Public Health Reports

Vol. 54 • July 28, 1939 • No. 30

PREVALENCE OF POLIOMYELITIS

For the week ended July 22, a total of 137 cases of poliomyelitis was reported in the United States, as compared with 143 cases for the preceding week, and with 227 cases for the 5-year median.

The largest decreases in incidence were shown for South Carolina, where the number of cases dropped from 20 to 12, and for Texas, where it decreased from 15 to 7 as compared with the preceding week. The largest increases were shown for Michigan (from 5 to 17 cases), Pennsylvania (from 0 to 5), and California (from 45 to 51). Of the cases occurring in California, Los Angeles reported only 6 and San Diego 2.

The decrease for the current week in the number of cases for the country as a whole cannot be interpreted to mean that the seasonal peak for poliomyelitis has been reached, as that peak usually comes later. The general situation remains favorable, however, as the current incidence is well below the 5-year median.

ANOPHELINE BREEDING: SUGGESTED CLASSIFICATION OF PONDS BASED ON CHARACTERISTIC DESMIDS[1]

By W. C. FROHNE, *Associate Limnologist, United States Public Health Service*

INTRODUCTION

Such classifications as may now exist of small bodies of standing fresh water are of limited utility to the practical malariologist seeking to correlate habitat and anopheline production. The vague biological concepts conveyed by the terms "borrow pit," "fish pond," and "reservoir"—terms of predilection of the sanitary engineer—are scarcely less elastic and indiscriminate than those of the naturalist, such as "swamp," "marsh," and "bog." As a result, those otherwise invaluable larval collection data, gathered over more than a quarter of a century of antimalaria activity, cannot be used to define accurately the ecological requisites of any of the American species of *Anopheles*. This paper proposes a preliminary natural classification based on a

[1] From the Henry R. Carter Memorial Laboratory, Malaria Research, Division of Infectious Diseases, National Institute of Health, Savannah, Georgia.

year's study of pond microbiotas with particular reference to the desmids. The areas investigated are in South Carolina and Georgia within approximately 100 miles of Savannah, Ga.

The term "pond" as used in this paper applies to relatively shallow bodies of quiet water, naturally or artificially impounded, and occupied more or less by the larger plants. Adherence to this usage eliminates misunderstanding and focuses attention on real biological differences, rather than on distinctions of name. In Europe, detailed studies (e. g., Nordquist, cited by Thienemann, 1925) of biological and physical-chemical differences have provided information allowing application of the trophic classification of lakes, so that certain Old World ponds may be classed as eutrophic, oligotrophic, or dystrophic. Further subdivision, especially of the dystrophic (bog) type, has received wide recognition. It is hoped that the following data on the desmids may provide a beginning for a natural classification of the standing fresh waters of the southeastern United States.

Desmids are one-celled or colonial grass-green algae composing two (or three) families of the order Zygnematales. They appear especially suitable as possible indicator organisms of habitat types of this study for the following reasons: (1) Shallow, weedy ponds are a preferred habitat; (2) the greater number of species occurs in colored waters ranging in reaction between pH 5 and 6 (like the majority of ponds in the region investigated); (3) species of desmids are known from virtually all fresh-water habitats; (4) the genera may usually be identified at a glance and the species are recognizable on the basis of size and shape of the resistant cell wall. An additional point of interest in the desmids for the malariologist lies in the recovery of many species from guts of anopheline larvae.

METHODS OF STUDIES

Three methods of obtaining representative samples of desmids were used: (1) Straining surface water through a No. 25 bolting-cloth plankton net; (2) putting out a slide rack as described by Miller(1936) for various periods; (3) wringing larger plants and detritus into the collection jar. The first two methods were expected to make possible a rough separation of planktonic and periphyton species. This expectation was not fulfilled, and since the simple third method furnished all the forms found by use of the other two, it was adopted as standard practice. Samples were examined alive within a few days after collection and a portion of each was preserved in formalin for further reference. With each collection, air and surface water temperatures were taken and the reaction was determined by Hellige

or La Motte colorimeters. In a few ponds with decidedly variable pH, and generally in the larger ponds, 6 to 10 stations were established where separate collections were made. All desmids were drawn with the aid of a camera lucida and measured with an ocular micrometer. Anopheline larvae were regularly dipped if present, and a cumulative list of the higher aquatic plants of each pond was prepared.

Systematic treatment of the desmids is reserved for a later paper. Only a few general data are essential at this time. Twenty-seven genera have been listed by Smith (1933) from the United States; only three of these, *Roya*, *Docidium*, and *Oöcardium*, were not found in the present study. Determination of *Phymatodocis*, a rare genus which was encountered, was kindly confirmed by Prof. W. R. Taylor, of the University of Michigan. About 155 species are considered from 26 ponds investigated. Although only slightly more than one-half are as yet satisfactorily identified, all chosen are believed to be distinct enough for recognition in the slightly different forms of the various ponds.

PONDS

In tables 1 and 2 are summarized some general data descriptive of the 26 ponds. Both ponds and data are, of course, selected, the data with a view to emphasizing variations in reaction and the ponds to represent somewhat equally the different parts of the pH scale. An attempt was made to weight results by the choice of ponds in three independent watersheds. In table 2 the characteristic higher plants are referred to by the number given in table 1, which is a general list of the most common species in these ponds. Morphometric data have been omitted. Except pond A (about one-thirtieth acre), all the ponds usually exceed one-fifth of an acre and the area of pond R at high level amounts to more than 5 square miles. The artesian-well ponds as a class are rather small, less than an acre, except ponds C, Y, and Z.

TABLE 1.—*Partial list of prominent aquatic plants of 26 ponds in coastal Georgia and South Carolina, 1938*

1. *Acer rubrum* L.
2. *Alnus* sp.
3. *Aralia spinosa* L.
4. *Bidens* sp.
5. *Brasenia Schreberi* Gmel.
6. *Cabomba caroliniana* Gray.
7. *Carex* spp.
8. *Castalia odorata* (Ait.) Woodville and Wood.
9. *Cephalanthus occidentalis* L.
10. *Ceratophyllum demersum* L.
11. *Cornus florida* L.
12. *Cyperus* spp.
13. *Drosera brevifolia* Pursh.
14. *Echinodorus radicans* (Nutt) Engelm.
15. *Eleocharis quadrangulata* (Michx.) R. and S.
16. *Eleocharis tuberculosa* (Michx.) R. and S.
17. *Elodea* sp.
18. *Eriocaulon* sp.
19. *Hydrochloa caroliniensis* Beauv.
20. *Hydrocotyle umbellata* L.
21. *Iris*, sp.
22. *Juncus scirpoides* Lam.
23. *Juncus* sp.
24. *Lecticula resupinata* (Greene) Small (?).
25. *Lemna minima* Philippi.
26. *Lemna minor* L.
27. *Limnobium Spongia* (Bosc.) Richard.
28. *Liquidambar Styraciflua* L.
29. *Liriodendron tulipifera* L.
30. *Ludvigia* (?) sp.
31. *Magnolia* sp.
32. *Mayaca Aubletii* Michx.
33. *Myriophyllum pinnatum* Walt.
34. *Nelumbo lutea* (Willd.) Pers.
35. "Newington grass." [1]
36. *Nymphaea odorata* Ait.
37. *Nymphoides aquaticum* (Walt.) Small.
38. *Nymphoides lacunosum* (Vent.) Small.
39. *Nyssa sylvatica biflora* (Walt.) Sarg.
40. *Orontium aquaticum* L.
41. *Oryza sativa L.*
42. *Pallavicinia Lyellii* (Hook) S. F. Gray.
43. *Peltandra* sp.
44. *Proserpinaca* sp.
45. *Pinus taeda* L.
46. *Polygonum* spp. (includes *Persicaria*).
47. *Pontederia cordata* L.
48. *Pontederia lanceolata* Nutt.
49. *Potamogeton diversifolius* Raf.
50. *Potamogeton* sp.
51. *Quercus* spp.
52. *Rhexia lutea* Walt.
53. *Rhexia* spp.
54. *Rhynchospora corniculata* (Lam.) Gray.
55. *Rhynchospora* spp.
56. *Ricciocarpus natans* (L.) Corda (?).
57. *Sagittaria* spp.
58. *Salix* sp.
59. *Sarracenia flava* L.
60. *Sarracenia minor* Walt.
61. *Sarracenia psittacina* Michx.
62. *Sassafras officinale* Nees and Eber.
63. *Saururus cernuus* L.
64. *Sclerolepis uniflora* (Walt.) B. S. P.
65. *Sparganium* sp.
66. *Sphagnum* spp.
67. *Taxodium ascendens* Brongn.
68. *Taxodium distichum* (L.) L. C. Rich.
69. *Typha angustifolia* L.
70. *Typha latifolia* L.
71. "Unidentified aquatic moss."
72. *Utricularia inflata* Walt.
73. *Utricularia radiata* Small.
74. *Utricularia* spp.
75. *Vallisneria spiralis* L.
76. *Wolffiella floridana* (J. D. Sm.) Thompson.
77. *Xyris* spp.
78. *Zizaniopsis miliacea* (Michx.) Döll and Asch.
79. *Chara* sp.
80. *Nitella* sp.
81. *Pisropus crassipes* (Mart.) Britton.
82. *Azolla caroliniana* Willd.

[1] Unidentified submerged aquatic.

TABLE 2.—*Source and appearance of water, light conditions, reaction, station individuality, higher plants, and anopheline breeding characteristic of 26 ponds located in coastal Georgia and South Carolina, 1937–38*

General	Date of visits	Reaction	Station individuality	Biotic
A. ALTAMAHA HILLSIDE POOL, WAYNE COUNTY, GA.				
[Desmid-rich class, type unsettled]				
Source: Seepage and run-off. Shade: Great; large trees. Appearance: Whitish; turbid with clay.	Aug. 12, 1938 Sept. 22, 1938	6.1 5.6	Presumably slight in this small pool, about 25 feet square.	Higher plants: 12, 30, 35. Anopheline breeding: *A. punctipennis* (Say).
B. BETHESDA CHURCH POND, EFFINGHAM COUNTY, GA.				
[Desmid-rich class; *Sphagnum* type]				
Source: Seepage and run-off; sandy district. Shade: Open along road, bushes dense in background. Appearance: Brown.	Apr. 11, 1938 June 26, 1938	4 (?) 4 (?)	Not investigated; presumably considerable.	Higher plants: 20, 35, 46, 48, 68. Anopheline breeding: *A. crucians* Wiedomann.
C. BOUHAN ARTESIAN POND, CHATHAM COUNTY, GA.				
[Desmid-poor class, exceptional artesian-water type pond]				
Source: Artesian well; some run-off. Shade: Part open; part shaded by scrub willow and cattails. Appearance: Source clear, colorless; locally brownish; slightly turbid.	June 8, 1938 Aug. 4, 1938 Sept. 14, 1938	7.3 7.1	Not studied; presumably great.	Higher plants: 6, 8, 14, 15, 22, 45, 46, 58, 70. Anopheline breeding: *A. quadrimaculatus* Say, *A. crucians*.
D. BUTLER POND, SAVANNAH, CHATHAM COUNTY, GA.				
[Desmid-poor class; artesian-water type]				
Source: Probably artesian well. Shade: Inconsequential; along shore cattails and 1 large willow. Appearance: Colorless; nearly clear.	Apr. 21, 1938 July 20, 1938 Aug. 1, 1938 Oct. 21, 1938	7.1 6.7 6.7 7.4	Not investigated; presumably slight.	Higher plants: 4, 17, 20, 22, 26, 46, 57, 58, 69. Anopheline breeding: *A. quadrimaculatus*, *A. crucians*.

TABLE 2.—*Source and appearance of water, light conditions, reaction, station individuality, higher plants, and anopheline breeding characteristic of 26 ponds located in coastal Georgia and South Carolina, 1937–38*—Continued

General	Date of visits	Reaction	Station individuality	Biotic
E. CONWAY ARTESIAN POND, CHATHAM COUNTY, GA.				
[Desmid-poor class; artesian-water type]				
Source: Artesian well. Shade: Rather open, little cattail and willow. Appearance: Colorless; nearly clear.	Aug. 16, 1938	8.4	Not studied; presumably slight.	Higher plants: 17, 19, 22, 57, 58, 70, 75. Anopheline breeding: *A. quadrimaculatus*, *A. crucians*.
F. DARIEN ARTESIAN POND, M'INTOSH COUNTY, GA.				
[Desmid-poor class; artesian-water type]				
Source: Artesian well. Shade: Open. Appearance: Colorless; clear.	Nov. 24, 1937 Jan. 17, 1938 Drained Apr. 15, 1938	8.1 8.4	Slight except in overflow pond.	Higher plants: 8, 22, 47, 79. Anopheline breeding: *A. quadrimaculatus*, *A. crucians*.
G. FOREST POND, NEAR SAVANNAH RIVER MIGRATORY WATERFOWL REFUGE, U. S. BIOLOGICAL SURVEY, JASPER CO., S. C.				
[Desmid-rich class; desmid-optimum type]				
Source: Seepage; run-off inconsequential. Shade: Partly open; partly half shaded; partly deep shaded. Appearance: Pale amber to brown; clear.	Feb. 15, 1938 Mar. 8, 1938 Mar. 23, 1938 Apr. 7, 1938 July 13, 1938 Aug. 24, 1938 Sept. 30, 1938	5.6 5.7 5.6 5.7 5.9 6.2 5.0	Investigated casually; very slight.	Higher plants: 7, 9, 12, 22, 27, 33, 38, 44, 46, 47, 55, 58, 63, 68, 70, 73, 74. Anopheline breeding: *A. crucians*, *A. quadrimaculatus*.

H. GOSHEN CHURCH POND, EFFINGHAM CO., GA.

[Desmid-rich class; desmid-optimum type]

			Station	pH [1]	pH [2]	Temperature (°C.) [1]	Temperature (°C.) [2]	pH [3]	
Source: Chiefly seepage; some run-off.	Feb. 3, 1938	5.0	1	8.0	8.5	30	36	7.1	Higher plants: 1, 8, 16, 19, 20, 22, 23, 25, 46,
Shade: Partly open; partly cattail shade; partly shrouded in dense bushes.	Feb. 24, 1938	6.3	2	5.3	5.2	27	31		55, 63, 66, 70, 72, 73, 74, 77.
Appearance: Pale brown to dark brown, clear or slightly turbid.	June 23, 1938	6.1	3	4(?)	4(?)	25.5	33	4.6	Anopheline breeding: *A. crucians.*
	Oct. 7, 1938	6.2	4	6.6	7.9	29.5	34.5		
			5	6.2	6.5	32	34.5		
			6	6.6	8.4	31	33	6.2	
			7	6.5	6.5	31.5	33		
			8	6.0	6.1	28	29	6.2	
			9	6.8	7.1	32	32		

I. GWINNETT POND, SAVANNAH, CHATHAM CO., GA.

[Desmid-poor class; temporary desmid-poor type]

Source: Run-off; seepage secondary.	Oct. 29, 1937	7.1	Weedy and open regions probably moderately dissimilar.	Higher plants: 33, 70.
Shade: Open, tree on north shore; tall weeds on east shore.	Dec. 20, 1937	7.2		Anopheline breeding: *A. quadrimaculatus.*
Appearance: Colorless; fairly clear.	Jan. 27, 1938	8.0		

J. LOTUS POND, SAVANNAH RIVER MIGRATORY WATERFOWL REFUGE, JASPER CO., S. C.

[Desmid-rich class; desmid-optimum type]

			Station	pH [4]	pH [5]	Temperature (°C.) [4]	Temperature (°C.) [5]	
Source: Remote seepage runs in occasionally at north end.	Oct. 25, 1937	5.4	1	6.0	6.6	22.5	31	Higher plants: 5, 8, 11, 13, 15, 19, 22, 28, 31, 34,
Shade: Open; station 1 shaded by pine.	Nov. 15, 1937	5.4	2	5.9	6.2	26	31	39, 49, 51, 55, 62.
Appearance: Colorless to faint brown; often turbid, but only at south end.	Feb. 15, 1938	5.8	3	5.3	5.8	27.5	31	Anopheline breeding: *A. crucians.*
	Apr. 6, 1938	6.0	4	6.2	6.7	29	29.5	
	Apr. 18, 1938	6.6	5	6.3	6.8	25.5	29	
	July 13, 1938	5.9	6	6.8	6.8	25	29	
	Aug. 24, 1938	5.4	7	7.0	6.9	28	27.5	
	Sept. 30, 1938	5.4	8	6.8	6.8	26	28	

[1] At 10 to 11:30 a. m. on May 11, 1938. [2] At 3:15 to 4 p. m. on May 11, 1938. [3] At noon on Oct. 7, 1933. [4] At 11 a. m. to noon on Apr. 18, 1938. [5] At 4 to 5 p. m. on Apr. 18, 1938.

TABLE 2.—*Source and appearance of water, light conditions, reaction, station individuality, higher plants, and anopheline breeding characteristic of 26 ponds located in coastal Georgia and South Carolina, 1937–38*—Continued

General	Date of visits	Reaction	Station individuality			Biotic
K. MAGNOLIA SPRING POND, JENKINS COUNTY, GA.						
[Desmid-poor class; artesian-water type]						
			Station	pH [6]	Temperature (° C.) [6]	
Source: Spring; run-off inconsiderable. Shade: Open, shaded in dense *Bidens*-bed. Appearance: Bluish; crystal-clear.	Nov. 3, 1937 Jan. 20, 1938 Apr. 13, 1938 May 18, 1938 June 27, 1938 Aug. 8, 1938 Oct. 13, 1938	6.8 6.8 6.8 6.8 6.8 6.9 6.8	1 2 3 4 5 6	6.8 6.8 6.9 7.0 6.8 6.8	20 22 22 23 23.5 29	Higher plants: 2, 4, 12, 20, 23, 25, 28, 30, 33, 36, 46, 58, 63, 65, 70, 71. Anopheline breeding: *A. punctipennis, A. quadrimaculatus, A. crucians.*
L. MAGNOLIA SPRING HATCHERY LIMESINK, JENKINS COUNTY, GA.						
[Desmid-poor class; *Closterium*-euglenoid type]						
Source: Run-off; no evidence of seepage. Shade: Oppressive in this 40-foot deep wooded depression. Appearance: Colorless to greenish; clear or turbid.	Nov. 3, 1937 Jan. 20, 1938 Apr. 13, 1938 May 18, 1938 June 27, 1938 Aug. 8, 1938 Oct. 13, 1938	6.8 6.8 6.2 6.8 6.8 6.4 6.7	Virtually none.			Higher plants: 3, 25, 36. Anopheline breeding: *A. crucians, A. quadrimaculatus.*
M. MAGNOLIA SPRING HATCHERY PONDS,[7] JENKINS COUNTY, GA.						
[Desmid-poor class; artesian-water type]						
			Pond	pH [6]		
Source: Magnolia Spring; run-off a minor source. Shade: Generally open; partly shaded on some shores. Appearance: Colorless; clear.	Sept. 2,3,1937 Nov. 3, 1937 Apr. 13, 1938 June 27, 1938 Aug. 8, 1938	[8]7.0-8.3 7.5 6.8 6.9 8.4	1 2 3 4 5	8.0 8.3 7.0 7.4 8.0		Higher plants: 2, 10, 12, 23, 25, 30, 33, 36, 46, 50, 54, 57, 58, 63, 67, 70, 75. Anopheline breeding: *A. quadrimaculatus, A. crucians.*

N. MOREHOUSE ARTESIAN POND, LIBERTY COUNTY, GA.

[Desmid-poor class; artesian-water type]

Source: Artesian well. Shade: Open. Appearance: Colorless; clear.	July 25, 1938	7.8	Not studied.	Higher plants: 20, 22, 46, 70, 81. Anopheline breeding: *A. crucians*.

