

PUBLIC HEALTH REPORTS

VOL. 48

OCTOBER 6, 1933

NO. 40

ESTIMATION OF FLUORIDES IN WATERS

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The association of the human dental lesion known as "mottled enamel" with fluoride in the drinking water (2, 5, 6) makes it desirable to have a convenient method for detecting and estimating fluorides in such waters. A colorimetric method would probably be most convenient and enable one to deal with comparatively very small quantities of fluoride.

It appeared that the zirconium-alizarin reagent of DeBoer (4) might be utilized in this connection. Willard and Winter (8), however, state that they attempted to use the colorimetric method based upon a zirconium-alizarin mixture but that their results did not show any definite relation between the fluorine content and the fading of the color. On the other hand, Casares and Casares (1) utilized this reagent for determining fluorides in mineral waters, and Thompson and Taylor (7) applied it to the determination of fluorides in sea water.

Casares and Casares used a series of standards ranging from 1 to 3.5 mg of NaF in 100 cc, i.e., their lowest standard corresponded to about 0.45 mg of fluorine in 100 cc, or 4.5 parts per million. Thompson and Taylor used a series of standards ranging from 0.08 to 0.16 mg of fluorine per 100 cc, which would indicate that by their improved procedure as little as 0.08 mg of fluorine per 100 cc, or 0.8 parts per million, could be detected.

Thompson and Taylor acidified their waters by adding 2 cc of 6 N HCl to 100 cc of the sample, which is about the same hydrochloric acid concentration employed by Casares and Casares, who used 1 cc of the concentrated (approx. 12 N) hydrochloric acid to 100 cc of the sample. As previously mentioned, their lowest standard contained 0.08 mg fluorine. The results obtained in the present study, however, indicated that by using a hydrochloric acid concentration obtained by adding 5 cc of 5 N HCl to 50 cc of water, as little as 0.01 mg of fluorine in 50 cc, or 0.2 parts per million, could be differentiated from the corresponding control by means of the zirconium-alizarin reagent as here employed.

After some preliminary experiments, the following procedure was adopted and used in estimating the fluorides¹ in the waters² listed in the accompanying table.

PROCEDURE

To 50 cc of the sample of water, or a smaller quantity diluted to 50 cc with distilled water, and to each of 50 cc of standards containing known amounts of fluoride in water of similar composition as the sample (prepared on the basis of the analysis), there were added³ 5 cc of 5 N HCl and 1 cc of the diluted⁴ zirconium-alizarin reagent, mixing⁵ well after each addition. All were allowed to stand, at room temperature, over night (about 18 hours)⁶ and then the color of the sample was compared, in 50 cc (tall form) Nessler tubes, with the colors of the fluoride standards.

The fluoride standards were prepared from sodium fluoride, the stock solution usually employed containing a quantity of sodium fluoride equivalent to 0.05 mg fluorine per cubic centimeter. The fluorine quantities of the standards were 0, 0.01, 0.02, 0.03, 0.04, 0.045, 0.05, and 0.055 mg, respectively. It was intended to take a quantity of the sample which would make its fluorine content⁷ about 0.04 to 0.05 mg.

¹ The estimation of fluorides in these waters represents part of the work of a preliminary survey for the purpose of selecting suitable localities for further study, particularly with reference to a possible correlation of the quantities of fluorides in the drinking waters with the observed degrees of mottled enamel. For the latter purpose, it will, of course, be necessary to make more than single determinations, in order to be able to allow for possible seasonal variations or variations in fluorine content due to some other factors.

² Assistant chemist C. G. Remsburg assisted in the determinations other than fluorides, using the methods given in the Standard Methods of Water Analysis of the American Public Health Association.

³ Since the highest concentration of bicarbonate (645.4 p.p.m.) encountered in this series corresponded to only about 0.1 cc of the 5 N HCl, and since the water used for the standards contained the same quantity as the sample, no additional HCl was added to balance the alkalinity of the waters.

⁴ The diluted zirconium-alizarin reagent was prepared by diluting 1 volume of the more concentrated with 2 volumes of distilled water. The latter was prepared by mixing equal volumes of 0.5-percent aqueous solution of zirconium oxychloride ($\text{ZrOCl}_2 \cdot 8\text{H}_2\text{O}$) and 0.1-percent aqueous solution of alizarin sodium monosulphonate (Harmer Laboratories Co., Philadelphia). It was found advantageous to add the alizarin solution slowly to the zirconium solution rather than in the reverse order, since when the zirconium solution was added to the alizarin solution, it was often necessary to let the mixture stand much longer (about 18 hours) before it became entirely clear. Although the reagent appears to be fairly stable when kept in a cool dark closet, it was generally used before it was more than a few days old.

