jan. 1–Feb. 3	79		
Java:				
East Java—				
Soerabaya	Oct. 23–Dec. 29	348	60	
Do	Dec. 30–Jan. 19	67	13	
West Java—				
Batavia	Oct. 27–Dec. 28	65	13	
Do	Dec. 29–Jan. 18	19	4	
Latvia				Oct. 1–31, 1923: Cases, 3. Nov. 1–30, 1923: Cases, 1. Dec. 1–31, 1923: Cases, 2.
Mexico:				
Guadalajara	Jan. 27–Mar. 15		5	
Manzanillo	Dec. 4–10	5	1	
Mexico City	Nov. 25–Dec. 29	32		Including municipalities in Federal District.
Do	Jan. 30–Mar. 1	75	23	Do.
Monterey				Mar. 24, 1924, 11 cases officially announced.
Salina Cruz	Jan. 1–31	1		
San Luis Potosi	Mar. 16–22		1	
Tampico	Jan. 21–Feb. 29	24		From Irapuato, 9; La Barra, 1.
Vera Cruz	Nov. 3–Dec. 30		4	
Do	Jan. 6–27	1	2	
Netherlands:				
Rotterdam	Jan. 20–26	3		
Palestine:				
Jaffa	Jan. 15–28	3		
Jerusalem	Feb. 18–25	1		
Persia:				
Teheran	Sept. 24–Dec. 23		4	
Poland				Sept. 23–Dec. 15, 1923: Cases, 69; deaths, 18.
Portugal:				
Lisbon	Nov. 11–Dec. 29	19	10	Corrected report.
Do	Dec. 31–Mar. 1	67	19	
Oporto	Nov. 25–Dec. 29	39	23	
Do	Dec. 30–Mar. 15	73	43	

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

Reports Received from December 29, 1923, to April 11, 1924—Continued.

SMALLPOX—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Portuguese East Africa:				
Lourenco Marques	Dec. 30-Jan. 5	2		
Russia:				
Ukraine				August, 1923: Cases, 77. September, 1923: Cases, 66.
Siam:				
Bangkok	Oct. 28-Dec. 8	33	18	Nov. 25-Dec. 1, 1923: Epidemic.
Do	Dec. 30-Feb. 9	4	2	
Siberia:				
Dauria Station	Oct. 21			Present. Locality on Chita Railway, Manchurian frontier.
Sierra Leone:				
Sherbro District—				
Tagbail	Nov. 1-15	3		
Spain:				
Barcelona	Nov. 15-Dec. 26		2	
Do	Jan. 3-9		2	
Valencia	Nov. 25-Dec. 29	152	12	
Do	Dec. 30-Mar. 8	233	25	
Straits Settlements:				
Singapore	Dec. 16-29	2	1	
Do	Dec. 30-Jan. 26	3		
Switzerland:				
Basel	Jan. 27-Feb. 9	4		Corrected.
Berne	Nov. 17-Dec. 22	15		
Do	Jan. 6-Mar. 1	13		
Lucerne	Nov. 1-30	34		
Do	Dec. 1-31	26		
Zurich	Jan. 27-Feb. 2	1		
Syria:				
Aleppo	Nov. 25-Dec. 1	1		In vicinity, at Djisr Choughour.
Beirut	Jan. 21-31	1		
Damascus	Nov. 16-Dec. 15	7		
Do	Jan. 29-Feb. 24	17		
Tunis:				
Tunis	Oct. 27-Nov. 2	5	1	
Do	Jan. 8-Mar. 10	3	4	
Turkey:				
Constantinople	Nov. 11-Dec. 8	3		
Do	Jan. 6-Feb. 16	1	1	
Union of South Africa				Oct. 1-31, 1923: Colored, cases, 41; deaths, 2; white, cases, 3.
Cape Province	Oct. 28-Dec. 8			Outbreaks.
Do	Jan. 20-Feb. 9			Do.
Natal	Oct. 28-Nov. 3			Do.
Northern Rhodesia	Dec. 4-31	40	5	
Do				Jan. 1-31, 1924: Cases, 50; deaths, 11; reported from Balovale, Kalabo, and Mankoya districts.
Orange Free State	Oct. 28-Nov. 24			Outbreaks.
Do	Jan. 20-Feb. 2			Do.
Transvaal	Nov. 18-Dec. 1			Do.
Johannesburg	Nov. 25-Dec. 15	3		
Do	Feb. 3-9	1		Do.
Uruguay:				
Montevideo	Oct. 1-31	1		
Venezuela:				
Caracas	Jan. 22			Epidemic.
On vessels:				
S. S. Torres	Jan. 14	1		At New Orleans quarantine station from Tampico, Mexico, via ports. Case in seaman signed on at Galveston, Tex., on outward voyage.
S. S. Tupper	Jan. 20-26	1		At Gonaives, Haiti.
S. S. Vasari	Dec. 31	1		At Trinidad, West Indies, from Buenos Aires, Argentina. Vessel left Buenos Aires, Dec. 15, 1923, for New York, via Santos, Rio de Janeiro, Trinidad, Barbados.
Sch. Annie M. Parker	Jan. 23	3		At sea. Vessel abandoned and crew removed to vessel bound for Rotterdam. Patients removed at Liverpool. Feb. 28, bound for Newfoundland.