O. NEWINGTON POND, SCREVEN COUNTY, GA.

[Desmid-rich class; desmid-optimum type]

			Station	pH[10]	pH[11]	Temperature (° C.)[10]	Temperature (° C.)[11]	
Source: Seepage from a filled spring ¼ mile east; little run-off. Shade: Center open, considerable gum tree shade along margins. Appearance: Colorless to brown; clear (but turbid near road from livestock).	Nov. 2, 1937	5.5	1	6.0	6.2	28	34.5	Higher plants: 1, 20, 29, 31, 33, 35, 37, 39, 45, 49, 73, 74. Anopheline breeding: *A. crucians*.
	Feb. 3, 1938	6.0	2	5.7	6.1	27	36.5	
	Feb. 24, 1938	5.8	3	5.6	6.1	33.5	37.5	
	May 6, 1938	5.6	4	5.0	5.2	37	36	
	July 22, 1938	6.1	5	5.0	5.5	24.5	32.5	
	Sept. 27, 1938	Dry	6	5.7	6.1	33	31.5	
			7	5.9	6.3	27.5	31.5	

P. RICE FIELD ON SAVANNAH RIVER MIGRATORY WATERFOWL REFUGE, JASPER COUNTY, S. C.

[Desmid-rich class; temporary desmid-rich type]

Source: Canal, itself fed by seepage and river. Shade: Great in rice and *Zizaniopsis*; slight along ditches. Appearance: Pale brown to deep brown; turbid to very turbid.	Aug. 1, 1938	5.6	Fortnightly fluctuation of water level probably prevents pronounced local differences.	Higher plants: 12, 30, 41, 46, 48, 74, 78. Anopheline breeding: *A. crucians*.
	Aug. 11, 1938	6.1		
	Aug. 29, 1938	6.1		
	Sept. 30, 1938	6.0		

[6] On May 18, 1938.
[7] 5 flowing ponds, current scarcely perceptible, in a series, the fifth private property.
[8] Not always taken at same station, hence not directly comparable.
[9] On Sept. 2 and 3, 1937.
[10] At 1:30 to 2:30 p. m. on May 6, 1938.
[11] At 1 to 1:30 p. m. on July 22, 1938.

TABLE 2.—*Source and appearance of water, light conditions, reaction, station individuality, higher plants, and anopheline breeding characteristic of 26 ponds located in coastal Georgia and South Carolina, 1937–38*—Continued

General	Date of visits	Reaction	Station individuality	Biotic
Q. RINCON FOREST STREAM POND, EFFINGHAM COUNTY, GA.				
[Desmid-rich class; temporary desmid-rich type]				
Source: Intermittent woodland stream which overflows along highway. Shade: Open, source in deep gloom. Appearance: Brown to dark-brown, turbid or nearly clear.	Feb. 3, 1938 Feb. 24, 1938 [12] July 22, 1938 Oct. 21, 1938	4.7 5.2 4.6 5.7	Not studied, probably slight.	Higher plants: 9, 21, 30, 39, 46, 50, 65. Anopheline breeding: *A. crucians*.
R. RUSHING POND, BULLOCH COUNTY, GA.				
[Desmid-rich class; desmid-optimum type]				
Source: Stream rising near Statesboro, carrying town sewage, is impounded. Shade: Heavy near shore; cypress half shades more open water. Appearance: Pale brown; clear.	June 1, 1938 Aug. 17, 1938 Sept. 27, 1938 Oct. 3, 1938	6.6 6.2 6.7 [13] 5.7	Not investigated; probably considerable.	Higher plants: 1, 5, 8, 18, 21, 32, 36, 37, 39, 45, 52, 53, 59, 60, 61, 64, 66, 67, 74, 77. Anopheline breeding: *A. quadrimaculatus*, *A. crucians*.
S. SAVANNAH WATERWORKS POND, CHATHAM COUNTY, GA.				
[Desmid-poor class; artesian-water type]				
Source: Artesian well. Shade: Open; very slight shade from cannas along margins. Appearance: Greenish or colorless, clear.	Sept. 16, 1938 Oct. 31, 1938	8.4 8.5	Virtually none.	Higher plants: 19, 50. Anopheline breeding: None.

T. SEQUOIA POND, BRYAN COUNTY, GA.

[Desmid-rich class; desmid-optimum type]

			Station	pH [14]	pH [15]	pH [16]	Temperature (°C.)[14]	Temperature (°C.)[15]	Temperature (°C.)[16]	
Source: Seepage into a railroad borrow pit and black gum swamp; run-off from sandy area. Shade: Open; station 8 heavily shaded by gums. Appearance: Pale brown to brown; clear or slightly turbid.	Nov. 24, 1937	5.6	1	6.0	5.9	5.5	27	31	32	Higher plants: 1, 5, 7, 8, 19, 20, 22, 26, 39, 47, 55, 56, 58, 63, 74, 76, 77. Anopheline breeding; *A. crucians*, *A. quadrimaculatus*.
	Dec. 20, 1937	5.8	2	5.8	6.1	5.8	25.5	29	34.5	
	Jan. 17, 1938	5.8	3	5.6	5.7	Dry	23.5	28	Dry	
	Mar. 31, 1938	5.8	4	6.0	5.9	5.4	28.5	31	36.5	
	May 3, 1938	6.0	5	5.6	5.6	5.1	25.5	27	36	
	June 13, 1938	5.5	6	5.6	5.8	5.0	29	31.5	35.5	
	July 25, 1938	5.8	7	5.7	5.9	5.5	27.5	32	33	
	Oct. 8, 1938	5.4	8	5.8	5.7	Dry	23	23.5	Dry	
			9	------	------	5.9	----------	----------	21.5	

U. SOUTH MAGNOLIA SPRING LIMESINK, JENKINS COUNTY, GA.

[Desmid-rich class; desmid-optimum type]

Source: Run-off, largely by ditch from clay-sand field at southwest. Shade: Moderate from depression, and trees, bushes. Appearance: Colorless or pale brownish; clear or slightly turbid.	Nov. 3, 1937	5.4	Not studied; some expected.	Higher plants: 1, 7, 9, 12, 20, 28, 42, 45, 46, 51, 66, 74, 77. Anopheline breeding: *A. crucians*.
	Jan. 20, 1938	5.8		
	Apr. 13, 1938	6.0		
	May 18, 1938	6.5		
	June 27, 1938	5.8		
	Aug. 8, 1938	5.6		
	Oct. 13, 1938	5.4		

V. TOWER CANAL, SAVANNAH RIVER MIGRATORY WATERFOWL REFUGE, JASPER COUNTY, S. C.

[Desmid-rich class; temporary desmid-rich type]

Source: Seepage and river overflow. Shade: Open; gloomy in *Zizaniopsis* stand. Appearance: Brown to dark brown; turbid to very turbid.	July 13, 1938	6.0	Not investigated.	Higher plants: 6, 14, 24, 36, 40, 43, 46, 47, 50, 57, 68, 78. Anopheline breeding: *A. walkeri*, *A. crucians*, *A. quadrimaculatus*.
	Aug. 1, 1938	6.0		
	Aug. 11, 1938	6.0		
	Sept. 30, 1938	5.9		

[13] Dry in May and June.
[13] After heavy rains.
[14] At 10:30 to 11:15 a. m., on May 3, 1938, air temperature 31.5° C.
[15] At 3:30 to 4:15 p. m., on May 3, 1938, air temperature 29.5° C.
[16] At 10:15 to 11:15 a. m., on June 13, 1938, air temperature 31.5° C.

TABLE 2.—*Source and appearance of water, light conditions, reaction, station individuality, higher plants, and anopheline breeding characteristic of 26 ponds located in coastal Georgia and South Carolina, 1937–38*—Continued

General	Date of visits	Reaction	Station individuality	Biotic
W. TRAVIS ARTESIAN WELL POND, CHATHAM COUNTY, GA.				
[Desmid-poor class; artesian-water type]				
Source: Artesian well. Shade: Open; connected ditches shaded by pines. Appearance: Colorless; clear.	Nov. 22, 1937 Mar. 7, 1938 Mar. 11, 1938 Apr. 22, 1938 Oct. 14, 1938	7.4 8.4 (?) 8.5 8.5	Not studied; probably slight.	Higher plants: 8, 20, 21, 22, 33, 34, 46, 47, 71. Anopheline breeding: *A. quadrimaculatus, A. crucians.*
X. TYPHA-AZOLLA ARTESIAN WELL POND, M'INTOSH COUNTY, GA.				
[Desmid-poor class; artesian-water type]				
Source: Artesian well; run-off via ditch. Shade: Partly open; partly shade of dense cattails. Appearance: Colorless; clear.	July 25, 1938	8.2	Not studied.	Higher plants: 8, 20, 69, 82. Anopheline breeding: *Anopheles* sp.
Y. WAYS HATCHERY, SOUTHEAST POND, BRYAN COUNTY, GA.				
[Desmid-poor class; artesian-water type]				
Source: Artesian well. Shade: Open. Appearance: Colorless; clear.	Aug. 4, 1938	8.3	Not studied; probably slight.	Higher plants: 57, 79. Anopheline breeding: *A. quadrimaculatus.*
Z. WAYS HATCHERY, SOUTHWEST POND, BRYAN COUNTY, GA.				
[Desmid-poor class; artesian-water type]				
Source: Artesian well. Shade: Open; some shade by *Echinodorus.* Appearance: Colorless; clear.	Aug. 4, 1938	7.3	Not studied; probably slight.	Higher plants: 14, 57, 69, 80. Anopheline breeding: *A. quadrimaculatus.*

PERMANENCE

The ponds listed, except I, P, and Q, must be considered permanent. An annual fluctuation in water level of as much as 18 inches in those ponds not produced by human agency results in extensive temporary margins, exceeding, occasionally, the areas of the ponds at low level. An artesian well pond varies little seasonally in depth and size.

The summer of 1938 was unusually dry, and ponds O and Q dried up completely. Nevertheless, neither is, from a biotic point of view, temporary. The former, Newington Pond, has a microbiota similar to and as rich as comparable permanent waters. The other pond that goes dry no doubt does so almost every year; yet it, too, may not be classed with temporary waters described in the literature, except roughly with a type proposed by Spandl in 1925 (cited by Thienemann, 1925).[2] An inlet or a stream apparently replenishes its plankton (and periphyton) with forms characteristic of permanent habitats. Only pond I which is dry the greater part of a normally wet year, is typically temporary, judged by the microbiota.

ANOPHELINE BREEDING

The information included on anopheline breeding is not regarded as important in characterizing ponds; it is of interest to malariologists as suggestive of the marked differences in environmental resistance to the several *Anopheles* species by the various pond types. The data indicate, as Boyd (1929) has shown, that *Anopheles quadrimaculatus* prefers a neutral or alkaline habitat, *A. crucians* an acid or neutral one. Quantitative data and seasonal notes on the occurrence of anopheline larvae are omitted from the tables summarizing pond characteristics, since this is a subject not related to pond type and involving extrinsic factors in the ecology of the adult insects. For example, a decided preference for small ponds isolated from other waters, which is suggested by larval counts, may result from lack of other acceptable breeding places, from presence of favorable resting places for adults, from proximity of available blood meals, or from other less obvious environmental requirements of the adult mosquito. Wholly aquatic organisms reflect differences in aquatic habitats, as a rule, better than forms with terrestrial stages.

SIGNIFICANCE OF PLANTS

The higher aquatic plants, which are partially listed in table 1, are of value as indicators of habitat only in a general way. Some time ago Pond (1918) pointed out that we do not know to what extent chemical factors are concerned in the distribution of fresh-water plants, and

[2] Described as follows: "Vorübergehende Gewässer, entstanden durch Überschwemmungen eines Flusses. Die fraglichen Wasseransammlungen liegen im Inundationsgebiete des Flusslaufes. Die Zeit der Wasserführung ist zumeist das Frühjahr, seltener der Herbst. In vereinzelten Fällen (Unwetterskatastrophen) auch der Sommer."

the late Will Scott (1910) suggested that ponds receive accidental co onization, in which early arrivals become the dominant species. Pond Y and the adjacent pond Z, at the Ways State Fish Hatchery, studied as new ponds, may serve as examples supporting Scott's claim.

The rearing ponds of this hatchery are in all essential respects, except one, similar if not identical. They support different aquatics. Ponds Y and Z were constructed in 1935 in previously cultivated fields and provided with aeration fountains of artesian water. When the hatchery was visited in 1937 a labor gang was removing a dense stand of *Sagittaria* from pond Y. Except *Chara* sp., no other macrophytes were present. In the neighboring pond Z a similar occupation by *Echinodorus radicans* and *Nitella* sp. had taken place. Probably *Chara* and *Nitella* were initial invaders in both ponds. The latter pond also had a few *Typha* (cattails). A third pond into which pond Y empties was choked with *Hydrochloa caroliniensis* and also supported a few plants of *Typha latifolia*. No other species were found. About a year prior to this visit two additional independent ponds had been excavated in which only a few cattails had established themselves.

Although without great significance as index organisms, macrophytes are themselves important ecological factors and must be considered in pond descriptions. They provide shelter for other organisms, affect illumination and circulation, and some of them, for instance *Sphagnum*, have notable chemical influence. The number of species is proportional in a general way to the age of the pond. In extreme habitats, such as pond L with only two aquatics although hundreds of years old, this generalization does not hold. Finally, in some extensive geologically old swamps, as the Wrights (1932) have shown for the Okefenokee, the higher aquatic plants (and trees) have reached a static distribution providing a basis for useful and natural classifications of the habitats.

SUITABILITY OF DESMIDS AS INDEX ORGANISMS

It is proper to inquire further into the premise that desmids are suitable index organisms for ponds. It has already been pointed out that the group is large, is represented in the most varied waters, and that recognition (if not identification) is less troublesome than in the case of other large taxonomic units of pond organisms, such as the higher plants, protozoa, diatoms, blue-green algae, flagellates, rotifers, and the like. Certainly more cogent a reason than assuredness of abundant material and the convenience of the investigator in its determination is the fact that the group contains sensitive indicator species.

Phytoplankton, according to Naumann (1929), is much more difficult to culture than zoöplankton, and successful cultivation of other

than tolerant forms, never a feat of the plant physiologist, was first achieved by the limnologist. It is significant that desmids should be notable among the phytoplankton as difficult to culture. Smith (1924) says, "The artificial culture of desmids is extremely difficult and there are no accurate data on the mineral requirements of the family as there are in the case of the other algae." The planktonic diatoms illustrate this contrast, since a great many of the species have been grown without difficulty in inorganic nutritive solutions. The blue-green algae, like the diatoms, require little more than proper essential food elements. Naumann (1929) reports only quantitative differences in the occurrence of blue-green species in oligotrophic, dystrophic, and eutrophic regions.

There are indications in the literature that desmids introduced into unsuitable waters do not survive. In his study of the algae of Palisades Interstate Park, Smith (1924) describes such a case, as follows: "Little Long Pond is a true desmid lake and one with very few blue-green algae. It might be a natural inference that if the water from this lake were collected in a new lake the plankton organisms in the new and the old lakes would be practically the same, since the old lake is continually introducing its algae into the new lake. In actual practice this has not been the result. Kanahwauke Lake was formed by damming the valley below Little Long Pond and impounding the water of its outlet. The plankton of Kanahwauke consists very largely of *Microcystis* and Phaeoflagellates, with only occasional desmids. The source of the water in the two lakes is the same and the explanation must be sought in the changes taking place in Kanahwauke after its entrance into the lake."

Personal observations, though less conclusive, favor the thesis of the great sensitivity of desmids to the environment. Some observations also indicate surprisingly prompt appearance in suitable new habitats. For example, a concrete aquarium inside a screened insectary for rearing anopheline mosquitoes at the Henry R. Carter Memorial Laboratory maintained a microflora dominated by species of the blue-green *Oscillatoria*. Certain species of diatoms occurred in moderate numbers, and a species of probably *Chlorella* was usually common. Although from time to time during a year and a half larger plants from varied habitats were put in and pond water also added once or twice so that such predators as damsel flies occasionally appeared in numbers, no desmids survived in the tank. This insectary building is protected by a miniature moat a few inches wide. The moat is better lighted than the aquarium and received some rain water, whereas in the insectary aquarium evaporation is replaced with artesian tap water. A small species of *Cosmarium* (a desmid) was a common organism in the moat. Nearby, a small experimental pond, dependent chiefly upon run-off from lawn and fields, retained water

for about three weeks and supported another desmid, a species of *Closterium*. Pond I, about one-quarter mile away, which is natural and temporary, filled up from run-off during the wet fall of 1937 and developed four desmids, *Hyalotheca dissiliens* and three closteria, including *Cl. rostratum*, not collected elsewhere. Whether introduction of algae is, as Smith (1924) proposes, "brought about by the agency of air currents, insects or birds" or by other means it is certain that the common species of desmids appear in a new pond meeting their ecological demands in a remarkably short time.

The tendency of early arrivals to monopolize a habitat has been considered an objection to the use of hydrophytes as indicator organisms. Certain algae, particularly blue greens, "bloom" and doubtless prevent development of other equally suitable species by sheer numbers. Only one desmid, *Cosmarium suevicum*, causes water bloom, according to Smith (1924), and it is exceptional among desmids for one species to become so numerous as to compete spatially with congeners. Thus the desmids appear to be ideal organisms for the investigation of environmental differences in mosquito-breeding areas. To quote Krieger (1933), author of the latest monograph on the desmids, "jede Art ist an ganz bestimmte Milieufaktoren gebunden."

DESMIDS

Tables 3 and 4 give qualitative and quantitative distribution data on the desmids recorded from the ponds included in this paper. However, some species from other waters belonging to pond types proposed below are excluded, even though a few of them are mentioned in the text. The difference in number between total species and species identified comprises well-marked forms not yet specifically determined.