⁵ Erlenmeyer flasks of about 125 cc capacity were found convenient in this connection. It is preferable, however, to transfer the mixed solutions to the Nessler tubes as soon as practicable. The solutions should also be mixed well immediately before the colorimetric comparisons, since there appears a tendency for the coloring matter to precipitate out on standing.

⁶ It was found possible, in some cases, to obtain fair readings after the treated fluoride solutions were allowed to stand at room temperature for only about 4 hours. It appears advantageous, however, to use the longer (over night) standing time, especially since the work can often be arranged so as to make the latter more convenient.

⁷ It appears that the reagent can be utilized most advantageously when the fluorine content is of a magnitude which will cause most of the reddish color to fade out. Under the present conditions this occurred when it was about 0.04 to 0.05 mg. Under these conditions the results obtained were within approximately 15 percent of the theory, which, for some practical purposes, are probably sufficiently close and useful, at least in preliminary surveys.

Analyses of waters containing fluorides

[In parts per million]

Description and source of sample	Residue on evaporation	Loss on ignition	Fixed residue	Silica (SiO ₂)	Phosphate (PO ₄)	Iron (Fe)	Aluminum (Al)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (calculated as Na)	Sodium (Na)	Potassium (K)	Carbonate (CO ₃)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Nitrate (NO ₃)	Chloride (Cl)	Fluoride (F)
Spring water, Twomey Springs, Tenn.	154.0	41.0	113.0	16.0	0	0.10	0.04	38.6	3.7	6.3	—	—	10.2	96.4	19.7	0.2	4.0	0.2
Spring water, Mount Pleasant, Tenn.	210.5	68.5	142.0	14.5	1.8	0.10	0.04	48.6	3.7	6.3	—	—	7.2	80.5	36.2	24.2	17.5	4.0
Well water, Fort Stanton, N. Mex.	363.5	64.5	299.0	15.8	0	0.05	0.23	69.9	12.5	22.9	—	—	—	133.6	139.9	45.6	17.5	6
Water from pipe line at Fort Stanton, N. Mex.	168.0	32.0	136.0	24.0	0	0.15	0.41	31.2	1.8	15.8	—	—	—	71.4	45.6	1.2	7.0	6
Cistern water (O'Neill), Rosiclare, Ill.	68.0	13.0	55.0	2.0	0	0.15	1.08	19.3	1.6	3.7	—	—	—	52.5	10.5	1.1	1.8	6
Well water, Rosiclare, Ill.	688.0	108.0	492.0	27.6	0	0.24	0.88	141.5	33.7	20.0	—	—	—	468.5	80.6	21.5	96.0	6
Cistern water (near mine), Rosiclare, Ill.	110.6	31.6	79.0	11.4	0	0.15	1.21	30.7	1.7	2.8	—	—	15.6	50.0	14.4	0.9	1.5	7
Water 420 feet below ground level at Mexico, Ky.	352.5	90.2	262.3	12.0	0	0.25	1.28	77.2	21.8	8.7	—	—	—	270.8	74.9	2.6	5.0	1.2
Spring water near Cave in Rocks, Ill.	314.8	65.0	249.8	16.0	0.9	0.20	1.17	97.9	6.7	8.8	—	—	—	308.2	29.8	0.6	5.5	1.5
Municipal water, Monmouth, Ill.	1,681.2	309.6	971.6	46.2	0	0.10	0.05	65.8	30.4	242.9	—	—	—	288.5	402.8	3.0	118.0	2.0
Municipal water, Fairbury, Ill.	1,731.8	308.1	973.0	18.5	0	0.10	0.05	43.6	17.9	275.6	435.9	50.3	10.8	392.8	76.9	0.9	553.3	2.4
Municipal water, Windsor, N. O.	1,919.2	317.1	887.5	18.5	0	0.13	1.15	40.0	15.7	32.7	660.7	42.5	18.6	374.5	71.8	0.9	534.3	2.6
Municipal water, Minot, Ill.	419.4	86.9	332.5	58.0	0	0.05	0.60	47.9	46.1	—	—	—	—	414.8	173.2	4.4	760.8	2.8
Municipal water, Amarillo, Tex.	765.0	9.0	757.0	28.4	0	0.10	0.10	3.4	2.2	317.1	646.4	—	20.4	646.4	6.6	0.8	90.5	4.2
Municipal water, Myrtle Beach, S. C.	632.0	8.7	623.3	8.8	0	0.05	0.09	3.2	2.2	265.6	—	—	14.4	573.8	4.9	0.9	45.5	4.5
Well water (Oliver), near Conway, S. C.	635.8	8.8	627.0	8.8	1.5	0.05	0.09	3.6	4.3	265.1	—	—	15.6	585.0	8.7	0.8	44.3	4.5
Well water (Proctor), near Conway, S. C.	245.8	3.8	242.0	27.4	3.2	0.10	0.03	1.2	0.8	85.7	—	—	16.6	176.9	13.9	0.3	16.3	5.0
Well water (Edwards), Courland, Va.	304.1	15.1	289.0	19.9	2.8	0.08	0.04	1.2	0.8	112.3	—	—	228.8	13.4	0.5	25.3	6.0	20.0
Well water (Yates-Williams), Courland, Va.	1,162.0	148.0	1,014.0	16.0	0	0.05	2.85	215.8	49.1	66.1	—	—	—	225.7	571.8	0.1	46.5	20.0