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

Reports Received from December 29, 1923, to April 11, 1924—Continued.

TYPHUS FEVER.

Place.	Date.	Cases.	Deaths.	Remarks.
Algeria:				
Algiers	Nov. 1-Dec. 31	7	3	
Do	Jan. 1-Feb. 10	8	5	
Bolivia:				
La Paz	Oct. 1-Dec. 31	43	5	
Do	Jan. 1-31	4	1	
Bulgaria:				
Sofia				Nov. 18-Dec. 15, 1923: Paratyphus fever, cases, 17. Jan. 6-Feb. 9, 1924: Paratyphus fever, cases, 6.
Canary Islands:				
Teneriffe	Jan. 14-Feb. 17		2	
Chile:				
Antofagasta	Dec. 2-8	4		
Concepcion	Oct. 1-Nov. 30		4	Dec. 11-24, 1923: Deaths, 3.
Do	Jan. 8-28	2	2	In district, at 12 localities, 92 cases.
Iquique	Jan. 20-26		1	
Talcahuano				Dec. 5, 1923: 3 cases under treatment. Jan. 12, 1924: 1 case under treatment.
Do	Dec. 31-Feb. 23	4		
Valparaiso	Nov. 25-Dec. 15		29	Dec. 24, 1923: In hospital, 34 cases.
Do	Dec. 30-Jan. 26		20	Reports from two districts of the Province of Valparaiso.
China:				
Antung	Nov. 12-Dec. 30	5		
Chungking	Nov. 18-24			Present.
Do	Dec. 16-29			Endemic.
Do	Dec. 30-Feb. 16			Do.
Czechoslovakia				Oct.-Dec., 1923: Cases, 21.
Danzig-Polish frontier:				
Mühlbanz	Mar. 6			Present. Origin stated to be focus at Mallinia.
Ecuador:				
Quito	Nov. 1-30	14	1	
Egypt:				
Alexandria	Nov. 19-Dec. 23	3		
Do	Jan. 8-Feb. 25	4		
Cairo	Sept. 10-Dec. 31	39	11	
Esthonia				Nov. 1-30, 1923: Paratyphus fever, cases, 8. Dec. 1-31, 1923: Typhus fever, cases, 15; paratyphus, cases, 4. January, 1924: Paratyphus fever, 6 cases.
Finland				Dec. 1-15, 1923: Paratyphus fever, cases, 15.
Germany:				
Coblenz	Jan. 27-Feb. 2	1		
Greece:				
Athens	Jan. 11-Feb. 20		7	
Saloniki	Nov. 26-Dec. 30	7	3	
Hungary				July 1-Aug. 31, 1923: Cases, 24.
Budapest	Jan. 27-Feb. 23	13	7	
Java:				
East Java—				
Soerabaya	Dec. 9-29	12		
Do	Dec. 30-Jan. 5	2		
Latvia				Oct. 1-31, 1923: Cases, 12; paratyphus fever, 7; recurrent typhus, 3. Nov. 1-30, 1923: Case, 1; paratyphus fever, 2 cases. Dec. 1-31, 1923: Cases, 9; paratyphus, cases, 3.
Mexico:				
Durango	Dec. 1-31		2	
Do	Jan. 1-Feb. 29		3	
Guadalajara	Jan. 27-Feb. 16		2	
Mexico City	Nov. 25-Dec. 29	86		Including municipalities in Federal District.
Do	Dec. 30-Mar. 12	43	8	Do.
San Luis Potosi	Jan. 17-23		1	
Torreon	Feb. 1-29		2	
Netherlands:				
Amsterdam	Mar. 2-8	2		
Norway:				
Stavanger	Dec. 25-31	1		