TABLE 3.—*Genera and species of desmids identified or recognized as distinct, from 26 ponds of coastal Georgia and South Carolina, 1937–38*

Pond	Desmids			Pond	Desmids		
	Total genera	Species identified	Total species		Total genera	Species identified	Total species
A. Altamaha Hillside	5	4	10	O. Newington	18	34	47
B. Bethesda Church	8	6	14	P. Ricefield	10	14	27
C. Bouhan's Artesian	7	3	14	Q. Rincon Forest Stream	5	5	13
D. Butler Lumber Co.	3	1	6	R. Rushing	12	22	38
E. Conway Artesian	1	0	2	S. Savannah Waterworks	3	1	7
F. Darien Artesian	1	0	1	T. Sequoia	15	30	56
G. Forest	15	29	47	U. S. Magnolia Spring Limesink	14	32	49
H. Goshen Church	14	35	43	V. Tower Canal	7	9	16
I. Gwinnett	2	3	4	W. Travis Artesian	3	0	4
J. Lotus	17	39	59	X. Typha-Azolla Artesian	2	0	3
K. Magnolia Spring	2	0	3	Y. Ways Hatchery S. E. Pond	2	1	5
L. Magnolia Spring Hatchery Limesink	1	0	3	Z. Ways Hatchery S. W. Pond	4	1	5
M. Magnolia Spring Hatchery	4	1	8				
N. Morehouse Artesian	2	0	4				

TABLE 4.—*Identified genera and species of desmids with their occurrence in 26 ponds (A–Z) of coastal Georgia and South Carolina, 1937–38*

I. *Arthrodesmus:*
1. *convergens* Ehr. (H).
2. *Ralfsii* var. *Brebissonii* (Racib.) G. M. Smith (T).

II. *Closterium:*
1. *acerosum* (Shrank) Ehr. (G, I, J).
2. *angustatum* Ktz (H, J).
3. *costatum* Corda (G, H, O, Q, R, T, U).
4. *intermedium* var. *hibernicum* West (T).
5. *Kuetzingii* DeBreb. (G, H, J, O, R, T, V).
6. *parvulum* Nag. (H, T).
7. *rostratum* Ehr. (I).
8. *setaceum* Ehr. (G, H, J, O, R, T, U).

III. *Cosmarium:*
1. *amoenum* DeBreb. (J).
2. *commissurale* var. *crassum* Nordst. (H, J, O, P, U).
3. *formosulum* Hoff. (O).
4. *impressulum* Elfv. (T).
5. *margaritatum* (Lund.) Roy and Biss. (J, R, U, V).
6. *Meneghinii* var. *nanum* Wille (T).
7. *Nymannianum* Grun. (T).
8. *ovale* Ralfs (A, R).
9. *Portianum* Arch (H, J, O, R).
10. *pseudoconnatum* Nordst. (C, G, H, J, O, P, Q, R, T, U, Y).
11. *quinarium* Lund (H).

IV. *Cosmocladium:*
1. sp. (R).

V. *Cylindrocystis:*
1. *Brebissonii* Menegh. (J).

VI. *Desmidium:*
1. *Aptogonum* DeBreb. (G, H, P, Q, V, Z).
2. *Baileyi* (Ralfs) Nordst. (G, H, J, O, P, T, U).
3. *Grevillii* (Ktz.) De Bary (G, J, P, U).

VII. *Euastrum:*
1. *affine* Ralfs (A).
2. *Didelta* (Turp.) Ralfs (G, H, J, O, T).
3. *evolutum* var. *integrius* W. and G. S. West (A, G, H, J, O, R, T, U, V).
4. *gemmatum* DeBreb. (O).
5. *intermedium* Cleve var. *validum* W. and G. S. West (G).

VIII. *Gonatozygon:*
1. *aculeatum* Hast (G, T).
2. *pilosum* Wolle (G, P).

IX. *Gymnozyga:*
1. *moniliformis* Ehr. (B, G, H, J, O, T, U).

X. *Hyalotheca:*
1. *dissiliens* (Smith) DeBreb. (B, G, H, I, J, P, Q, R, T, U, V).

XI. *Micrasterias:*
1. *Americana* (Ehr.) Ralfs forma (R).
2. *apiculata* (Ehr.) Menegh. (U).
3. *apiculata* var. *fimbriata* (Ralfs) Nordst. (H, T, U).
4. *apiculata* var. *fimbriata* forma *spinosa* G. M. Smith (G, H, R, T).
5. *foliacea* Bail (J, R, U).
6. *laticeps* Nordst. (G, H, P, R, T, U, V).
7. *Mahabuleshwarensis* Hobson (R).
8. *muricata* (Bail.) Ralfs (J, O).
9. *papillifera* DeBreb. forma (U).
10. *pinnatifida* (Ktz.) Ralfs (G, H, O, T, U).
11. *radiata* Hass (J, O, P, U).
12. *radiata* var. *simplex* (Wolle) G. M. Smith (O, U).
13. *radiosa* Ralfs var. *ornata* forma *elegantior* G. S. West (J).
14. *radiosa* var. *ornata* Nordst. (G).
15. *truncata* (Corda) DeBreb. (B, C, H, M, O).

XII. *Netrium:*
1. *Digitus* (Ehr.) Itz & Roth (G, H, J, O, T, U).
2. *interruptum* (DeBreb.) Lütkem (U).

TABLE 4.—*Identified genera and species of desmids with their occurrence in 26 ponds (A–Z) of coastal Georgia and South Carolina, 1937–38*—Continued

XIII. *Onychonema:*
1. *filiforme* (Ehr.) Roy and Biss. (J, R).
2. *filiforme* forma (H).
3. *laeve* Nordst. (C, G, J, R, U).
4. *laeve* forma (H).
5. *laeve* var. *latum* W. and G. S. West (H).

XIV. *Penium:*
1. *cucurbitinum* Biss. (B).
2. *Libellula* (Focke) Nordst. var. *interruptum* W. and G. S. West (J).

XV. *Phymatodocis:*
1. *Nordstedtiana* Wolle (J).

XVI. *Pleurotaenium:*
1. *Ehrenbergii* (DeBreb.) De Bary (G, H, J, T, V).
2. *Ehrenbergii* forma (A, D, G, H, J, P, S, U).
3. *Ehrenbergii* var. *elongatum* W. West (T, U).
4. *eugeneum* (Turn.) W. and G. S. West (P).
5. *nodosum* (Bail.) Lund. (H, J, U).
6. *subcoronulatum* (Turn.) W. and G. S. West var. *detum* W. and G. S. West (G, H).
7. *Trabecula* (Ehr.) var. *rectum* (Delp.) W. and G. S. West (O).
8. *trochiscum* W. and G. S. West var. *tuberculatum* G. M. Smith (J, O, U).

XVII. *Sphaerozosma:*
1. *excavata* Ralfs (H, O, R, U).
2. *excavata* forma (J, T).

XVIII. *Spirotaenia:*
1. *condensata* DeBreb. (O, T).

XIX. *Spondylosium:*
1. *planum* (Wolle) W. and G. S. West (O).

XX. *Staurastrum:*
1. *Arachne* Ralfs (J, U, V).
2. *Arctiscon* (Ehr.) Lund. var. *glabrum* W. and G. S. West (O).
3. *Cerastes* Lund. (O).
4. *gladiosum* Turn. (G, H, J, O, P, Q, T, U, V).
5. *inconspicuum* Nordst. forma (O).
6. *inconspicuum* var. *crassum* Gay (?) (G, H, J, R, T).
7. *setigerum* Cleve forma (U).
8. *subgrande* Borge var. *minor* G. M. Smith (T).
9. *tetracerum* (Ktz.) Ralfs (J, Y).

XXI. *Tetmemorus:*
1. *Brebissonii* (Menegh) Ralfs var. *minor* DeBary (B, G, O).

XXII. *Triploceras:*
1. *gracile* Bail. (J, O).
2. *verticillatum* Bail. (J).

XXIII. *Xanthidium:*
1. *antilopaeum* (DeBreb.) Ktz. (H, J, O, P, U).
2. *antilopaeum* forma (B).
3. *antilopaeum* var. *minneapoliense* Wolle (G, O, P, R, T, U).
4. *antilopaeum* var. *polymazum* Nordst. (G, H, J, O, T).
5. *cristatum* DeBreb. (G, H, J, O).
6. *cristatum* var. *uncinatum* DeBreb. (H).

POND TYPES

The foregoing is intended as an introduction and to form a basis for the tentative pond classification proposed in this and succeeding paragraphs. The general distribution of 89 identified species or varieties of desmids in the 26 ponds is striking. Twelve ponds each have only 1 or none of these forms; 7 of the 12 ponds have none. These 12, and 2 other ponds which have 3 forms each, will be designated as the "desmid-poor class." The remaining ponds average 21.58 different desmids each; the poorest, a turbid pool, has only 4 identified

species. This pool and 2 temporary ponds lower the average from 26.22 forms per pond. This second group of waters in which desmid species are numerous will hereafter be called the "desmid-rich class." When unidentified forms and species are included and none of the 26 ponds is disregarded, the "desmid-rich class" averages 34.91 species per pond, and the "desmid-poor" only 4.92. This well-marked cleavage of ponds into 2 major habitats based on the occurrence of desmids appears to parallel the demonstration by the Wests in 1903 (cited by Smith, 1924) that the planktons of British lakes similarly belong to either of 2 contrasting types which they have named Baltic (few desmid species) and Caledonian (many desmids). Smith (1933) believes the distinction should be recognized in North American lakes; others have reported lakes of the Baltic and Caledonian types from continental Europe, and from Australia and Africa.

Desmid-rich waters are varied. Those factors, reflected almost invariably by an acid reaction, which combine to favor the occurrence of a large number of desmid genera, exert a marked selective effect on the species. No one desmid species is common to all 12 ponds of this class. Nevertheless, since it seems at this stage more prudent to emphasize similarities than differences, only 3 most clearly distinguishable pond types will be conceded. They will be designated as follows: (1) Sphagnum type; (2) desmid-optimum type; and (3) temporary, desmid-rich type.

The sphagnum type of desmid-rich pond is associated with an extensive mat of the moss, has a fairly acid reaction (pH 4.2 or more), and contains a quantitatively reduced desmid flora. Diatoms are prominent. Pond B alone is classed as belonging to this type, but Billy's Lake of the Okefenokee (pH 3.8), studied from two collections, apparently must be placed in this category. *Xanthidium antilopaeum* occurs as a peculiar forma [3] quite distinct from the species or its two varieties known in seven other desmid-rich habitats. *Penium cucurbitinum* has not been found in other ponds. *Anopheles crucians* is regularly present in small numbers, but larvae of *Anopheles quadrimaculatus* have not been found here.

The desmid-optimum type, which includes the 7 ponds, G, H, J, O, R, T, U, may be recognized by the great variety of genera and species of desmids (an average of 47 species and 15 genera) and by the constant presence of *Closterium setaceum*, *Cosmarium pseudoconnatum*, and *Euastrum evolutum* var. *integrius*. Desmids appear to predominate at all times in these ponds; diatoms, protozoans, and blue-green algae are relatively few. Some of these waters react constantly near pH 6.0; others fluctuate seasonally and by station between approximately pH 5.0 and 7.0. Their waters are colored, at least most of the

[3] This may be a distinct, closely related species.

year. Such ponds are often a favored breeding habitat of *Anopheles crucians*, which species is, however, supplanted or supplemented by relatively small numbers of *A. quadrimaculatus* in the late summer. Minor variations in physico-chemical and biological conditions among desmid-optimum ponds and attendant differences of their desmid floras illustrate sensitivity to environment of many species of this algal group. The distribution in these slightly dissimilar habitats of a large genus might be preferable as a measure of pond individuality; *Micrasterias*, a genus relatively poor in species, has been selected for the sake of brevity and because all species of the genus found have been determined.

TABLE 5.—*Distribution of* Micrasterias *in desmid-optimum ponds of coastal South Carolina and Georgia, 1937–38*

Micrasterias	Pond							Ponds of other types
	G	H	J	O	R	T	U	
M. Americana forma					x			
M. apiculata							x	
M. apiculata var. *fimbriata*		x				x	x	
M. apiculata var. *fimbriata* forma *spinosa*	x	x			x	x		
M. foliacea			x		x		x	
M. laticeps	x	x			x	x	x	P, V.
M. Mahabuleshwarensis					x			
M. muricata			x	x				
M. papillifera							x	
M. radiata			x	x			x	P.
M. pinnatifida	x	x		x		x	x	
M. radiata var. *simplex*				x			x	
M. radiosa var. *ornata*	x							
M. radiosa var. *ornata* forma *elegantior*					x			
M. truncata		x		x				B, C, M.

Pond R (Rushing) is unique in having several species of *Micrasterias* not found in the other ponds. It probably is not mere coincidence that this water is dominated by pond cypress (*Taxodium distichum*) and fringed with bog plants. Three species of pitcher plants (*Sarracenia*), also *Sclerolepis uniflora* and *Mayaca Aubletii*, are common here but absent from the other ponds. In this connection, two other pond cypress waters excluded from this paper also differ somewhat from any desmid-optimum pond investigated. In one of them several unidentified desmids, as well as *Xanthidium armatum* (DeBreb.) Rabenhorst variety, and *Micrasterias torreyi*, Bali., not found in other ponds were among the common species. In table 5 six other forms of *Micrasterias* are reported from only one pond. The table also indicates that *M. truncata* and *laticeps* are more tolerant of environment than the other species of *Micrasterias*. It is perhaps not exceptional that *M. laticeps* occurs in two temporary desmid-rich ponds, but *M. truncata* severely tries the apparent rule of desmid environmental specificity by appearing also in the most acid sphagnum type and the alkaline artesian-water ponds.

Temporary, desmid-rich ponds are associated with the sluggish, coffee-colored intermittent streams or canals prevalent in the coastal region. At high-water stage these drains link up newly submerged borrow pits, ditches, or natural low places and introduce organisms carried from permanent depressions previously isolated. Usually 10 to 15 or more desmids persist, among which closteria and staurastra comprise the majority. This type is even less uniform than the other desmid-rich types, although there are sharply defined subtypes. *Hyalotheca dissiliens* and *Staurastrum gladiosum* are conspicuous common forms of ponds P, Q, and V, which are a selection representing three rather different waters of the type. Temporary ponds similar to Q are widespread in the region in the flood plains of small streams, and the subtype of V, in which *Anopheles walkeri* finds a favorable breeding habitat, is associated with many more or less permanent canals and ditches of the Ogeechee and Savannah valleys. Pond P, a ricefield, must for the present be regarded as a special case.

Desmid-poor permanent ponds are much less common in coastal Georgia and South Carolina than the desmid rich, and their combined area is relatively insignificant. All are nearly neutral or alkaline in reaction. A majority results from the impoundment of artesian-well water. However, as impoundment is a common practice, and since these ponds, which remain moderately warm throughout the winter, are almost invariably located near dwellings, they cannot be ignored by the practical malariologist. Moreover, they are on the increase along the main arteries of motor transport. The State of Georgia and the United States Biological Survey have recently established ponds of this class for rearing game fish and encouraging waterfowl. Not directly due to human agency are the natural alkaline ponds impounded below Magnolia Spring in Jenkins County, Ga., where limestone lies near the surface and a number of limesinks occur. One of the sinks has been described as a typical desmid-optimum pond. Another, pond L, is desmid poor and, unlike the other waters of this class, reacts occasionally as acid as pH 6.2. This type will be called the *Closterium*-euglenoid, since species of *Euglena*, *Trachelomonas*, and *Phacus* are numerically the most important plankters present throughout the year. Three species of *Closterium* which occurred in the October collection were the only desmids. Deficient sunlight seems to be an important factor responsible for the peculiar microbiota. Although this is a very old, permanent, and mud-bottom pond, only *Lemna minima* and *Nymphaea advena* among hydrophytes maintain a precarious footing.

An artesian-water type is proposed for the habitat represented by the 10 ponds, C, D, E, F, N, S, W, X, Y, Z, all artesian-well impoundments, and for Magnolia Spring waters K and M. In all 12 situations a total of only 8 desmid genera occur, viz, *Cosmarium*, *Staurastrum*,

Closterium, *Euastrum*, *Desmidium*, *Pleurotaenium*, *Micrasterias*, and *Onychonema*. The latter 4 genera are not characteristic, rarely present, and then always as the same single species, except *Pleurotaenium*, of which there are 2 species. Further study probably will justify subdivision into subtypes, since no desmid species or even genus is common to all these ponds. On the contrary, each pond appears to provide tolerable conditions for a few different species. Sometimes one of more of these becomes exceedingly abundant as in the instance of a small species of *Staurastrum* in pond S during September and October 1938. Data are too few to judge artesian-water ponds on the composition of the entire microbiota, but while recognizing certain ubiquitous diatoms, protozoans, and such green algae as *Scenedesmus arcuatus* Lemmermann and *Pediastrum tetras* (Ehr.) Ralfs, it is certain that great quantitative differences exist among them. For example, in October 1938 plankton in ponds D, S, and W was dominated by blue-greens, a desmid, and diatoms, respectively. Blue-green algae, though not necessarily the same forms, were most numerous in the other (April, July, August 1938) collections from pond D; and in pond W diatoms or diatoms and protozoans were dominant whenever sampled (November 1937; March, April 1938).

A temporary, desmid-poor type exists in large numbers in the region during wet seasons. These ponds are not associated with streams and their water is colorless and alkaline (or occasionally slightly acid). For such ponds, area and the period elapsed since the rains which produced them might appear to be consequential factors restricting the microbiota. Actually these run-off waters are so dominated by cyst-forming protozoa, microcrustacea, and rotifers that a whole assemblage of characteristic forms appears in the smallest pond almost as soon as it is formed. Desmids are few in kind and number and invariably chiefly different species of *Closterium*. In pond I, included to illustrate the type, *Hyalotheca dissiliens*, and *Closterium rostratum* and *acerosum* were the only desmids found. This quite distinct type of desmid-poor pond is of especial interest as *Anopheles quadrimaculatus* sometimes breeds here in great numbers.

KEY TO POND TYPES

It should be kept clearly in mind when considering a pioneering attempt at classification of habitats that a system will be useful and constructive if it succeeds in being illustrative and representative. Ultimately, and only when detailed ecological studies are available, may such a classification be exhaustive and critical. In this sense and with considerable reservation is proposed the following tentative key to the more obvious pond habitats of the region studied.