The samples of water listed in the table, the fluoride contents of which were estimated by the procedure here described, were collected mostly by Dental Surg. H. T. Dean ⁸ in connection with field studies of mottled enamel.⁹

SUMMARY

A procedure is described for estimating approximately small amounts of fluorides in drinking water, which utilizes the zirconium-alizarin reagent for fluoride. The results obtained in the analyses of 20 samples of water from various localities are reported.

REFERENCES

- (1) Casares, J., and Casares, R.: *Anales soc. españ. fis. quim.*, **28**, 1159-1162 (1930); *Chem. Abstracts*, **25**, 550 (1931).
- (2) Churchill, H. V.: *Ind. Eng. Chem.*, **23**, 996-998 (1931).
- (3) Dean, H. T.: *Jour. Amer. Dental Assoc.*, **20**, 319-333 (1933); *Pub. Health Rep.*, **48**, 703-734 (1933).
- (4) De Boer, J. H.: *Chem. Weekblad*, **21**, 404-405 (1924); *Chem. Abstracts*, **19**, 793 (1925).
- (5) Smith, M. C., Lantz, E. M., and Smith, H. V.: *Tech. Bull. No. 32, Agricultural Experiment Station, University of Arizona* (1931).
- (6) Sebrell, W. H., Dean, H. T., Elvove, E., and Breaux, R. P.: *Pub. Health Rep.*, **48**, 437-444 (1933).
- (7) Thompson, T. G., and Taylor, H. J.: *Ind. Eng. Chem., Anal. Ed.*, **5**, 87-89 (1933).
- (8) Willard, H. H., and Winter, O. B.: *Ind. Eng. Chem., Anal. Ed.*, **5**, 7-10 (1933).

EXTENT OF RURAL HEALTH SERVICE IN THE UNITED STATES, JANUARY 1, 1929-DECEMBER 31, 1932

According to data obtained by the United States Public Health Service from the health departments of the States, table 1 presents a list, by States, of counties, townships, or districts in which the rural sections thereof at the beginning of the calendar years 1929, 1930, 1931, and 1932, and on December 31, 1932, respectively, were provided with health service under the administration of local whole-time health officers.

The list for the year ended December 31, 1932, includes, as it did at the beginning of the calendar year, all counties, townships, or districts which are operating in groups under the direction of local whole-time health officers who are maintained jointly by the pooling of local official appropriations. Also all counties, townships, or districts are included in which there are whole-time local health organizations maintained entirely by the State health departments.

⁸ According to the writer's information, Dr. Dean collected personally all of the samples of water listed in this article excepting those from Monmouth, Ill., Amarillo, Tex., and Fort Stanton, N.Mex., in which cases the samples were collected for him by other persons.

⁹ Brief references to some of these studies have already been published (3). It is expected that further details will appear later.

In this report the figures are shown as of December 31 instead of January 1 as heretofore, in order to make the report coincide with the reports of other national agencies collecting similar data.

TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers

ALABAMA

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Baldwin	Baldwin	Baldwin	Baldwin	Baldwin
Barbour	Barbour	Barbour	Barbour	Barbour
Blount	Blount	Blount	Blount	Blount
Bullock	Bullock	Bullock	Bullock	Bullock
Calhoun	Calhoun	Calhoun	Calhoun	Calhoun
Chambers	Chambers	Chambers	Chambers	Chambers
Cherokee	Cherokee	Cherokee	Cherokee	Cherokee
Clarke	Choctaw	Choctaw	Choctaw	Choctaw
Cleburne	Clarke	Clarke	Clarke	Clarke
Coffee	Cleburne	Cleburne	Cleburne	Cleburne
Colbert	Coffee	Coffee	Coffee	Coffee
Conecuh	Colbert	Colbert	Colbert	Colbert
Covington	Conecuh	Conecuh	Conecuh	Conecuh
Crenshaw	Covington	Covington	Covington	Covington
Cullman	Crenshaw	Crenshaw	Crenshaw	Crenshaw
Dale	Cullman	Cullman	Cullman	Cullman
Dallas	Dale	Dale	Dale	Dale
De Kalb	Dallas	Dallas	Dallas	Dallas
Elmore	De Kalb	De Kalb	De Kalb	De Kalb
Escambia	Elmore	Elmore	Elmore	Elmore
Etowah	Escambia	Escambia	Escambia	Escambia
Franklin	Etowah	Etowah	Etowah	Etowah
Houston	Franklin	Franklin	Franklin	Franklin
Jackson	Geneva	Geneva	Geneva	Geneva
Jefferson	Houston	Houston	Houston	Houston
Lamar	Jackson	Jackson	Jackson	Jackson
Lauderdale	Jefferson	Jefferson	Jefferson	Jefferson
Lawrence	Lamar	Lamar	Lauderdale	Lamar
Lee	Lauderdale	Lauderdale	Lawrence	Lauderdale
Limestone	Lawrence	Lawrence	Lee	Lawrence
Lowndes	Lee	Lee	Limestone	Lee
Macon	Limestone	Limestone	Lowndes	Limestone
Madison	Lowndes	Lowndes	Macon	Lowndes
Marengo	Macon	Macon	Madison	Macon
Marshall	Madison	Madison	Marengo	Madison
Mobile	Marengo	Marengo	Marion	Marengo
Monroe	Marshall	Marion	Marshall	Marion
Montgomery	Monroe	Marshall	Mobile	Marshall
Morgan	Montgomery	Monroe	Montgomery	Mobile
Pickens	Morgan	Montgomery	Morgan	Montroe
Pike	Perry	Perry	Pickens	Montgomery
Shelby	Pickens	Pickens	Pike	Morgan
Sumter	Sumter	Pike	Shelby	Perry
Talladega	Talladega	Shelby	Sumter	Pickens
Tallapoosa	Tallapoosa	Sumter	Talladega	Pike
Tuscaloosa	Tuscaloosa	Tallapoosa	Tallapoosa	Shelby
Walker	Walker	Tuscaloosa	Tuscaloosa	Sumter
Washington	Washington	Walker	Walker	Talladega
Wilcox	Winston	Washington	Washington	Tallapoosa
Winston		Wilcox	Wilcox	Tuscaloosa
		Winston	Winston	Walker
				Washington
				Wilcox
				Winston

ARIZONA

Cochise	Cochise	Cochise	Cochise	Cochise
Coconino	Coconino	Coconino	Gila	Gila
Yuma	Yuma	Gila	Maricopa	Maricopa
		Maricopa	Pima	Pima
		Pima	Yuma	
		Yuma		

TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

ARKANSAS

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Arkansas Ashley Chicot Conway Crittenden Cross Desha Drew Garland Jackson Faulkner Garland Jackson Jefferson Little River Mississippi Monroe Phillips Pope Pulaski Saline Sebastian Union White Woodruff Yell	Arkansas Ashley Conway Cross Desha Drew Garland Jackson Jefferson Little River Mississippi Monroe Phillips Pope Pulaski Saline Sebastian Union White Woodruff Yell	Arkansas Ashley Clark Conway Cross Desha Drew Garland Jackson Jefferson Little River Lonoke Mississippi Monroe Ouachita Phillips Pope Pulaski Saline Sebastian Union White Woodruff Yell	Arkansas ¹ Ashley Bradley Clark Clebume Conway Crittenden Cross Desha Drew Garland Jackson Jefferson Little River Lonoke ¹ Miller Mississippi Monroe Ouachita Perry Phillips Pope Prairie ¹ Pulaski Saline Sebastian Union White Woodruff Yell	Arkansas ¹ Ashley Bradley Chicot Clark Cleveland Conway Crittenden Cross Drew Garland Jackson Jefferson Lincoln Little River Lonoke ¹ Mississippi Monroe Ouachita Phillips Pope Prairie ¹ Pulaski Saline Sebastian Woodruff Yell