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

Reports Received from December 29, 1923, to April 11, 1924—Continued.

TYPHUS FEVER—Continued.

Place.	Date.	Cases.	Deaths.	Remarks.
Palestine:				
Jaffa	Jan. 1–Feb. 26	4		
Jerusalem	Feb. 19–28	2		
Persia:				
Teheran	Sept. 24–Oct. 23		1	
Poland				Sept. 23–Dec. 15, 1923: Cases, 665; deaths, 58; recurrent typhus, cases, 49; deaths, 1.
Portugal:				
Oporto	Jan. 27–Feb. 2	2		
Rumania:				
Kishineff District	Nov. 1–Dec. 31	15		
Russia:				
Ukraine				August, 1923: Cases, 454. September, 1923: Cases, 314. Recurrent typhus: August, 1923, cases, 1,366; September, 1923, cases, 941.
Spain:				
Barcelona	Nov. 29–Dec. 12		2	
Do	Jan. 3–Feb. 13		5	
Madrid	Dec. 1–31		7	
Syria:				
Damascus	Jan. 27–Feb. 2	1		
Tunis:				
Tunis	Feb. 5–11	1		
Turkey:				
Constantinople	Nov. 11–Dec. 29	15	1	
Do	Dec. 30–Jan. 26	6		
Union of South Africa				Oct. 1–31, 1923: Colored, 1 cases, 58 deaths; white, 2 cases; total, 289 cases, 58 deaths.
Cape Province				Oct. 1–31, 1923: Colored, cases, 245; deaths, 47.
Do	Oct. 28–Dec. 8			Outbreaks.
Do	Jan. 27–Feb. 9			Do.
Natal				Oct. 1–31, 1923: Colored, cases, 4; deaths, 3.
Do	Oct. 28–Nov. 3			Outbreaks.
Do	Jan. 27–Feb. 2			Do.
Durban	Nov. 24–Dec. 1	73		Cases occurring among native stevedores in the harbor area of the port and confined to one barracks.
Orange Free State				Oct. 1–31, 1923: Colored, cases, 25; deaths, 8.
Do	Dec. 15			Outbreaks.
Do	Feb. 3–9			Do.
Kroonstad District	Jan. 20–26			Outbreaks on two farms.
Transvaal				Oct. 1–31, 1923: Colored, cases, 13.
Do	Oct. 28–Dec. 1			Outbreaks.
Do	Jan. 1–31	4	1	
Johannesburg	Oct. 1–Dec. 31	3	4	
Do	Jan. 6–Feb. 16	7		
Potschefstrom District	Jan. 20–26			Outbreaks on seven farms.
Venezuela:				
Maracaibo	Dec. 16–22		1	
Do	Feb. 17–Mar. 1		2	
Yugoslavia:				
Croatia—				
Zagreb	Dec. 2–15	3		
Do	Feb. 17–23	1		
Serbia—				
Belgrade	Nov. 25–Dec. 1	1		

YELLOW FEVER.

Brazil:				
Pernambuco City	Nov. 16	3	2	