Key to pond classes and their types in coastal Georgia and South Carolina

1. (6) Reaction acid (5.2–6.7); water colored; provenience of water chiefly seepage; desmid genera 5 to 18.....Desmid-rich class 2
2. (3) Temporary; associated with stream or canal; 10 to 15 species of desmids, chiefly closteria and staurastra
Temporary desmid-rich type
3. (2) Permanent..... 4
4. (5) Reaction less acid than pH 4.2; desmids dominant group, 14 or more desmid genera, 30 to 60 species among which *Closterium setaceum*, *Cosmarium pseudoconnatum*, *Euastrum evolutum* var. *integrius* are characteristic.....Desmid-optimum type
5. (4) Reaction more acid than pH 4.2; extensive sphagnum marginal areas; diatoms quantitatively more prominent than desmids; *Xanthidium antilopaeum* forma and *Penium cucurbitinum* characteristic
Sphagnum type
6. (1) Reaction alkaline or nearly neutral (pH 6.8–8.6); water virtually colorless; provenience of water subterranean or run-off; desmid genera 1 to 8, usually less than 3.....Desmid-poor class 7
7. (8) Illumination deficient; reaction slightly acid (pH 6.2–6.8); euglenoid plankton dominant; *Closterium* only desmid genus
Closterium-euglenoid type
8. (7) Exposed to direct sunlight; some or all of desmid genera *Closterium*, *Cosmarium*, *Euastrum*, *Staurastrum* present..... 9
9. (10) Permanent; source subterranean; dominant group of plankton variable, often diatoms, sometimes blue-green algae, rarely a single species of desmid.....Artesian-water type
10. (9) Temporary; water mainly run-off; dominant plankters microcrustacea, rotifers, and cyst-forming protozoa; closteria constantly present.....Temporary desmid-poor type

DISCUSSION

Ecology is essentially a study of relationships. A few of the more obvious and easily determined relationships have served for the purposes of this classification of ponds, a classification which, it is believed, will facilitate investigation of the relations of pond organisms to their environment, the interrelations of parts of ponds and the whole, succession of pond types, and their stability or mutability, according to vagaries of the environment (particularly weather). The following discussion emphasizes the need for further study. Some desmid-rich waters show marked station individuality. This holds true and may be constant for months (or perhaps years) and is reflected in the biota, including anopheline mosquitoes. Pond H is an extraordinary example of this phenomenon. The variable factors included in the term "weather" have greatest influence, of course, on the temporary and least on the sphagnum and artesian-water types of both classes. Desmid-optimum ponds repeatedly have been observed to become less and less acid during periods of drought. Heavy rains restore approximately the usual acid reaction. It appears reasonably certain that there is in the region succession

from the desmid-poor to the desmid-rich class. A few artesian waters (e. g., pond C) where the area impounded relative to the source is great, seem to be acquiring characteristics of the latter class. Most lentic waters appear to have reached an end type at the desmid-optimum. It is possible, however, that this is no more climax (in the sense of the plant ecologists) than is the domination of much of the southeastern coastal region by pines, which are admittedly subclimax. Perhaps the sphagnum type of pond, particularly as developed in the Okefenokee Swamp, supports climatic plant associations. There is no evidence to indicate succession from the desmid-optimum or other types, but it is reasonable to suppose that this takes place. Possibly upon the ascendency of sphagnum itself depends a shift from desmid-optimum to the sphagnum type.

SUMMARY

A preliminary limnological classification of ponds of the coastal region of Georgia and South Carolina is proposed. Twenty-six representative ponds near Savannah, Ga., are compared from data relating to reaction, source and nature of water, individual variability, permanence, and especially biotas. Hydrophytes are considered and found wanting as index organisms. Reasons are given for regarding the desmids as a suitable group for the discrimination of pond types. A total of 88 identified desmid species, varieties, and forms represent 23 of the 27 genera recently reported from the United States. However, almost as many unidentified, well-marked, recognizable species and one additional genus aid in characterizing the habitats. A desmid-poor class of ponds, in which desmids are qualitatively always, and quantitatively usually, infrequent, is recognized and described. Three types of the class—(1) temporary, desmid-poor, (2) *Closterium*-euglenoid, (3) artesian-water—are distinguished and designated. A second class, desmid-rich, which includes most of the standing fresh water of the region, is similarly divided into three types—(1) temporary, desmid-rich, (2) desmid-optimum, and (3) sphagnum. Variability within the limits of a type is discussed and probable need of subdivision of some types is suggested. A key to the pond classes and types is presented which summarizes their most salient characteristics.

Tentative correlations of *Anopheles* larval occurrence and pond types are presented. Decided differences in suitability of the different types of ponds for the local species of *Anopheles* are manifest. *Anopheles quadrimaculatus* was found to occur in large numbers throughout the warm season only in the temporary, desmid-poor, and the artesian-water types of the desmid-poor class. When present in the desmid-rich class either in ponds of the desmid-optimum or temporary,

desmid-rich types, the species is both restricted and inhibited by as yet undetermined, unfavorable environmental factors. In such waters not only do relatively few imagines emerge during only part of the active breeding season, but also the larvae ordinarily occur in limited areas of the ponds. *Anopheles quadrimaculatus* has not been found to breed in the sphagnum type. *A. walkeri* has been found by us only in a subtype of the temporary, desmid-rich waters. *A. punctipennis*, like *A. quadrimaculatus*, appears to be associated principally with waters of the desmid-poor class but has also a propensity for flowing water. Small streams of the region studied usually drain desmid-rich ponds, a fact which probably explains the relative infrequency of the species in coastal Georgia. *A. crucians* inhabits all six pond types but the species has been observed to thrive best in desmid-rich waters. It is recommended that American malariologists try the proposed key to pond types when making anopheline surveys with a view to perfecting this classification and eventually providing fundamental facts of anopheline ecology.

ACKNOWLEDGMENT

The writer gratefully acknowledges the assistance and cooperation of Senior Surgeon T. H. D. Griffitts, Director of the Henry R. Carter Memorial Laboratory of the Public Health Service, under whose direction and supervision the study was made and this paper prepared.

REFERENCES

Boyd, M. F.: (1929) Studies on the bionomics of North American anophelines physical and chemical factors in their relation to the distribution of larvae in northeastern North Carolina. Am. J. Hyg., **9**: 346–370.

Krieger, W.: (1933) Die Desmidiaceen Europas mit Berücksichtigung der aussereuropäischen Arten. Dr. L. Rabenhorsts Kryptogamen-Flora von Deutschland, Oesterreich und der Schweiz, edited by Dr. Kolkwitz. Leipzig. Vol. 13, pt. 1, No. 1.

Miller, D. E.: (1936) A limnological study of *Pelmatohydra* with special reference to their quantitative seasonal distribution. Trans. Am. Micr. Soc., **55**: 123–193.

Naumann, Einar: (1929) Grundlinien der experimentellen Planktonforschung. Die Binnengewässer. Edited by Thienemann, A. Stuttgart. Vol. 6, pp. 80–88.

Pond, R. H.: (1918) The larger aquatic vegetation. *In* Fresh-water Biology, by Ward, H. B., and Whipple, G. C., pp. 178–209.

Scott, Will: (1911) The fauna of a solution pond. Proc. Indiana Acad. Sci., 1910 pp. 395–442.

Smith, Gilbert M.: (1924) Ecology of the plankton algae in the Palisades Interstate Park, including the relation of control methods to fish culture. Roosevelt Wild Life Bull., **2**: 95–195.

Smith, Gilbert M.: (1933) The fresh-water algae of the United States. McGraw-Hill. New York.

Thienemann, August: (1925) Die Binnengewässer Mitteleuropas. Eine limnologische Einführung. Die Binnengewässer, edited by Thienemann, A. Stuttgart. Vol. 1, p. 213.

Wright, A. H., and Wright, A. A.: (1932) The habitats and composition of the vegetation of Okefinokee Swamp, Georgia. Ecol. Monogr., **2**: 109–232.

FACTORS INFLUENCING CARCINOGENESIS WITH METHYLCHOLANTHRENE [1]

I. THE EFFECT OF AGE

By MICHAEL B. SHIMKIN, M. D., *Research Fellow, National Cancer Institute, United States Public Health Service*

It is of fundamental significance to determine whether the cells of the younger or of the older individual are more susceptible to malignant degeneration. The influence of age upon the production of tumors with carcinogenic compounds remains unestablished, as the published studies reach diametrically opposite conclusions.

Woglom (*1*), in a comprehensive review, has stated that age is not an important factor in experimental tar cancer. Dunning, Curtis, and Bullock (*2*) have reported that the average time from injection of 3:4 benzpyrene to observation of tumors was slightly longer in young than in old rats and mice. The mean latent periods after a single subcutaneous injection of 8 mg. of benzpyrene in 0.8 cc. paraffin into rats were as follows: In animals up to 60 days old, 147 days; 60 to 120 days old, 156 days; 120 to 180 days old, 133 days; and in rats over 180 days old, 128 days. The mean latent periods after a single injection of 2 mg. of benzpyrene in 0.2 cc. paraffin into mice were: In animals up to 60 days old, 116 days; 60 to 120 days old, 104 days; 120 to 180 days old, 111 days; and in mice over 180 days old, 108 days. The value of the observations is reduced because the authors reached the extraordinary conclusion that "the probability of the occurrence of malignant changes was not influenced by the * * * genetic constitution of the host" and because they apparently used several strains of mice and of rats in the compilation of the results upon the effects of age. Moreover, the large doses of the carcinogen employed may have obscured the findings.

Brunschwig and Tschetter (*3*) injected 12 rats over 1 year of age and 13 rats 3 weeks old with 2 mg. of methylcholanthrene in 0.1 cc. of lard and found no difference in the latent period of tumor production. In the older rats, 9 developed sarcoma between 96 and 192 days (average 151), and in the younger group, 8 developed tumors between 148 and 184 days (average 159) after injection.

In contrast, Strong, Smith, and Gardner (*4*) observed that tumors were produced earlier in younger mice after injections with 3:4:5:6-dibenzcarbazole in sesame oil. In mice of the CBA strain, subcutaneous sarcomas appeared in 97 days in animals averaging 148 days of age, in 116 days in mice 198 days old, and in 148 days in 425-day-old mice. In mice of strain A, tumors arose in 96 days in animals 161 days old, and in 108 days when the mice were 244 days old at the time of injection.

[1] From the Office of Cancer Investigations, U. S. Public Health Service, Gibbs Memorial Laboratory, Harvard University, Cambridge, Mass.

The following investigations of the effect of age upon carcinogenesis with methylcholanthrene in mice were begun in August 1938.

EXPERIMENTAL

Experiment 1.—Male mice of the C_3H strain, 1.5, 5, 11, and 17 months of age were injected subcutaneously with 0.8 mg. of methylcholanthrene dissolved in 0.2 cc. of lard. The animals were examined weekly and were killed and necropsied as soon as an indubitable tumor was present.

The results are presented in table 1. Although the absolute differences in the average times at which the tumors arose are not striking, the average latent period was prolonged as the age of the animals increased. Thus, although the difference between the 6-week-old animals and 17-month animals is only 2.5 weeks, the relationship $1.5 < 5 < 11 < 17$ is significant. Moreover, whereas the first tumors in mice 5 months old or younger appeared in 7 weeks, no tumors occurred before 9 weeks in 17-month-old mice.

TABLE 1.—*Experiments 1 and 4. Time of appearance of subcutaneous tumors in C_3H mice 1.5, 5, 11, and 17 months old following injection of methylcholanthrene*

Experiment No.	Mice	Age in months	Average weight, gm.	Methylcholanthrene, mg.	Number injected	Time in weeks: 7	8	9	10	11	12	13	14	15	16	17	Total number of tumors	Average time in weeks
						Number of tumors												
1	C_3H ♂	1.5	17	0.8	19	2	10	5	2	----	----	----	----	----	----	----	19	8.3
1	do	5	35	.8	11	1	2	4	1	2	1	----	----	----	----	----	11	9.4
1	do	11	38	.8	21	----	6	4	2	2	4	1	1	----	----	----	20	10.0
1	do	17	38	.8	16	----	----	3	4	3	1	3	----	----	----	----	14	10.8
4	do	1.5	17	.4	22	1	2	3	2	2	4	2	2	----	----	2	20	11.4

The experiment was terminated at 22 weeks, when one mouse injected at 11 months and one mouse injected at 17 months of age were still living and well.

Experiment 2.—Male mice of the I strain, 1.5 and 5 months of age, were injected subcutaneously in the right axilla with 1.0 mg. of methylcholanthrene in 0.25 cc. of lard.

As seen in table 2, the difference between the two age groups is more striking when mice less susceptible to carcinogenic hydrocarbons than the C_3H strain were utilized. At 17 weeks after injection, half of the younger animals had developed tumors, whereas not one of the older mice had done so; at 24 weeks, all of the younger animals and less than half of the older animals had sarcoma. The experiment was terminated at 30 weeks, when 5 of the older mice were still living and well.

TABLE 2.—*Experiment 2. Time of appearance of subcutaneous tumors in* I *mice 1.5 and 5 months old following injection of 1.0 mg. methylcholanthrene in 0.25 cc. lard*

Time in weeks				12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Total number of tumors	Average time in weeks
Mice	Age in months	Average weight, gm.	Number injected	Number of tumors																		
I ♂	1.5	16	10	1	1	--	2	1	--	1	2	--	--	--	1	1	--	--	--	--	10	17.4
I ♂	5	25	11	--	--	--	--	--	--	1	1	--	1	--	1	--	--	1	--	1	6	22.5+

Experiment 3.—Male mice of the L strain (or M leaden strain), 2 months old (10 animals, weighing an average of 20 grams), and 11 months old (10 animals, weighing an average of 33 grams), were injected subcutaneously with 0.8 mg. of methylcholanthrene in 0.2 cc. of lard.

Five animals of the younger group developed tumors, at 9, 11, 12, 14, and 15 weeks, before the first tumor, at 16 weeks, arose in the older animals. The experiment was terminated at this time because the condition of the older mice was becoming unsatisfactory.

Experiment 4.—It is to be noted that in the three experiments described above, there was a marked disparity in the weight of the younger and the older animals. It was impossible to obtain mice of the same age with significant differences in weight, for in pure-strain mice kept under identical conditions and upon identical diets, the weights at any one age are approximately the same. Therefore, 22 male C_3H mice 6 weeks old were injected subcutaneously with 0.4 mg. methylcholanthrene in 0.2 cc. of lard. Since their weight was about half the weight of the animals 5 months or older, the dose was proportional to the weight of these animals. As shown in table 1, tumors arose in 20 out of 22 animals in the average time of 11.4 weeks. Although the average latent period was longer than in any of the other groups, regardless of age, it is suggestive that 3 of these young mice developed tumors before the first tumor was noted in the 17-month-old animals, despite the great difference in the amounts of the hydrocarbon administered.

DISCUSSION

In mice of strains C_3H, I, and L, injected with 0.8 to 1.0 mg. methylcholanthrene in lard, tumors developed earlier in 39 animals 2 months of age or younger than in 58 animals that were 5 to 17 months old at the time of injection.

Since the action of methylcholanthrene in the animal body is still unelucidated, the results may be interpreted in two ways. First, if the production of neoplasm by methylcholanthrene is a local tissue reaction, as is concluded for benzpyrene by Brock, Druckrey, and Hamperl (*5*), it may be stated that the younger tissues are more sus-

ceptible than the older tissues to malignant degeneration with the agent. Second, if methylcholanthrene acts upon the whole body, the results are explainable by the variance in the weight-dose ratio. The studies on the excretion of hydrocarbons (*6*) support the view that the whole body is involved in at least the elimination of the compounds, if not in the actual local neoplasia. It is therefore evident that it cannot be unreservedly concluded that the subcutaneous tissue of the younger and rapidly growing mice is more prone to sarcomatous degeneration with methylcholanthrene than is the subcutaneous tissue of the fully developed or the senescent animals.

Whether dependent upon the age or upon the relative size of the mice, the investigation illustrates that in experiments designed to compare various factors that may influence carcinogenesis with carcinogenic hydrocarbons, the age and the weight of the animals, as well as the strain (*7*), and possibly the sex must be taken into consideration.

CONCLUSIONS

1. In mice of strains C_3H, I, and L, injected subcutaneously with 0.8 to 1.0 mg. methylcholanthrene in lard, tumors developed earlier in 39 animals 2 months of age or younger than in 58 animals 5 to 17 months old.

2. The age and/or the weight of pure strain mice modifies the latent period of carcinogenesis with methylcholanthrene.

ACKNOWLEDGMENTS

The author is indebted to Dr. H. B. Andervont for advice and criticism, and to Mr. W. F. Gately for technical assistance.

REFERENCES

(*1*) Woglom, W. H.: Experimental tar cancer. Arch. Path. and Lab. Med., **2**: 709 (1926).

(*2*) Dunning, W. F., Curtis, M. R., and Bullock, F. D.: Respective rôles of heredity and somatic mutation in origin of malignancy. Am. J. Cancer, **28**: 681 (1936).

(*3*) Brunschwig, A., and Tschetter, D.: Age factor and latent period in production of sarcoma by methylcholanthrene in rats. Proc. Soc. Exp. Biol. and Med., **36**: 439 (1937).

(*4*) Strong, L. C., Smith, G. M., and Gardner, W. U.: Induction of tumors by 3:4:5:6-dibenzcarbazole in male mice of CBA strain, which develops spontaneous hepatoma. Yale J. Biol. and Med., **10**: 335 (1938).

(*5*) Brock, N., Druckrey, H., and Hamperl, H.: Zur Wirkungsweise carcenogener Substanzer. Arch. f. exper. Path. u. Pharmakol., **189**: 709 (1938).

(*6*) (*a*) Boyland, E., and Levi, A. A.: Metabolism of polycyclic compounds. Production of dihydroxydihydroanthracene from anthracene. Biochem. J., **29**: 2679 (1935).

(*b*) Berenblum, I., and Kendall, L. P.: Destruction of 1:2:5:6-dibenzanthracene in mouse. Biochem. J., **30**: 429 (1936).

(*c*) Chalmers, J. G., and Peacock, R. R.: Further evidence regarding elimination of certain polycyclic hydrocarbons from animal body. Biochem. J., **30**: 1242 (1936).

(*d*) Hieger, I.: On mechanism of carcinogenesis by chemical compounds. Am. J. Cancer, **28**: 522 (1936).

(*7*) Andervont, H. B.: Susceptibility of mice to spontaneous, induced and transplantable tumors. Comparative study of eight strains. Pub. Health Rep., **53**: 1647 (1938).

THE PREPARATION AND CLEANING OF THE NIH ANAL SWAB USED IN THE DIAGNOSIS OF OXYURIASIS

By JOHN P. FOLAN, *Laboratory Assistant, Division of Zoology, National Institute of Health, United States Public Health Service*

The NIH anal swab, first described by Hall (*1*), has been used extensively in connection with a group study on oxyuriasis conducted by the Division of Zoology of the National Institute of Health. Because of an increasing interest in this method of diagnosis, additional information concerning the swab is frequently requested by public health investigators and by private physicians. A description will be given here of the procedure which, after considerable experimentation, has been adopted for the preparation of the swabs and for their cleaning after use.

SPECIFICATIONS FOR THE NIH SWAB

The NIH swab (fig. 1) consists of the swab proper and the tube housing it. The swab proper is composed of a solid glass rod approximately 4 mm. in diameter and 4 inches long, with rounded ends. The rod is inserted through a No. 00 single-hole rubber stopper with about 1 inch of the rod protruding from the larger end of the stopper, to form a handle. At the other end of the rod, a cellophane tip is held securely by a rubber band made from rubber tubing having a 3-mm. bore and walls 2 mm. in thickness cut into strips approximately 2 mm. wide. The tips consist of 25-mm. squares of plain, transparent (P. T.) cellophane which may be procured in rolls 25 mm. in width.

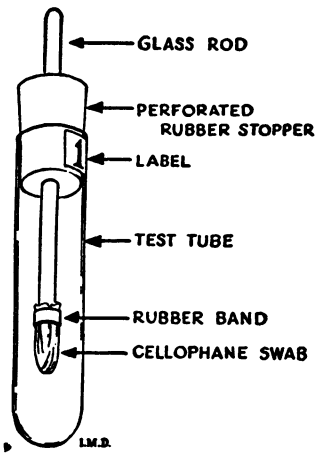

FIGURE 1.—The NIH swab (after Hall, 1937)

The swab proper fits into a test tube 15 by 85 mm., to which a label of adhesive tape is attached.