CALIFORNIA

Contra Costa Los Angeles Madera Monterey Orange Riverside San Diego San Joaquin San Luis Obispo Santa Barbara Yolo	Contra Costa Los Angeles Madera Monterey Orange Riverside San Diego San Joaquin San Luis Obispo Santa Barbara Stanislaus Yolo	Contra Costa Imperial Los Angeles Madera Monterey Orange Riverside San Diego San Joaquin San Luis Obispo Santa Barbara Stanislaus Yolo	Contra Costa Imperial Los Angeles Madera Monterey Orange Riverside San Bernardino San Diego San Joaquin San Luis Obispo Santa Barbara Stanislaus Yolo	Contra Costa Imperial Los Angeles Madera Monterey Orange Riverside San Bernardino San Diego San Joaquin San Luis Obispo Santa Barbara Stanislaus Yolo
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COLORADO

Otero	Otero	Otero	Otero	
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CONNECTICUT

Fairfield ¹	Fairfield ¹	Fairfield ¹	Fairfield ¹	Fairfield ¹ West Hartford ²
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DELAWARE

Kent Newcastle Sussex	Kent Newcastle Sussex	Kent Newcastle Sussex	Kent Newcastle Sussex	Kent Newcastle Sussex
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¹ Included in 1 district of 3 counties.² Township.

TABLE 1.—*List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued*

FLORIDA

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Manatee Polk Sarasota	Manatee Sarasota	Leon Manatee Taylor	Leon Taylor	Escambia Leon Taylor

GEORGIA

Baldwin Bartow Bibb Brooks Chatham Clarke Cobb Coffee Colquitt Crisp Decatur De Kalb Dougherty Emanuel Floyd Glynn Grady Hall Laurens Lowndes Mitchell Richmond Spalding Sumter Thomas Troup Walker Ware Washington Wayne Worth	Baldwin Bartow Bibb Brooks Chatham Clarke Clinch Cobb Coffee Colquitt Crisp Decatur De Kalb Dougherty Emanuel Floyd Glynn Grady Hall Jefferson Jenkins Laurens Lowndes Mitchell Richmond Spalding Sumter Thomas Troup Walker Ware Washington Wayne Worth	Baldwin Bartow Bibb Brooks Chatham Clarke Clinch Cobb Coffee Colquitt Decatur De Kalb Dougherty Floyd Glynn Grady Hall Jefferson Jenkins Laurens Lowndes Mitchell Richmond Spalding Sumter Thomas Troup Walker Washington	Baldwin Bartow Bibb Brooks Catoosa ¹ Chatham Chattooga ² Clarke Cobb Coffee Colquitt Dade ¹ Decatur De Kalb Dougherty Floyd Glynn Gordon ¹ Grady Hall Jefferson Jenkins Laurens Lowndes Mitchell Murray ¹ Richmond Spalding Sumter Thomas Troup Walker ¹ Ware Washington Whitfield ¹	Baldwin Bartow Bibb Brooks Catoosa ¹ Chatham Clarke Cobb Colquitt Dade ¹ Decatur De Kalb Dougherty Floyd Glynn Grady Hall Jefferson Jenkins Laurens Lowndes Mitchell Richmond Spalding Sumter Thomas Troup Walker ¹ Ware Washington
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IDAHO

	Bonneville Twin Falls	Twin Falls	Twin Falls	Twin Falls
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ILLINOIS

Cook Du Page Morgan Pulaski	Du Page Morgan	Du Page Morgan	Du Page	Du Page
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IOWA

		Washington Woodbury	Des Moines Washington Woodbury	Des Moines Washington Woodbury
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¹ Included in 1 district of 4 counties.² Included in 1 district of 3 counties.³ Walker County also included in a tricounty district.

TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

KANSAS

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Brown Butler Cherokee Geary Greenwood Jefferson Lyon Marion Ottawa Shawnee	Brown Butler Cherokee Dickinson Geary Greenwood Lyon Marion Ottawa Sedgwick Shawnee	Brown Butler Cherokee Dickinson Geary Greenwood Lyon Marion Ottawa Sedgwick Seward Shawnee	Brown Butler Cherokee Dickinson Geary Greenwood Lyon Marion Sedgwick Shawnee	Brown Geary Lyon Marion Sedgwick Shawnee