The approximate cost of the material necessary for the initial preparation of 100 swabs is slightly over $3, according to present prices under Government order; this cost is apportioned as follows:

100 test tubes (85 by 15 mm.)	$1. 60
100 glass rods (4 mm. diameter by 4 inches long)	. 73
100 rubber bands (2 mm. walls, 3 mm. bore)	. 04
100 No. 00 one-hole rubber stoppers	. 85
100 strips of adhesive tape (1 inch wide)	. 07
100 squares of 1-inch cellophane	. 01
	3. 30

DISPENSER FOR CELLOPHANE RIBBON

In order to facilitate preparation of the swabs, a dust-proof wooden housing, made of white pine, has been devised for the cellophane roll (figs. 2 and 3). The front is detachable and is held in position by two hooks, one at the top (fig. 2B) and one at the bottom of the box. On the ⅜-inch bolt (fig. 2C) 3 inches long, revolves a wooden spool (fig. 3A) carrying the cellophane reel (fig. 3B). The ribbon of cellophane (fig. 2D) passes through an aperture in the front of the box; a metal strip (fig. 3C) on the inner surface guides the ribbon and feeds it between two rubber rollers (fig. 3D) operated by a crank (fig. 3E). The crank is turned until the cellophane strip extends to a ridge (fig. 2E) placed seven-eighths of an inch below the rollers (fig. 2F), and the desired length of the ribbon is cut off by forcing the strip up against a razor blade (fig. 2G) held in position between two metal strips (fig. 2H) mounted with two small screws.

USE OF NIH SWAB IN DIAGNOSIS OF OXYURIASIS

For the diagnosis of pinworm infection, the cellophane-covered tip of the swab is stroked firmly, with an outward motion, over the perianal folds and across the anal opening, preferably in the morning immediately after the patient arises, in order to pick up pinworm ova which may have been deposited during the night by migrating females. For microscopical examination, the cellophane square is mounted in water or, if fecal material is apparent, in decinormal sodium hydroxide, and the surface of the cellophane and material released from it are examined for ova. The remaining parts of the swab may be cleaned and sterilized as described below, for subsequent reuse.

METHOD OF CLEANING THE NIH SWAB

As received in the laboratory, all swabs used for the diagnosis of oxyuriasis must be regarded as carrying infective material. The object of the method here described is the handling of the various parts of the swab in such a manner that (1) until after sterilization the hands will not come in contact with any part of the swab proper other than the handle, and (2) there will be thorough cleaning of all parts of both the swab proper and the housing. There must be no ova remaining from a previous use of the swab, since such ova might be carried over to a later examination and thus be credited to the wrong patient, possibly leading to a faulty diagnosis.

A 10-percent solution of trisodium phosphate has been found to distort the outer layers of the shell of the pinworm ovum, thus distinguishing it from nontreated ova. The use of this solution also loosens the ova and debris from the glass rod and the sides of the

tube. In addition, this process will loosen the rubber stopper from the glass rod and enable that part of the swab under the stopper to be cleaned.

Two containers of approximately 3-liter capacity each are used, one to receive the swabs and the other the tubes. These parts are im-

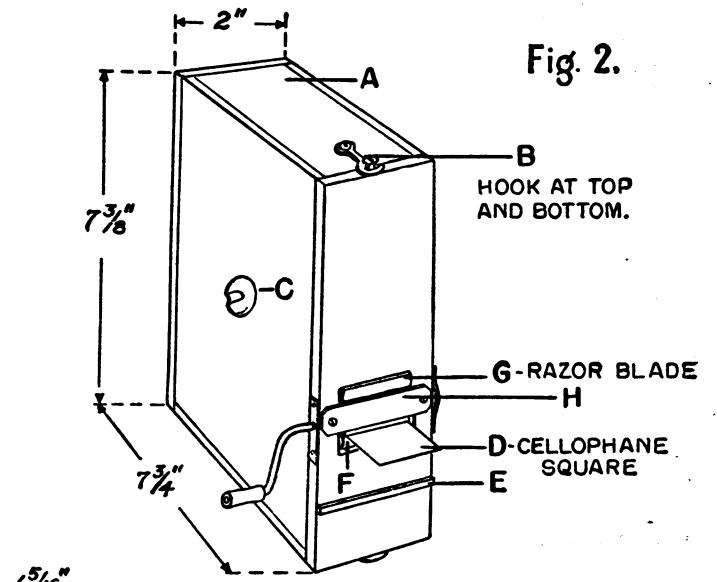

Fig. 2.

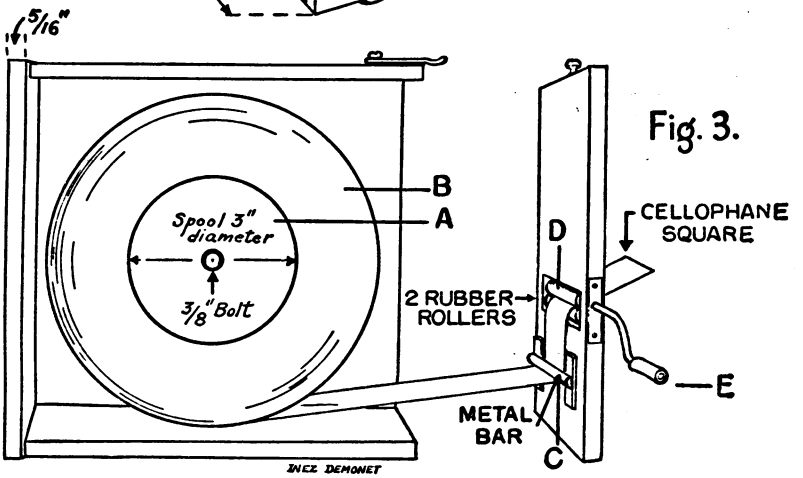

Fig. 3.

FIGURE 2.—Three-quarter view of NIH cellophane ribbon dispenser.

FIGURE 3.—Side view of NIH cellophane ribbon dispenser.

mersed in the trisodium phosphate solution for 24 to 48 hours; they are then handled separately, as follows.

The swab proper.—The trisodium phosphate solution is poured off and the swabs are transferred to a flat-bottomed tray and autoclaved for 15 minutes at 15 pounds' pressure.

After cooling, the rubber band which had been used for holding the cellophane tip in position is removed with forceps. The swabs are then put under running water for 20 minutes.

The rod and stopper of each swab are dried with a clean piece of gauze, examined for defects, and stored for future use.

The tube or housing of the swab.—The tubes are handled in much the same manner as described for the swabs. After having been soaked in the trisodium phosphate solution, the adhesive tape label is easily removed from the tubes. The tubes are then transferred to a metal tray and autoclaved for 15 minutes at 15 pounds' pressure.

After sterilization, the tubes are washed in liquid soap and water with a stiff brush and rinsed in running water several times. They are then inverted in a wire basket and the excess water allowed to drain off.

Owing to the strong alkali action of trisodium phosphate on glass, the tubes may become quite cloudy with continued use. The cloudiness may be removed by immersion of the tubes in a 20-percent solution of oxalic acid until the glass is clear. After drying, the tubes are placed in an oven at 150° C. for 1 hour. When cooled, they are stored for future use.

This method of preparing and cleaning the NIH swab has been in use in the Division of Zoology for the past 2 years. It has proved to be both speedy and economical.

REFERENCE

(1) Hall, M. C.: Studies on oxyuriasis. I. Types of anal swabs and scrapers, with a description of an improved type of swab. Am. J. Trop. Med., 17: 445–453 (1937).

DEATHS DURING WEEK ENDED JULY 8, 1939

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

	Week ended July 8, 1939	Corresponding week, 1938
Data from 88 large cities of the United States:		
Total deaths	7,206	7,245
Average for 3 prior years	[1] 7,857	
Total deaths, first 27 weeks of year	236,564	229,223
Deaths under 1 year of age	454	543
Average for 3 prior years	[1] 545	
Deaths under 1 year of age, first 27 weeks of year	14,025	14,354
Data from industrial insurance companies:		
Policies in force	67,112,141	69,193,356
Number of death claims	8,512	8,915
Death claims per 1,000 policies in force, annual rate	6.6	6.7
Death claims per 1,000 policies, first 27 weeks of year, annual rate	10.9	9.6

[1] Data for 86 cities.

PREVALENCE OF DISEASE

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

UNITED STATES

CURRENT WEEKLY STATE REPORTS

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

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

Cases of certain diseases reported by telegraph by State health officers for the week ended July 15, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median

Division and State	Diphtheria				Influenza				Measles			
	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934–38, median	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934–38, median	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934–38, median
NEW ENG.												
Maine	6	1	2	1	----	----	----	----	302	50	39	80
New Hampshire	10	1	0	0	----	----	----	----	71	7	----	3
Vermont	13	1	0	0	----	----	----	----	1,019	76	48	29
Massachusetts	4	3	4	9	----	----	----	----	482	410	157	217
Rhode Island	8	1	0	1	----	----	----	----	397	52	2	16
Connecticut	0	0	3	3	6	2	2	1	321	108	38	53
MID. ATL.												
New York	8	21	26	29	[1]4	[1]6	[1]3	[1]3	336	840	1,092	1,066
New Jersey [2]	8	7	8	8	----	----	4	2	24	20	98	247
Pennsylvania	11	22	15	17	----	----	----	----	34	66	549	514
E. NO. CEN.												
Ohio	5	6	22	13	10	13	----	7	59	77	233	604
Indiana	15	10	13	7	18	12	19	8	9	6	10	27
Illinois [2]	11	17	22	26	7	10	6	7	15	23	91	299
Michigan [2]	6	6	14	14	----	----	----	----	104	98	482	137
Wisconsin	2	1	3	3	25	14	21	4	334	190	659	569
W. NO. CEN.												
Minnesota	2	1	11	4	2	1	3	1	56	29	122	53
Iowa [2]	8	4	2	4	2	1	----	----	111	55	57	15
Missouri	4	3	9	12	----	----	----	27	4	3	15	35
North Dakota	15	2	1	1	467	64	16	2	285	39	42	8
South Dakota	8	1	2	2	----	----	----	----	113	15	----	3
Nebraska	15	4	1	2	----	----	----	----	31	8	22	22
Kansas	0	0	3	6	----	----	2	2	28	10	21	21

Cases of certain diseases reported by telegraph by State health officers for the week ended July 15, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Diphtheria				Influenza				Measles			
	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934–38, median	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934–38, median	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934–38, median
SO. ATL.												
Delaware	0	0	1	1	------	------	------	------	20	1	3	3
Maryland [2 3]	6	2	2	4	15	5	2	1	83	27	21	31
Dist. of Col	40	5	6	6	8	1	------	------	283	35	10	10
Virginia [3]	21	11	11	7	36	19	------	------	171	91	65	60
West Virginia	8	3	3	9	30	11	7	7	5	2	41	41
North Carolina [3 4]	10	7	10	10	1	1	2	1	120	82	301	86
South Carolina	16	6	3	2	229	84	69	40	22	8	33	8
Georgia [4]	17	10	16	5	43	26	------	------	25	15	------	------
Florida [4]	6	2	6	3	21	7	------	------	33	11	13	8
E. SO. CEN.												
Kentucky	7	4	2	5	------	------	3	3	3	2	15	40
Tennessee [4]	5	3	5	3	23	13	15	5	39	22	19	19
Alabama [4]	18	10	9	10	16	9	7	7	14	8	23	10
Mississippi [3]	8	3	3	4	------	------	------	------	------	------	------	------
W. SO. CEN.												
Arkansas	12	5	5	5	15	6	5	4	57	23	30	4
Louisiana [4]	10	4	12	9	75	31	11	11	------	[5] 366	6	9
Oklahoma	2	1	4	3	6	3	42	7	40	20	21	8
Texas [4]	99	119	20	20	72	87	91	55	70	85	47	76
MOUNTAIN												
Montana [3]	0	0	1	1	------	------	------	------	271	29	38	13
Idaho [3]	0	0	4	0	------	------	1	1	20	2	5	5
Wyoming	0	0	0	0	------	------	------	------	458	21	1	2
Colorado [6]	24	5	9	3	------	------	------	------	77	16	30	30
New Mexico	0	0	0	0	------	------	------	------	49	4	8	8
Arizona	0	0	2	1	123	10	18	8	49	4	17	7
Utah [2 3]	10	1	5	0	------	------	1	------	238	24	107	22
PACIFIC												
Washington	0	0	0	0	------	------	------	------	1,135	368	21	45
Oregon	5	1	1	1	30	6	21	4	303	61	18	17
California	17	21	16	20	14	17	16	16	393	479	397	323
Total	13	335	317	317	22	459	387	232	146	3,622	5,067	5,067
28 weeks	15	10,759	12,796	13,685	253	150,230	44,403	102,780	494	342,249	751,050	656,834

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended July 15, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934-38, median	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934-38, median	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934-38, median
NEW ENG.												
Maine	0	0	0	0	0	0	0	0	338	56	10	10
New Hampshire	0	0	0	0	0	0	0	0	0	0	1	3
Vermont	0	0	0	0	0	0	1	1	13	1	4	4
Massachusetts	1.2	1	1	1	1.2	1	1	2	60	51	98	66
Rhode Island	0	0	0	0	0	0	1	1	0	0	6	6
Connecticut	0	0	0	0	0	0	0	0	39	13	19	12
MID. ATL.												
New York	0	0	2	10	2.4	6	2	9	41	103	140	167
New Jersey [3]	0	0	0	1	2.4	2	2	2	37	31	17	31
Pennsylvania	2	4	2	2	0	0	0	0	50	98	188	144
E. NO. CEN.												
Ohio	1.5	2	1	4	4	5	1	1	70	91	78	120
Indiana	6	4	0	0	1.5	1	1	0	27	18	23	26
Illinois [3]	0	0	2	4	3	5	2	5	45	69	87	139
Michigan [3]	0	0	1	1	5	5	3	2	90	85	145	137
Wisconsin	0	0	0	0	4	2	0	0	74	42	55	66
W. NO. CEN.												
Minnesota	0	0	0	0	12	6	1	1	25	13	34	34
Iowa [3]	0	0	0	0	0	0	0	0	26	13	23	19
Missouri	0	0	1	2	1.3	1	1	1	10	8	18	19
North Dakota	0	0	2	1	15	2	0	0	15	2	12	10
South Dakota	0	0	0	0	0	0	2	0	30	4	6	2
Nebraska	0	0	1	0	4	1	0	0	19	5	4	4
Kansas	0	0	0	1	0	0	0	2	64	23	16	27
SO. ATL.												
Delaware	0	0	0	0	0	0	0	0	39	2	2	2
Maryland [2 3]	0	0	1	3	0	0	0	0	49	16	9	16
Dist. of Col	0	0	0	0	0	0	1	0	8	1	3	3
Virginia [3]	6	3	4	4	1.9	1	4	3	26	14	8	8
West Virginia	0	0	1	1	0	0	0	2	24	9	12	17
North Carolina [2 4]	2.9	2	3	3	4	3	1	3	13	9	23	17
South Carolina	5	2	1	1	55	20	1	1	3	1	1	2
Georgia [4]	0	0	1	1	8	5	1	1	2	1	8	5
Florida [4]	3	1	1	0	9	3	1	0	15	5	2	1
E. SO. CEN.												
Kentucky	5	3	2	1	5	3	1	1	7	4	9	11
Tennessee [4]	0	0	1	2	4	2	2	7	26	15	4	4
Alabama [4]	0	0	4	0	4	2	3	3	18	10	9	9
Mississippi	0	0	1	1	0	0	3	2	5	2	6	3
W. SO. CEN.												
Arkansas	5	2	0	1	2.5	1	0	0	2	1	6	6
Louisiana [4]	2.4	1	3	1	2.4	1	1	1	17	7	3	6
Oklahoma	0	0	0	0	2	1	1	0	10	5	12	7
Texas [4]	0	0	0	2	12	15	1	1	14	17	35	30
MOUNTAIN												
Montana [3]	9	1	0	0	0	0	0	0	75	8	10	4
Idaho [3]	0	0	1	0	0	0	0	0	20	2	6	3
Wyoming	0	0	0	0	0	0	0	0	153	7	0	1
Colorado [6]	0	0	0	0	5	1	0	0	43	9	24	21
New Mexico	0	0	0	0	12	1	1	0	49	4	5	5
Arizona	0	0	0	0	12	1	1	0	12	1	2	4
Utah [2 3]	0	0	0	0	10	1	0	0	40	4	9	9
PACIFIC												
Washington	0	0	0	0	0	0	0	0	15	5	15	14
Oregon	0	0	0	0	0	0	0	0	25	5	10	11
California	0.8	1	0	3	37	45	4	19	54	66	81	81
Total	1.1	27	37	79	6	143	45	191	38	956	1,298	1,391
28 weeks	1.8	1,232	1,963	3,795	1.4	1,020	625	1,346	160	112,675	132,945	160,214

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended July 15, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934–38, median	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases	1934–38, median	July 15, 1939, rate	July 15, 1939, cases	July 16, 1938, cases
NEW ENG.											
Maine	0	0	0	0	0	0	1	1	157	26	16
New Hampshire	0	0	0	0	10	1	0	0	0	0	0
Vermont	0	0	0	0	80	6	0	0	630	47	36
Massachusetts	0	0	0	0	5	4	0	3	165	140	94
Rhode Island	0	0	0	0	0	0	0	0	237	31	14
Connecticut	0	0	0	0	9	3	4	1	157	53	64
MID. ATL.											
New York	0	0	0	0	5	13	14	14	165	413	603
New Jersey [2]	0	0	0	0	7	6	1	6	285	239	318
Pennsylvania	0	0	0	0	3	6	15	15	222	438	334
E. NO. CEN.											
Ohio	9	12	0	0	7	9	8	12	403	524	302
Indiana	3	2	25	2	12	8	16	9	146	98	15
Illinois [3]	2	3	13	11	16	25	17	23	237	362	415
Michigan [3]	1	1	4	0	1	1	0	3	191	181	448
Wisconsin	0	0	0	5	0	0	3	2	373	212	245
W. NO. CEN.											
Minnesota	4	2	7	6	0	0	1	1	68	35	66
Iowa [2]	26	13	6	5	4	2	2	2	69	34	27
Missouri	4	3	8	5	6	5	7	21	46	36	40
North Dakota	15	2	4	1	0	0	1	0	421	58	51
South Dakota	53	7	0	1	0	0	0	0	23	3	10
Nebraska	11	3	3	3	0	0	1	1	130	34	20
Kansas	3	1	1	3	3	0	7	6	61	22	119
SO. ATL.											
Delaware	0	0	0	0	20	1	1	1	138	7	6
Maryland [2 3]	0	0	0	0	6	2	12	12	200	65	49
Dist. of Col	0	0	0	0	32	4	3	1	307	38	12
Virginia [3]	0	0	0	0	69	37	26	17	109	58	88
West Virginia	0	0	0	0	46	17	4	9	22	8	71
North Carolina [2 4]	3	2	0	0	28	19	21	25	400	274	340
South Carolina	0	0	0	0	57	21	11	22	49	18	101
Georgia [4]	0	0	0	0	40	24	50	50	56	34	26
Florida [4]	0	0	0	0	3	1	1	1	99	33	0
E. SO. CEN.											
Kentucky	0	0	6	0	64	37	38	38	76	44	52
Tennessee [4]	0	0	0	0	56	32	45	45	229	130	62
Alabama [4]	0	0	0	0	23	13	20	24	37	21	34
Mississippi [3]	0	0	0	0	23	9	11	16	------	------	------
W. SO. CEN.											
Arkansas	2	1	0	0	32	13	28	23	37	15	18
Louisiana [4]	0	0	0	0	97	40	21	21	385	159	68
Oklahoma	0	0	5	1	40	20	26	26	8	4	49
Texas [4]	0	0	5	0	25	30	55	40	95	115	268
MOUNTAIN											
Montana [2 7]	0	0	1	1	9	1	2	2	56	6	55
Idaho [2]	0	0	6	2	20	2	3	0	0	0	2
Wyoming	44	2	0	3	0	0	0	0	22	1	5
Colorado [6]	10	2	4	3	24	5	7	2	183	38	50
New Mexico	0	0	0	0	74	6	3	5	235	19	18
Arizona	25	2	2	0	25	2	6	4	0	0	18
Utah [2 3]	0	0	0	0	10	1	3	0	755	76	74
PACIFIC											
Washington	3	1	18	4	6	2	5	5	52	17	62
Oregon	5	1	8	3	10	2	3	3	99	20	35
California	11	14	14	3	6	7	17	11	89	109	249
Total	3	74	140	103	17	437	520	594	174	4,295	5,049
28 weeks	12	[7] 8,454	12,270	5,788	7	4,601	5,268	5,268	158	109,344	121,044

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended July 15, 1939, 22 cases as follows: New Jersey, 3; Illinois, 3; Iowa, 3; Maryland, 1; Virginia, 4; North Carolina, 5; Montana, 1; Idaho, 1; Utah, 1.
[3] Period ended earlier than Saturday.
[4] Typhus fever, week ended July 15, 1939, 77 cases as follows: North Carolina, 6; Georgia, 27; Florida, 5; Tennessee, 5; Alabama, 17; Louisiana, 2; Texas, 15.
[5] Delayed report.
[6] Colorado tick fever, Colorado, 2 cases.
[7] One case reported as Rocky Mountain spotted fever in Montana during the week ended July 1, published in the PUBLIC HEALTH REPORTS of July 14, 1939, p. 1293, was later diagnosed as smallpox.

ROCKY MOUNTAIN SPOTTED FEVER

Cases reported by States, Feb. 26 to July 22, 1939

State	Feb. 26 to Mar. 25	Mar. 26 to Apr. 22	Apr. 23 to May 20	May 21 to June 17	June 18 to July 15	Week ended July 22
New York				3	3	
New Jersey				4	8	1
Pennsylvania				6	3	1
Ohio				3	2	
Indiana				2	1	
Illinois			1	1	5	2
Iowa			1	10	9	2
Missouri				1		
Delaware				3		
Maryland			7	13	11	5
District of Columbia			2	2	2	1
Virginia			1	13	10	1
North Carolina				3	13	5
Georgia					1	
Tennessee			1		3	3
Montana	[1] 2	2	8	5	1	
Idaho		4	7	4	5	
Wyoming		3	14	16	5	3
Colorado		2	3	9	4	
Utah		2	5	5	6	2
Washington		2	3	2		
Oregon		9	16	7	2	

[1] 1 other case was reported in Montana as occurring in February, exact date not given.

SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Meningitis, meningococcus	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid and paratyphoid fever
June 1939										
Delaware	1	0			43		0	13	0	2
Iowa	2	18	9	1	511		0	144	54	12
Kentucky	2	15	23	16	48	8	1	55	3	52
Maine	0	4	1		568		0	37	0	3
Nebraska	1	4	10		454		2	31	21	2
New Jersey	2	42	9		117		1	353	0	6
Ohio	3	48	61	1	243	1	0	642	58	26
Pennsylvania	36	72		3	611	2	3	716	1	29
Texas	3	74	371	451	1,340	134	11	90	13	70
Vermont	0	0			430		0	17	0	1
West Virginia	1	18	28	1	46	9	0	66	1	35

June 1939

	Cases
Anthrax:	
Pennsylvania	2
Chickenpox:	
Delaware	6
Iowa	139
Kentucky	49
Maine	71
Nebraska	24
New Jersey	627
Ohio	1,015
Pennsylvania	2,015
Texas	343
Vermont	65
West Virginia	40
Diarrhea:	
Ohio (under 2 years; enteritis included)	73
Dysentery:	
Iowa (bacillary)	2
Kentucky	59
New Jersey (amoebic)	1
Ohio (amoebic)	1
Ohio (bacillary)	19
Pennsylvania (amoebic)	4
Texas (amoebic)	4
Texas (bacillary)	295
West Virginia (bacillary)	9
Encephalitis, epidemic or lethargic:	
New Jersey	3
Ohio	2
Pennsylvania	2
German measles:	
Maine	6
New Jersey	38
Ohio	14
Pennsylvania	46
Vermont	6
Impetigo contagiosa:	
Ohio	30

June 1939—Continued

	Cases
Lead poisoning:	
Ohio	10
Leprosy:	
Ohio	1
Texas	1
Mumps:	
Delaware	14
Iowa	111
Kentucky	79
Maine	58
Nebraska	22
New Jersey	505
Ohio	1,421
Pennsylvania	1,109
Texas	125
Vermont	128
West Virginia	56
Ophthalmia neonatorum:	
New Jersey	12
Pennsylvania	4
Texas	2
Puerperal septicemia:	
Ohio	2
Rabies in animals:	
Iowa	5
New Jersey	63
Texas	5
Rabies in man:	
Ohio	2
Rocky Mountain spotted fever:	
Delaware	3
Iowa	11
New Jersey	7
Ohio	5
Pennsylvania	9
West Virginia	2
Septic sore throat:	
Iowa	5
Kentucky	13
Nebraska	3
New Jersey	25
Ohio	117

June 1939—Continued

	Cases
Tetanus:	
New Jersey	2
Trachoma:	
Maine	1
Pennsylvania	1
Trichinosis:	
New Jersey	1
Pennsylvania	1
Tularaemia:	
Kentucky	2
Texas	15
Typhus fever:	
Maine	1
Pennsylvania	1
Texas	36
Undulant fever:	
Delaware	1
Iowa	38
Kentucky	3
Maine	2
New Jersey	5
Ohio	6
Pennsylvania	9
Texas	17
Vermont	3
West Virginia	1
Vincent's infection:	
Maine	2
Whooping cough:	
Delaware	45
Iowa	131
Kentucky	97
Maine	211
Nebraska	97
New Jersey	1,207
Ohio	867
Pennsylvania	1,639
Texas	584
Vermont	152
West Virginia	76

CASES OF VENEREAL DISEASES REPORTED FOR MAY 1939

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	1,332	4.60	220	.76
Arizona	235	5.70	120	2.91
Arkansas	814	3.97	222	1.08
California	2,334	3.79	1,455	2.36
Colorado	107	1.00	53	.49
Connecticut	150	.86	65	.37
Delaware	179	6.86	35	1.34
District of Columbia	502	8.01	300	4.78
Florida	1,472	8.81	148	.89
Georgia	1,852	6.00	310	1.00
Idaho	30	.61	12	.24
Illinois	2,618	3.32	1,285	1.63
Indiana	806	2.32	82	.24
Iowa	237	.93	128	.50
Kansas	219	1.17	100	.54
Kentucky	956	3.27	342	1.17
Louisiana	907	4.25	102	.48
Maine	38	.44	32	.37
Maryland	987	5.88	265	1.58
Massachusetts	462	1.04	358	.81
Michigan	1,276	2.64	520	1.08
Minnesota	244	.92	126	.48
Mississippi	2,510	12.41	2,577	12.74
Missouri	1,585	3.97	181	.45
Montana	42	.78	13	.24
Nebraska	67	.49	31	.23
Nevada [1]				
New Hampshire [1]				
New Jersey	767	1.77	195	.45
New Mexico	119	2.82	30	.71
New York	5,233	4.04	2,017	1.56
North Carolina	2,361	6.76	348	1.00
North Dakota	35	.50	38	.54
Ohio	1,636	2.43	285	.42
Oklahoma	1,274	5.00	277	1.09
Oregon	159	1.55	92	.90
Pennsylvania	1,345	1.32	195	.19
Rhode Island	98	1.44	42	.62
South Carolina	1,317	7.02	337	1.80
South Dakota	13	.19	17	.25
Tennessee	927	3.20	338	1.17
Texas	5,708	9.25	843	1.37
Utah	12	.23	25	.48
Vermont	10	.26	15	.39
Virginia	1,740	6.43	298	1.10
Washington	249	1.50	176	1.06
West Virginia	306	1.64	114	.61
Wisconsin	93	.32	109	.37
Wyoming			4	.17
Hawaii	78	1.93	83	2.05
Total	45,441	3.52	14,960	1.16

See footnotes at end of table.

Reports from cities of 200,000 population or over [2]

Atlanta, Ga	266	8.86	47	1.57
Baltimore, Md	582	6.97	189	2.26
Birmingham, Ala	318	10.80	79	2.68
Boston, Mass	200	2.51	129	1.62
Buffalo, N. Y	100	1.66	49	.81
Chicago, Ill	1,706	4.65	890	2.43
Cincinnati, Ohio	212	4.49	98	2.07
Cleveland, Ohio	269	2.85	101	1.07
Columbus, Ohio	61	1.95	12	.38
Dallas, Tex	222	7.30	108	3.55
Denver, Colo	67	2.22	43	1.43
Detroit, Mich	545	3.00	266	1.47
Houston, Tex	317	8.85	110	3.07
Indianapolis, Ind	25	.65	22	.57
Jersey City, N. J	23	.71	11	.34
Louisville, Ky	253	7.46	56	1.65
Memphis, Tenn	249	8.53	111	3.80
Minneapolis, Minn	75	1.50	23	.46
Newark, N. J	311	6.85	106	2.33
New York, N. Y	3,996	5.33	1,598	2.13
Omaha, Nebr	35	1.57	8	.36
Philadelphia, Pa	488	2.43	----	----
Pittsburgh, Pa	362	5.14	18	.26
Portland, Oreg	90	2.81	51	1.59
Rochester, N. Y	32	.94	37	1.08
St. Paul, Minn	34	1.18	9	.31
San Antonio, Tex	150	5.73	81	3.10
San Francisco, Calif	166	2.41	164	2.38
Seattle, Wash	109	2.82	82	2.12
Syracuse, N. Y	120	5.32	21	.93
Washington, D. C	502	8.01	300	4.78

[1] No report for current month.
[2] Reports not received from Akron, Dayton, Kansas City, Mo., Los Angeles, Milwaukee, New Orleans, Oakland, Providence, St. Louis, or Toledo.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 8, 1939

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

State and city	Diphtheria cases	Influenza cases	Influenza deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Data for 90 cities:											
5-year average	118	32	14	2,012	339	636	8	374	58	1,334	----
Current week [1]	64	13	12	998	210	296	0	327	21	1,113	----
Maine:											
Portland	0	----	0	3	2	0	0	0	0	1	27
New Hampshire:											
Concord	0	----	0	0	0	0	0	0	0	0	8
Manchester	0	----	0	0	0	0	0	0	0	0	6
Nashua	0	----	0	0	0	0	0	0	1	0	6
Vermont:											
Barre	0	----	0	0	0	0	0	0	0	6	2
Burlington	0	----	0	4	0	0	0	0	0	0	16
Rutland	0	----	0	0	0	0	0	0	0	0	8
Massachusetts:											
Boston	2	----	0	80	10	7	0	4	0	27	187
Fall River	1	----	0	1	0	1	0	2	0	0	24
Springfield	0	----	0	12	0	1	0	0	0	0	31
Worcester	0	----	0	11	6	1	0	0	0	12	45
Rhode Island:											
Pawtucket	0	----	0	0	0	0	0	0	0	0	10
Providence	0	----	0	51	3	6	0	3	0	12	51
Connecticut:											
Bridgeport	----	----	----	----	----	----	----	----	----	----	----
Hartford	0	----	0	1	0	0	0	1	0	7	30
New Haven	0	1	0	39	0	0	0	0	0	4	29
New York:											
Buffalo	0	----	0	24	3	8	0	5	0	12	112
New York	9	1	1	106	35	44	0	67	1	120	1,205
Rochester	0	1	0	27	3	2	0	2	0	5	61
Syracuse	0	----	0	113	1	1	0	2	0	84	56

[1] Figures for Bridgeport and Winston-Salem estimated; reports not received.

City reports for week ended July 8, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
New Jersey:											
Camden	0	------	0	1	0	5	0	0	0	7	15
Newark	1	------	0	7	1	6	0	5	0	51	83
Trenton	0	------	0	0	1	1	0	4	0	7	27
Pennsylvania:											
Philadelphia	1	------	0	23	11	11	0	20	3	113	391
Pittsburgh	1	------	0	0	6	23	0	7	0	25	137
Reading	0	------	0	8	0	0	0	0	0	2	21
Scranton	0	------	--------	0	-------	4	0	-------	0	0	--------
Ohio:											
Cincinnati	0	------	0	0	3	5	0	3	0	12	106
Cleveland	0	1	0	4	5	10	0	15	1	80	174
Columbus	1	------	0	4	2	0	0	2	0	6	63
Toledo	0	------	0	19	2	4	6	6	0	47	60
Indiana:											
Anderson	0	------	0	0	0	0	0	2	1	0	12
Fort Wayne	0	------	0	0	0	0	0	0	0	0	26
Indianapolis	2	------	0	2	5	4	0	3	1	47	102
Muncie	0	------	0	0	0	0	0	0	0	0	9
South Bend	0	------	0	0	0	0	0	0	0	6	15
Terre Haute	0	------	1	0	0	0	0	0	0	0	17
Illinois:											
Alton	0	------	0	0	0	0	0	0	0	0	8
Chicago	9	------	1	12	15	41	0	38	0	112	629
Elgin	0	------	0	0	1	0	0	0	0	5	10
Moline	0	------	0	0	0	0	0	0	0	2	10
Springfield	0	------	0	1	1	1	0	0	0	13	31
Michigan:											
Detroit	2	------	1	39	5	31	0	13	0	57	207
Flint	0	------	0	0	1	2	0	0	0	7	13
Grand Rapids	0	------	0	2	0	9	0	0	0	2	27
Wisconsin:											
Kenosha	0	------	0	0	1	0	0	1	0	1	7
Madison	0	------	0	34	2	0	0	0	0	10	15
Milwaukee	0	------	0	2	0	15	0	2	0	25	101
Racine	1	------	0	1	0	0	0	0	0	2	13
Superior	0	------	0	7	0	0	0	0	0	0	9
Minnesota:											
Duluth	0	------	0	3	1	0	0	1	0	0	17
Minneapolis	0	------	0	2	2	5	0	4	0	2	84
St. Paul	0	------	0	3	4	3	0	2	0	15	60
Iowa:											
Cedar Rapids	0	------	--------	7	-------	0	0	-------	0	0	--------
Davenport	0	------	--------	0	-------	1	2	-------	0	0	--------
Des Moines	1	------	0	3	0	0	1	0	2	0	43
Sioux City	0	------	--------	3	-------	0	0	-------	0	4	--------
Waterloo	4	------	--------	0	-------	2	0	-------	0	5	--------
Missouri:											
Kansas City	0	------	0	1	1	2	0	6	1	3	94
St. Joseph	0	------	0	1	1	0	0	0	0	1	28
St. Louis	0	------	0	1	4	4	0	7	2	17	174
North Dakota:											
Fargo	0	------	0	0	1	0	0	0	0	1	5
Grand Forks	0	------	--------	0	-------	0	0	-------	0	0	--------
Minot	0	------	0	2	0	0	0	0	0	0	13
South Dakota:											
Aberdeen	0	------	--------	9	-------	0	7	-------	0	0	--------
Sioux Falls	0	------	0	0	0	2	0	0	0	0	9
Nebraska:											
Lincoln	0	------	--------	3	-------	0	0	-------	0	26	--------
Omaha	0	------	0	2	2	1	0	1	0	0	51
Kansas:											
Lawrence	0	------	0	0	0	1	0	0	0	0	3
Topeka	0	------	0	1	1	0	0	0	0	1	18
Wichita	0	------	0	1	2	2	0	1	0	0	45
Delaware:											
Wilmington	0	------	0	1	1	0	0	0	0	3	26
Maryland:											
Baltimore	2	2	1	6	3	2	0	7	0	35	183
Cumberland	0	------	0	0	0	0	0	0	0	0	6
Frederick	0	------	0	12	1	0	0	0	0	0	4
District of Columbia:											
Washington	0	------	0	47	4	3	0	7	0	29	136
Virginia:											
Lynchburg	0	------	0	7	1	0	0	0	2	31	8
Norfolk	0	------	0	1	0	0	0	1	1	3	18
Richmond	0	------	0	26	2	0	0	3	1	6	46
Roanoke	0	------	0	0	1	0	0	1	0	0	16

City reports for week ended July 8, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
West Virginia:											
Charleston	0	------	0	0	0	1	0	0	1	0	10
Huntington	0	------	------	0	------	0	0	------	0	0	------
Wheeling	0	------	0	0	0	0	0	1	1	6	21
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	0	------
Raleigh	0	------	0	0	0	0	0	2	0	0	12
Wilmington	0	------	0	1	0	0	0	0	0	0	8
Winston-Salem	------	------	------	------	------	------	------	------	------	------	------
South Carolina:											
Charleston	0	3	0	0	0	0	0	0	0	0	21
Florence	0	------	0	0	1	0	0	0	0	0	6
Greenville	0	------	0	0	1	0	0	0	0	0	17
Georgia:											
Atlanta	1	1	1	0	4	0	0	5	1	0	89
Brunswick	0	------	0	0	1	0	0	0	0	0	2
Savannah	0	------	0	0	------	0	0	4	0	11	28
Florida:											
Miami	0	------	0	0	1	1	0	1	0	0	22
Tampa	0	------	0	5	1	0	0	1	0	0	18
Kentucky:											
Ashland	0	------	0	0	0	0	0	0	0	0	4
Covington	0	------	0	0	1	0	0	4	0	0	12
Lexington	0	------	0	3	0	0	0	1	0	1	18
Louisville	1	------	0	0	2	0	0	4	1	11	52
Tennessee:											
Knoxville	0	------	0	0	1	0	0	0	0	0	21
Memphis	0	------	0	0	2	2	0	5	2	18	62
Nashville	0	------	0	0	0	0	0	3	1	8	53
Alabama:											
Birmingham	1	------	2	0	2	0	0	4	0	1	57
Mobile	0	------	0	0	1	0	0	1	0	0	21
Montgomery	0	------	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	0	0	------	1	0	------
Little Rock	0	------	0	0	0	0	0	2	1	1	------
Louisiana:											
Lake Charles	0	------	0	1	0	0	0	0	1	0	2
New Orleans	2	1	1	1	9	4	0	9	2	8	140
Shreveport	2	------	0	1	9	0	0	3	0	1	67
Oklahoma:											
Oklahoma City	0	------	0	0	4	1	0	2	0	3	36
Tulsa	0	------	------	0	------	0	0	------	0	2	------
Texas:											
Dallas	3	1	0	6	1	1	0	3	0	0	68
Fort Worth	0	------	0	3	2	1	0	2	2	0	37
Galveston	1	------	0	3	1	1	0	0	0	0	16
Houston	3	------	0	3	3	2	0	4	0	0	64
San Antonio	0	------	0	0	2	0	0	7	0	0	89
Montana:											
Billings	0	------	0	0	0	0	0	1	0	0	16
Great Falls	0	------	0	18	0	0	0	0	0	0	5
Helena	0	------	0	0	0	0	0	0	0	0	4
Missoula	0	------	0	0	0	0	0	0	0	0	2
Idaho:											
Boise	0	------	0	0	0	0	0	0	0	0	2
Colorado:											
Colorado Springs	1	------	0	0	0	0	0	2	0	0	10
Denver	4	------	0	15	1	3	0	1	0	13	69
Pueblo	1	------	0	1	2	0	0	0	0	13	13
Mew Mexico:											
Albuquerque	0	------	0	0	0	0	0	1	0	3	14
Utah:											
Salt Lake City	0	------	0	7	0	2	0	1	0	28	88
Washington:											
Seattle	2	------	0	185	2	2	0	7	0	2	89
Spokane	0	------	0	18	0	0	0	0	0	0	16
Tacoma	1	------	0	4	1	2	0	0	0	0	22
Oregon:											
Portland	0	------	0	4	6	4	0	0	0	2	62
Salem	0	------	------	1	------	0	0	------	0	0	------
California:											
Los Angeles	7	------	0	68	11	10	0	23	0	14	285
Sacramento	0	------	0	8	1	1	0	0	0	2	26
San Francisco	4	1	3	2	7	6	0	3	0	5	135

City reports for week ended July 8, 1939—Continued

State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	1
New York:			
Buffalo	1	1	0
New York	0	0	1
Rochester	0	0	2
Syracuse	1	1	0
Pennsylvania:			
Philadelphia	0	0	2
Ohio:			
Cincinnati	1	0	0
Cleveland	0	0	1
Toledo	0	0	1
Michigan:			
Detroit	0	0	5
Wisconsin:			
Madison	0	0	1
Virginia:			
Norfolk	0	0	1
South Carolina:			
Charleston	0	0	8
Georgia:			
Atlanta	1	0	5
Kentucky:			
Louisville	1	0	0
Tennessee:			
Nashville	0	0	1
Oklahoma:			
Tulsa	0	0	1
Texas:			
Dallas	0	0	1
San Antonio	0	0	2
California:			
Los Angeles	0	0	5

Encephalitis, epidemic or lethargic.—Cases: St. Paul, 1; Topeka, 1.
Pellagra.—Cases: Philadelphia, 1; Wilmington, N. C., 1; Charleston, S. C., 2; Savannah, 5; Nashville, 1; Los Angeles, 1.
Typhus fever.—Cases: Baltimore, 1; Savannah, 1; Mobile, 1; Lake Charles, 1; New Orleans, 1; Fort Worth, 1; Houston, 2.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended June 24, 1939.—During the week ended June 24, 1939, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis		1	2			1			4
Chickenpox	36	[1]30	46	199	21	8	22	38	400
Diphtheria	1		23	3	2	1			30
Influenza	3			8	1			21	33
Measles	8	[1]20	96	795	34	2		7	962
Mumps	1		19	62	33			6	121
Pneumonia	12			11	1	1	1	13	39
Poliomyelitis			1	3	1		1		6
Scarlet fever	3	36	15	98	11	5	11	9	188
Smallpox					1		22		23
Trachoma					3	1	1		5
Tuberculosis	24	9	34	53	4	18			142
Typhoid and paratyphoid fever		1	15	3			1	1	21
Whooping cough	33	[1]17	12	101	12	22	11	52	260

[1] Delayed reports; cases reported occurred since Jan. 1, 1939.

NOTE.—Prince Edward Island reported no cases of any of the above diseases.

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended April 1, 1939.—During the 13 weeks ended April 1, 1939, cases of certain infectious diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	14,678	Puerperal pyrexia	2,341
Dysentery	466	Scarlet fever	21,698
Ophthalmia neonatorum	1,170	Smallpox	1
Pneumonia	19,868	Typhoid fever	249

England and Wales—Vital statistics—First quarter 1939.—During the first quarter ended March 31, 1939, 153,547 live births and 154,158 deaths were registered in England and Wales. The following statistics are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar General, and are provisional:

Birth and death rates in England and Wales, quarter ended Mar. 31, 1939

Annual rates per 1,000 population:	
Live births	15.1
Stillbirths	.62
Deaths, all causes	15.2
Deaths under 1 year of age	[1] 65
Deaths from:	
Diarrhea and enteritis (under 2 years of age)	[1] 5.5
Diphtheria	.07
Influenza	0.61
Measles	.01
Scarlet fever	.01
Typhoid and paratyphoid fever	.00
Whooping cough	.04

[1] Per 1,000 live births.

ITALY

Communicable diseases—4 weeks ended April 23, 1939.—During the 4 weeks ended April 23, 1939, cases of certain communicable diseases were reported in Italy as follows:

Disease	Mar. 27–Apr. 2	Apr. 3–9	Apr. 10–16	Apr. 17–23
Anthrax	14	3	7	12
Cerebrospinal meningitis	37	41	60	43
Chickenpox	526	539	552	693
Diphtheria	477	432	437	391
Dysentery (amoebic)	16	8	13	8
Dysentery (bacillary)	3	1	1	
Hookworm disease	31	22	19	14
Lethargic encephalitis	1	1		1
Measles	1,765	1,705	1,867	2,031
Mumps	266	257	270	318
Paratyphoid fever	45	37	35	34
Pellagra	2	4	20	69
Poliomyelitis	24	19	25	20
Puerperal fever	22	26	16	15
Scarlet fever	291	273	273	291
Typhoid fever	259	217	197	182
Undulant fever	103	102	120	138
Whooping cough	332	304	407	564

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

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

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Nov. 27–Dec. 31, 1938	Jan. 1–28, 1939	Jan. 29–Feb. 25, 1939	Feb. 26–Mar. 25, 1939	Week ended— April 1939					May 1939				June 1939			
						1	8	15	22	29	6	13	20	27	3	10	17	24
Afghanistan: Kandahar Province—Greshk.[1]																		
China:																		
Canton	C												P	9				
	D													6				
Fatshan	C												P					
	D													154				
Foochow	C	118	6															
	D	7	2															
Hainan Island	C												P					
Honan	C												P					
Hong Kong	C	11	5								2	4	9	10	16	27	20	50
	D	9	2								1	2	10	6	9	13	20	38
Macao	C	1							1			1	9	10	9	20	30	
	D	1										1	5	6	6	11	16	
Shanghai	C	10														1		
Swatow	C	1																
Whampoa	C																	
Yunnanfu.[2]													P					
India	C	6,004	3,871	4,915	6,667	587	3,205	3,028	3,067	2,009	1,772	1,827	1,918					
	D	3,978	1,924	2,567	3,013	242	1,326	1,425	1,581	928	887	807	891					
Akyab	C										1				1			
Allahabad	C				[3] 1									1				[4] 1
Assam	C	2,863	427	113	238	59	53	50	33	25	35	69	185	116	115	105	58	43
	D	1,838	295	67	98	26	20	25	21	13	17	[4] 26	75	38	39	41	23	14
Bassein	C				1		1		1		2		2	2	3	1	[4] 1	
Bengal Presidency	C	14,235	4,477	3,157	4,941	1,816	2,132	1,882	1,922	1,002	911	915	699	663	550	466	430	594
	D	8,073	2,307	1,606	2,297	788	940	917	1,043	486	449	417	337	301	248	199	198	229
Bombay Presidency	C	513	258	205	98	36	37	34	31	19	23	44	67	62	35			
	D	181	111	87	34	13	17	13	8	10	9	20	30	24	16			
Calcutta	C	114	59	118	315	147	219	208	190	199	196	245	196	184		140	111	243

[1] During the week ended July 1, 1939, 5 cases of cholera were reported in Greshk, Afghanistan.
[2] Information dated Nov. 30, 1938, stated that cholera had appeared in villages near Yunnanfu, China. In 1 village of approximately 1,000 persons, 500 were said to have died.
[3] Suspected.
[4] Imported.

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

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 27–Dec. 31, 1938	Jan. 1–28, 1939	Jan. 29–Feb. 25, 1939	Feb. 26–Mar. 25, 1939	Week ended— April 1939					May 1939				June 1939			
						1	8	15	22	29	6	13	20	27	3	10	17	24
India—Continued.																		
Cawnpore	C				3				2	1		1	3		3	2	1	4
	D				1							1		1		1	1	2
Central Provinces and Berar	C	228	95	61	71	17	47	37	44	39	55	57	39	43	7	11	7	9
Chittagong	C	1			2	2		1	3	6	[4]1	2	5	1	1	1		[4]1
Delhi	D								[4]1									
Howrah	C	168	98	255	482	141	143	211	164	126	128	95	94	103				
Madras Presidency	C	568	1,464	997	201	36	40		7	1	6	20	24	10				
	D	211	627	496	93	12	14		2	2	3	4	9	8				
Madras	C	3		3	2												1	
	D	1		2														
Negapatam	C	7	2															
	D	2																
Orissa Province	C	20	36	73	56	11	19	29	58	44	27	46	7	31	25	40	64	41
Rangoon	C									4	7		2		2		[4]1	1
Tirumalaivasal	C			5														
India (French):																		
Chandernagor Territory	C		2	1	16	5	6	6	2	3								
Karikal Territory	C	1	5	41														
Pondichery Province	C							1										
Iran: Zabol.[5]																		
Siam:																		
Bangkok	C						[4]1		1	2		1						
Smud Prakar Province	C				5	5	7	1										
On vessel:																		
S. S. *Erinpura* at Rangoon from Calcutta	C												1					
S. S. *Amra* at Calcutta from Rangoon	C															1		

[4] Imported.

[5] During the week ended July 1, 1939, 10 cases of cholera were reported in Zabol, Iran.

PLAGUE[1]

Algeria: Algiers	C					1													
Belgian Congo	C	1				3						1	4	2	11				
Bolivia. (See table below.)																			
Brazil. (See table below.)																			
British East Africa:																			
Kenya	C	1		3															
Uganda	C	9	14	20	24	6		5	2	4	2	3	4	8	2				
	D	9	14	29	24	6		5	2	4	2	3	4	8	2				
China: Manchuria[2]																			
Dutch East Indies: Java and Madura	C	135	252	259	236	42	48	30											
	D	135	242	256	232	41	48	30											
Ecuador:																			
Chimborazo Province	C				6	[3]8	7	[3]3											
Riobamba	C			[3]16															
	D			15															
Guayaquil	C				1				2										
	D								2										
Plague-infected rats				1	3														
Loja	C			[4]4															
Pueblo Viejo	C			3															
Egypt: Asyut Province	C		1	[5]32	22	5		10	7	13	3	3	1	3	2				
Hawaii Territory: Plague-infected rats:																			
Hawaii Island—Hamakua District:																			
Hamakua Mill Sector		40									1								
Honokaa						1													
Kaiwiki		1																1	
Kapulena								1		1									
Kukaiau		10	6	1	3														
Paauhau Sector		7	3	1	5														
India	C	1,931	2,015	3,443	5,718	3,303	4,628	1,170	931	495	349	207	114						
	D	872	970	1,391	2,636	628	1,061	527	595	307	266	118	63						
Allahabad	D			[6]1													1		
Bassein	C				3														
Plague-infected rats					1														
Bihar Province	C											1	12						
	D											1	1	7					
Bombay Presidency	C	101	51	27	33	11	8	9	13	5	4	3	1	3	3				
	D	61	29	13	20	7	5	3	3	5	4	2	1	1	1				
Calcutta	C					[6]1													
Calicut	C											1							
Central Provinces and Berar	C	677	715	1,414	2,056	454	608	557	295		132	37	27	2	3				
Cochin: Plague-infected rats		6	1															1	
Coorg Province	C								4			1							

[1] Including plague in the United States and its possessions.
[2] Information dated May 5 stated that 34 cases of plague with 8 deaths had occurred in Hsinking, Manchuria, since the beginning of the year.
[3] Pneumonic.
[4] Unofficially reported.
[5] Includes 4 pneumonic cases.
[6] Imported.

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

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 27–Dec. 31, 1938	Jan. 1–28, 1939	Jan. 29–Feb. 25, 1939	Feb. 26–Mar. 25, 1939	Week ended— April 1939 1	8	15	22	29	May 1939 6	13	20	27	June 1939 3	10	17	24
India—Continued																		
Madras Presidency	C	135	140	164	28	10	3	------	1	1	3	------	2	8	------	------	------	------
	D	61	53	64	19	7	------	------	1	------	1	------	2	5	------	------	------	1
Rangoon	C	------	3	[6]1	------	------	------	------	------	------	------	------	------	------	------	------	------	1
	D	------	2	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Indochina (see also table below):																		
Cambodia	C	------	------	------	------	------	------	------	------	1	------	------	------	------	------	1	------	------
Pnom Penh	C	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Madagascar. (See table below.)																		
Peru. (See table below.)																		
Siam:																		
Bichitr Province	C	------	------	------	------	------	------	------	------	------	------	3	1	------	------	------	------	------
	D	------	------	------	------	------	------	------	------	------	------	1	------	------	------	------	------	------
Bisnulok Province	C	------	1	33	1	------	------	------	------	------	------	------	------	------	------	------	------	------
	D	------	1	5	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Lampang Province	C	------	------	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Prae	C	------	3	------	------	------	1	2	------	------	------	------	------	------	------	------	------	------
Svargalok Province	C	------	11	17	2	------	------	------	------	------	------	------	------	------	------	------	------	------
Tak Province	C	3	7	3	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Tunisia: Tunis	C	2	------	------	------	------	------	1	------	------	------	------	------	------	------	------	------	------
Plague infected rats		------	2	3	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Union of South Africa	C	2	8	18	22	------	[7]6	------	[7]3	------	------	------	------	------	------	------	------	------
Cape Province	C	------	2	7	4	------	2	------	2	------	1	------	------	------	------	------	------	------
Port Elizabeth	C	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
	D	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Orange Free State	C	5	------	4	6	------	1	------	[7]6	------	------	------	------	------	------	------	------	------
Transvaal	C	------	------	------	7	------	------	------	------	------	------	------	------	------	------	------	------	------
United States.[8]																		

[6] Imported.
[7] For 2 weeks.
[8] Last reported human case, Aug. 30, 1937, Fresno County, Calif. Intensive plague work is being conducted in the Western States and detailed reports of plague infection found in animals and insect hosts are published currently in the PUBLIC HEALTH REPORTS. The following summarizes recent reports for 1938 and 1939: *California*—Ground squirrels, December 1938; Mar. and Apr. 18, 25, and 26, 1939; insects, December 1938, March and June 8, 1939; *Idaho*—Insects, June 14, 1939; *Nevada*—Insects, Apr. 7–8, 1939; *New Mexico*—Kangaroo rat, Apr. 15, 1939; *Oregon*—Ground squirrels, June 4, 1939, insects, May and June 4, 1939; *Washington*—Rabbit, May 27, 1939, insects, March, April, and May 25 and 27, 1939.

Place		December 1938	January 1939	February 1939	March 1939	April 1939	May 1939
Bolivia	C				[1] 1		
Brazil:							
Alagoas State	C	5	19	5	11	1	
Bahia State	C				1		
Parahiba State	C	1	1				
Pernambuco State	C	17	15	3	5	6	
Rio de Janeiro State	C	1					
Indochina: Cambodia	C			2			
Madagascar (central region)	C	107	79	77	52	33	11
	D	102	42	67	21	25	9
Peru	C	7	14	9	12	11	11
Cajamarca Department	C				3		
Lambayeque Department	C	1	2		1	1	1
Libertad Department	C	2	11	4	1	2	3
Lima Department	C	4	1	4	2	1	
Piura Department	C			1	5	7	7

[1] Pneumonic.

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

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Nov. 27–Dec. 31, 1938	Jan. 1–28, 1939	Jan. 29–Feb. 25, 1939	Feb. 26–Mar. 25, 1939	Week ended— April 1939 1	8	15	22	29	May 1939 6	13	20	27	June 1939 3	10	17	24
Algeria: Oran Department	C							1						2				
Angola. (See table below.)																		
Arabia: Aden	D			1														
Argentina. (See table below.)																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil. (See table below.)																		
British East Africa: Tanganyika	C		1	174	96	50	24	15	32	25		3		6	17		5	
Canada:																		22
Alberta	C			37	7													
British Columbia	C			4	8													1
Manitoba	C	[1]1	8	1	22			1	8	4	2							
Ontario	C	2		1														
Saskatchewan	C	5	17	10	2													
Canary Islands: Las Palmas	C				3													
Ceylon: Maskeliya	C				[2]1													
China (see also table below):																		
Dairen	C	2	1		2	1	2	1				1	1	3	1	1		
Foochow	C		8		2		4		4		5	3						
Hong Kong	C	30	18	45	45	12	9	5	4	4	3	2	5	1	1			
	D	23	13	23	49	6	6	4	5	5	5	2	1	3	1			
Macao	C			3														
Shanghai	C	1,284	834	274	102	10	18	10	7	5	9	4	1	4	2	2	1	3
Swatow	C		1	3	2	3	1		2	1								
Tientsin	C	2		1		1			2	1			1					
Chosen (Korea). (See table below.)																		
Colombia (see also table below): Cartagena	D			1	2			1										
Dahomey. (See table below.)																		
Dutch East Indies: Surabaya	C	[2]1																3
Ecuador: Guayaquil (see also table below)	C				4				1									1
	D				1				1									
France. (See table below.)																		
French Equatorial Africa: Chad	C								14									
Great Britain: England and Wales—Liverpool	C	1	1															
Greece. (See table below.)																		
Guatemala. (See table below.)																		

India	C	5,335	7,797	11,353	15,237	1,407	1,661	5,508	4,998	5,006	4,109	4,690	4,682					
	D	1,377	1,777	2,536	3,254	627	840	1,245	1,138	1,045	1,003	1,014	1,063					
Allahabad	C		1		2								1					
Assam	C	80	67	58	121	46	14	35	47	83	59	56	87	50	24	36	35	32
Bengal Presidency	C	300	572	1,735	2,152	687	642	631	795	550	411	488	399	328	230	202	184	165
	D	83	203	632	724	262	203	258	308	211	166	169	136	134	87	78	60	70
Bihar Province	C											603	853	903	672			
Bombay Presidency	C	681	1,388	1,514	3,936	1,120	1,228,	1,634	1,105	1,311	1,111	1,010	987	953	806			
	D	91	187	220	558	175	150	248	192	196	155	152	136	155	118			
Bombay	C	2	12	20	56	11	17	20	8	5	9	12	6	14	9	12	9	10
	D	1	8	11	21	2	4	6	6	2	4	6	2	5	7	5	6	3
Calcutta	C	116	400	776	806	184	186	205	177	158	100	70	59	69	34	40	22	31
	D	66	231	451	548	141	125	168	129	113	78	54	52	51	25	31	17	22
Cawnpore	C		4	2	5	4	1	5	3	1	7	4	2	3	1		2	
Central Provinces and Berar	C	46	81	198	540	245	178	219	281	209	184	203	284	233	265	154	174	164
Chittagong	C			1														
Cochin	C	1		4			2	1										1
Delhi	C	23	96	113	183	38	36	34	39	40	44	47	48	64	39	23	15	22
Howrah	C	21	67	148	152		86	56	47	33	31	43	29					
Jodhpur	D											19	9	10		3	3	1
Karachi	C	[1]3	3	3	3	1			2		1	4	1	2	1			
Madras Presidency	C	893	1,058	1,389	1,400	249	325		207	149	180	170	101	94				
	D	168	370	233	234	57	69		57	58	51	41	35	28				
Madras	C	186	171	304	236	49	39	37	36	32	18	8	2	4	5	5		2
Moulmein	C		1															
Northwest Frontier Province	C	290	155	113	114	15	30	28	3	34	19	10	10	47	62	37	54	12
Orissa Province	C	208	338	465	699	192	205	187	237	218	290	155	140	137	84	117	89	86
Punjab	C	135	196	329	180	63	67	25	38		61		41	112	97	72	45	
Rangoon	C	2	9	5	14	5	3			2	4	3	5	2	6	2	2	
Sind State	C	302	158	299	279	58	38	25	48	82	58	60	42	49		44	64	23
Vizagapatam	C					3	2	1										
India (French):																		
Chandernagor Territory	C	1		2		1	1		1	1	3							
Pondichery Territory	C			6	7		1			2								
	D			4	3		1			1								
Indochina (French) (see also table below):																		
Tonkin Province	C	267	214	183	211	29	59	52	27	61	73		33	29	20	20	14	
Haiphong	C			2														
Hanoi	C		1	10	6	1	1		3	8	4		7	11		3		
Saigon-Cholon	C	12	6	3														
Iran	C	1	1		11	6				4		3						
Iraq	C	1	6	1			5			1					2		2	
Baghdad	C											[2]1						
Ivory Coast. (See table below.)																		
Japan:																		
Kanagawa prefecture	C		1															
Kobe	C	3	4	66	16													
Kyoto	C		13	1														
Nagasaki	C	7																
Nagoya	C				1													
Okayama prefecture	C	1																

[1] For 2 weeks.

[2] Imported.

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

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 27–Dec. 31, 1938	Jan. 1–28, 1939	Jan. 29–Feb. 25, 1939	Feb. 26–Mar. 25, 1939	Week ended— April 1939 1	8	15	22	29	May 1939 6	13	20	27	June 1939 3	10	17	24
Japan—Continued																		
Osaka	C			1	1					1	1	1	2	1		1		
Taiwan.[3]																		
Tokyo	C	2		5					1									
Malta. (See table below.)																		
Mexico (see also table below):																		
Mexico, D. F	C	1	1	3	6	1	2											
Monterrey	C		4	2	1	1												
Piedras Negras	D				1													
San Luis Potosi	D			5	3			1						1			3	1
Tampico	C			7	22	1												
Morocco. (See table below.)																		
Mozambique	C				11						4	12	9	7	1			
Nigeria	C	182	320	984	884	267	224	233	197	340	209	197	79	29	16			
Calabar	C		1	6	5	1		2			42	2						
Lagos	C				1						2		2					
Port Harcourt	C		3	1	1													
Niger Territory. (See table below.)																		
Northern Rhodesia	C	6																
Portugal (see also table below):																		
Lisbon	C	6	42	21	21	10	7	6	7	4	8	7	4	14	17	13	9	14
Oporto	C	5	5	14	2					2		7	1		1	2	5	2
Portuguese Guinea. (See table below.)																		
Salvador. (See table below.)																		
Senegal. (See table below.)																		
Siam	C	6	48		2			1		1					1			
Sierra Leone	C	2	4	9	2				8		9							
Southern Rhodesia	C	30	37	48			9			12		1	9	1				
Straits Settlements: Singapore	C				1													
Sudan (Anglo-Egyptian)	C	31	28	18	17	5	3	8	65	9	6	1		5	7	1	5	2
Syria: Aleppo	C				1													
Turkey. (See table below.)																		
Union of South Africa. (See table below.)																		
Uruguay: Artigas	C				1													
Venezuela. (See table below.)																		

[3] Information dated Apr. 6, 1939, states that up to Mar. 31, 1939, 61 cases of smallpox were reported in Taiwan, Japan.

On vessels:

S. S. *Hartlebury* bound for New York via Durban [4]	1 case	Dec.	1, 1938
S. S. *Nagasaki Maru* at Nagasaki from Shanghai	1 case	Dec.	7, 1938
S. S. *Pyrrhus* at Yokohama from Shanghai	1 case	Dec.	10, 1938
S. S. *Westpoint* at sea en route Surabaya	1 death	Do.	
S. S. *Tyles* at Yokohama from Hong Kong and Shanghai	1 case	Dec.	13, 1938
S. S. *Nagasaki Maru* at Nagasaki from Shanghai	1 case	Dec.	16, 1938
S. S. *Bellerophon* at Hong Kong from Yokohama, Kobe, and Shanghai	1 case	Dec.	22, 1938
S. S. *Selandia* at Singapore from Saigon	1 case	Jan.	15, 1939
S. S. *Potsdam* at Singapore from Yokohama	1 case	Jan.	17, 1939
S. S. *E. Sang* at Swatow from Shanghai	1 case	Jan.	18, 1939
S. S. *Maihar* at Aden from Calcutta	1 case	Jan.	30, 1939

On vessels:—Continued.

S. S. *Alavi* at Aden from Bombay	1 case	Feb.	2, 1939
S. S. *Orange Moor* at Saigon from Shanghai	1 case	Do.	
S. S. *Queen Victoria* at Victoria from Shanghai	1 death	Feb.	6, 1939
S. S. *Rugelsey* at Williamshead from Shanghai	10 cases	Feb.	19, 1939
Pilgrim ship *Tantalus* at Penang from Jeddah	1 case	Feb.	27, 1939
Pilgrim ship *Ajax* at Penang from Jeddah	1 case	Mar.	2, 1939
S. S. *Gneisenan* at Genoa	1 case	Mar.	5, 1939
S. S. *Riley* at Fremantle from Shanghai	1 case	Do.	
S. S. *Mau Sang* at Sandakan from Hong Kong	1 case	Apr.	6, 1939
S. S. *Thisteleglen* at Singapore	1 case	Apr.	10, 1939
S. S. *Empress of Russia* at Hong Kong from Shanghai	2 cases	Apr.	20, 1939
S. S. *Liebenfels* at Rangoon from Moulmein	1 case	June	2, 1939

[4] Patient removed from vessel and died in hospital in Iloilo district, P. I.

Place		December 1938	January 1939	February 1939	March 1939	April 1939	May 1939
Angola	C	27					
Argentina	C			3			
Belgian Congo	C	211	175	26			
Bolivia:							
Cochabamba Department	C				8		
La Paz Department	C				8		
Oruro Department	C				1		
Potosi Department	C				1		
Santa Cruz Department	C				6		
Brazil: **Bahia**	C	1					
China: Harbin	C		2	1	5	5	1
Chosen (Korea)	C				42		
Colombia (see also table above)	C	[5] 122	25				
Dahomey	C	14	12		4		
Ecuador: **Guayaquil** and vicinity	C	2					
France	C		1	3			
Greece	C	5	12	1	38	7	
Guatemala	C			5		4	
Indochina (French) (see also table above)	C	475	312	163	515	606	671
	D	65	47	21	79	52	109
Ivory Coast	C		18	59	17		
Malta	C	9					

Place		December 1938	January 1939	February 1939	March 1939	April 1939	May 1939
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C	6		[6] 15	3		
Chihuahua State—Chihuahua	C			[6] 1			
Hidalgo State	C	36		[6] 29	7		
Jalisco State—Guadalajara	C			[6] 1			
Mexico, D. F.	C	6		[6] 7	9		
Nuevo Leon State—Monterrey	C				3		
Queretaro State	C			[6] 1			
San Luis Potosi State—San Luis Potosi	C			[6] 16	11		
Sonora State—**Guaymas**	C				1		
Tamaulipas State—**Tampico**	C			[6] 9	15		
Morocco	C	4	2		1		6
Niger Territory	C		48	34	40	9	
Portugal (see also table above)	C	62			112		
	D	12			11		
Portuguese Guinea	C					115	
	D					8	
Salvador	C				1		
Senegal	C			35	66	42	55
Turkey	C		58	8		59	34
Union of South Africa:							
Cape Province	C	1					
Transvaal	C	37					
Venezuela	D	1	2	8	6	3	7

[5] For November and December 1938.

[6] For January and February 1939.

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

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Nov. 27–Dec. 31, 1938	Jan. 1–28, 1939	Jan. 29–Feb. 25, 1939	Week ended— March 1939				April 1939					May 1939				June 1939			
					4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24
Algeria:																					
Algiers Department	C	27	9	14	7	5	13	4	6	-----	6	1	8	-----	11	-----	15	12	28	25	-----
Algiers	C	5	2	-----	-----	5	8	3	-----	-----	-----	-----	5	-----	10	-----	12	7	-----	7	-----
Constantine Department	C	44	115	90	36	18	53	57	30	19	38	54	54	69	13	-----	103	43	43	56	-----
Bone	C	-----	4	-----	-----	-----	2	-----	1	-----	-----	5	3	1	-----	-----	-----	-----	-----	-----	-----
Constantine	C	7	11	8	1	4	-----	2	-----	4	8	27	-----	10	8	-----	34	3	-----	31	-----
Philippeville	C	3	3	1	-----	-----	-----	14	-----	2	-----	-----	-----	2	-----	-----	7	4	-----	1	-----
Oran Department	C	5	28	29	4	10	9	6	2	7	2	4	16	6	2	-----	20	7	5	21	-----
Southern Territories	C	-----	-----	7	2	1	17	1	9	-----	1	9	3	-----	36	-----	26	17	-----	4	-----
Australia:																					
Brisbane	C	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Queensland	C	-----	-----	5	-----	-----	-----	-----	3	1	1	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
Bolivia. (See table below.)																					
British East Africa: Kenya	C	3	-----	1	-----	-----	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bulgaria. (See table below.)																					
Chile	C	147	80	49	13	12	12	6	9	2	-----	6	-----	-----	-----	-----	-----	-----	-----	-----	-----
Antofagasta Province	C	-----	2	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Bio Bio Province	C	-----	2	4	-----	2	3	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----
Cautin Province	C	-----	-----	2	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Coquimbo Province	C	-----	-----	12	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Curico Province	C	-----	15	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Los Angeles	C	-----	9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Nuble Province	C	3	2	1	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	-----	-----	-----	-----	-----	-----	-----
Santiago Province	C	81	50	40	9	7	4	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valdivia Province	C	2	1	1	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Valparaiso	C	5	-----	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	-----	-----	-----	-----	-----	-----
China (see also table below):																					
Dairen	C	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1	1	-----	-----	-----	-----
Shanghai	C	-----	6	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2	-----	-----	-----	-----	-----	-----	-----
Tientsin	C	-----	2	-----	-----	-----	-----	-----	1	-----	-----	-----	2	-----	1	-----	-----	-----	-----	-----	-----
Chosen (Korea). (See table below.)																					
Egypt:																					
Alexandria	C	2	-----	-----	1	-----	-----	2	4	2	1	-----	6	5	8	3	10	9	3	-----	-----
Asyut Province	C	-----	1	4	-----	-----	-----	-----	2	-----	-----	1	11	8	2	1	4	3	-----	-----	-----
Beheira Province	C	-----	1	24	14	14	10	6	22	17	13	29	28	20	10	8	26	7	6	-----	-----
Cairo	C	2	3	18	7	14	9	1	6	2	3	12	4	2	1	2	4	2	-----	-----	3
Dakahilya Province	C	-----	-----	11	14	30	16	46	25	20	36	51	46	49	44	48	55	54	37	-----	-----
Faiyum Province	C	-----	-----	-----	-----	-----	-----	-----	-----	-----	7	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Gharbiya Province	C		15	51	82	53	43	67	64	104	97	48	42	50	34	76	56	45	39		
Girga Province	C		4	58	17	12	5	13	14	12	3	12	1	3	4	7	17	18	7		
Giza Province	C			19	8	2	6		8	2	8	21	14	9		9	4	8	11		
Kalyubiya Province	C			33	25	28	11	20	3	8	3	12	18	6	8	10	21	16	5		
Minufiya Province	C		3	67	36	16	18	31	9	6	11	25	45	40	45	19	37	21	12		
Qena Province	C							47	61	18	13	20	15	6	4	1	10	2	4		
Sharkiya Province	C			17	14	10	17	5	11	25	6	12	12	4	5		15	11	5		
Provinces	C	43	70	323	212	155	145	236	229	216	199	234	232	195	200	186	247	186	126	90	59
Eritrea: Hamasien	C						2	2													
Greece. (See table below.)																					
Guatemala. (See table below.)																					
Hawaii Territory: Honolulu	C	7	1	1		1								1						1	
Hungary	C	3	1					5		4			5								
India: Coorg Province	C						5				3								3		
Iran	C			1							1			2	9		7				
Iraq	C	2		2																	
Arbil Province	C																1	2		1	1
Baghdad	C				1							1	2	1	1						1
Kirkuk Province	C			1													7				
Irish Free State: Louth County—Drogheda.[1]																					
Latvia. (See table below.)																					
Libya: Suani Benaden	C		3																		
Lithuania. (See table below.)																					
Mexico (see also table below):																					
Guadalajara	D	1																			
Mexico, D. F	C	9	5	4	1	1			4	1											
Monterrey	C																1				3
Nuevo Laredo	D																				
San Luis Potosi	D	1								1				1							
Torreon	D	1		1								2		1							
Morocco	C	117	111	152	35	44	51	47	41	26	42	47	37	45	36	42	22	28	30	29	
Casablanca	C		1	6	4	1	1	2	2	2	4	4						1			
Palestine:																					
Haifa	C	1		1									2		2	1	1			3	
Jaffa	C	6	3					1			1						2			3	
Poland	C	321	357	463	139	135	171	135	145	165	151	158	107	109	99	104	125	97	81	71	
	D	20	14	20	5	7	6	5	10	6	5	7	6	6	5		1	3	6	2	
Portugal: Oporto (see also table below)	C		2								2	1									
Portuguese East Africa: Laurenco Marques	C						2														
Rumania. (See table below.)																					
Spain. (See table below.)																					
Straits Settlements: Singapore	C		2	5		1					1										
Sumatra: Medan	D			1																	
Swaziland. (See table below.)																					
Syria:																					
Aleppo	C			2																	
Beirut	C	1						1													
Lebanese Republic	C								1				1								

[1] During the week ended July 1, 1939, 5 cases of typhus fever were reported in Drogheda, Louth County, Irish Free State.

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

TYPHUS FEVER—Continued

[C. indicates cases; D, deaths; P, present]

Place		Nov. 27–Dec. 31, 1938	Jan. 1–28, 1939	Jan. 29–Feb. 25, 1939	Week ended— March 1939				April 1939					May 1939						June 1939	
					4	11	18	25	1	8	15	22	29	6	13	20	27	3	10	17	24
Trans-Jordan	C											7	1	5	1	3			1		
Tunisia:																					
Tunis	C	42	43	33	16	14	12	22	32	21	8	16	12	6	13	16	4	1	13	2	2
Provinces	C	261	436	506	109	191	206	188	185	93	221	282	292	264	248	271	223	202	228	316	221
Turkey. (See table below.)																					
Union of South Africa. (See table below.)																					
Venezuela. (See table below.)																					
Yugoslavia	C	25	21	38		11	29	9	12	13	3	56	31	13	25	19	5	10	3		
On vessel: S. S. *Stanbrook* at Mers el Kebir	C												1								

Place		December 1938	January 1939	February 1939	March 1939	April 1939	May 1939
Bolivia:							
Cochabamba Department	C				1		
Potosi Department	C				7		
Tarija Department	C				1		
Bulgaria	C	2	8			14	
China: Manchuria—Harbin	C		5		23	4	16
Chosen (Korea)	C		78	9	106		
Greece	C	8	9				
Guatemala	C	2	9	22	25	14	4
Latvia	C		2			1	
Lithuania	C		30	42	32	23	6
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C	2		[1]11	2		
Hidalgo State	C	1		[1]2	1		
Mexico State	C			[1]8			
Mexico, D. F.	C	6	2	[1]14	9		

Place		December 1938	January 1939	February 1939	March 1939	April 1939	May 1939
Mexico—Continued.							
Queretaro State	C	1		[1]4			
San Luis Potosi State—San Luis Potosi	C	5		[1]8	3		
Tamaulipas State	C			[1]1			
Portugal (see also table above)	C	3					
Rumania	C	100	144	121	205	78	
Spain	C					4	
Swaziland	C		1				
Turkey	C	49	32	46	57	62	49
Istanbul	C	4	6		4	4	
Union of South Africa:							
Cape Province	C	93	23	25	17	32	
Natal	C	1	1	3	2	25	
Orange Free State	C			1	3	4	
Transvaal	C		26		16	16	
Venezuela: Bolivar	C					1	3

[1] For January and February 1939.

YELLOW FEVER

[C, indicates cases: D, deaths: P, percent]

Place		Nov. 27–Dec. 31, 1938	Jan. 1–28, 1939	Jan. 29–Feb. 25, 1939	Week ended— March 1939 4	11	18	25	April 1939 1	8	15	22	29	May 1939 6	13	20	27	June 1939 3	10
Brazil: [1]																			
Espirito Santo State	D		4	42	5	6	6	4	9	6	5	7	1				[2] 1		
Minas Geraes State	D			8	2		1			1		1							
Para State	D																[2] 1		
Rio de Janeiro State	D		2				1												
Colombia: Antioquia Department—Caracoli	D																	1	
French Equatorial Africa: [3] Chad—Fort Lamy	C		1																
Gold Coast	C			[4] 1							1							1	
Ivory Coast	C	[5] 5		3						[4] 2		1		[4] 3			2	2	[6] 8
	D	2		1															
Nigeria	C	3	2	2				1											
	D		1	2															
Niger Territory: Tahua	C																[4] 1		
Sudan (French): Sangha	C	1																	

[1] See also reports of yellow fever in Brazil in preceding issues of the PUBLIC HEALTH REPORTS.
[2] Jungle type.
[3] For the week ended July 15, 1939, 1 suspected death from yellow fever was reported in Port Gentil, Gabon, French Equatorial Africa.
[4] Suspected.
[5] Includes 2 suspected cases.
[6] Includes 4 suspected cases.