KENTUCKY

Ballard Bell Boyd Breathitt Bullitt Carlisle Carter Davies Elliott Estill Fayette Floyd Fulton Henderson Hickman Hopkins Johnson Knott Knox Lawrence Lee Leslie Letcher Magoffin Martin Mason McLean Menifee Monroe Morgan Ohio Owsley Perry Pike Scott Trigg Webster Whitley Wolfe	Ballard Bell Boyd Breathitt Bullitt Calloway Carlisle Carter Davies Elliott Estill Fayette Floyd Fulton Henderson Hickman Hopkins Hopkins Jefferson Johnson Kenton Knott Knox Lawrence Lee Leslie Letcher Lincoln Madison Magoffin Martin Mason McLean Menifee Monroe Morgan Muhlenberg Ohio Owsley Perry Pike Scott Trigg Union Wayne Webster Whitley Wolfe	Bell Boyd Breathitt Bullitt Calloway Carlisle Carter Davies Elliott Estill Fayette Floyd Fulton Henderson Hickman Hopkins Jefferson Kenton Knott Knox Lawrence Lee Leslie Letcher Lincoln Madison Magoffin Mason McLean Menifee Monroe Morgan Muhlenberg Ohio Owsley Perry Pike Scott Trigg Union Wayne Webster	Adair Allen Anderson Barren Bath Bell Boyd Breathitt Bullitt Butler Caldwell Calloway Carlisle Carter Casey Clinton Davies Edmonson Elliott Estill Fayette Fleming Floyd Fulton Gallatin Grant Grayson Green Greenup Hancock Harrison Hart Henderson Hickman Hopkins Jackson Jefferson Kenton Knott Knox Laurel Lawrence Lee Leslie Letcher Lewis Lincoln Lincoln McCreary McLean Madison Magoffin Marshall Martin Mason Meade Menifee Metcalfe Monroe Morgan Muhlenberg Nicholas	Adair Allen Anderson Barren Bath Bell Boyd Breathitt Bullitt Butler Caldwell Calloway Carlisle Carter Casey Clinton Davies Edmonson Elliott Estill Fayette Fleming Floyd Fulton Gallatin Grant Grayson Green Greenup Hancock Hart Henderson Hickman Hopkins Jackson Jefferson Kenton Knott Knox Laurel Lawrence Lee Leslie Letcher Lewis Lincoln McCreary McLean Madison Magoffin Marshall Martin Mason Meade Menifee Metcalfe Monroe Morgan Muhlenberg Nicholas
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TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

KENTUCKY—Continued

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
			Nicholas Ohio Owen Owsley Perry Pike Powell Pulaski Robertson Rockcastle Rowan Scott Todd Trigg Trimble Union Warren Wayne Webster Whitley Wolfe	Ohio Owsley Perry Pike Powell Pulaski Robertson Rockcastle Rowan Scott Todd Trigg Trimble Union Warren Wayne Webster Whitley Wolfe

LOUISIANA

Assumption Avoyelles Caddo Caldwell Catahoula Claiborne Concordia De Soto East Carroll Franklin Iberia Iberville Lafayette Lafourche La Salle Madison Morehouse Natchitoches Ouachita Point Coupee Rapides Richland St. Landry St. Martin St. Mary Tensas Terrebonne Webster West Carroll	Assumption Avoyelles Caddo Caldwell Catahoula Claiborne Concordia De Soto East Carroll Franklin Iberia Iberville Lafayette Lafourche La Salle Lincoln Madison Morehouse Natchitoches Ouachita Point Coupee Rapides Richland St. Landry St. Martin St. Mary Tensas Terrebonne Washington Webster West Carroll	Assumption Avoyelles Caddo Caldwell Catahoula Claiborne Concordia De Soto East Carroll Franklin Iberia Iberville Lafayette Lafourche La Salle Lincoln Madison Morehouse Natchitoches Ouachita Point Coupee Rapides Richland St. Landry St. Martin St. Mary Tensas Terrebonne Washington Webster West Carroll	Assumption Avoyelles Caddo Caldwell Catahoula Claiborne Concordia De Soto East Carroll Evangeline Franklin Iberia Iberville Lafayette Lafourche La Salle Lincoln Madison Morehouse Natchitoches Ouachita Point Coupee Rapides Richland St. Landry St. Martin St. Mary Tensas Terrebonne Washington Webster West Carroll	Assumption Avoyelles Caddo Caldwell Catahoula Claiborne Concordia De Soto East Carroll Franklin Iberia Iberville Lafayette Lafourche La Salle Lincoln Madison Morehouse Natchitoches Ouachita Point Coupee Rapides Richland St. Landry St. Martin St. Mary Tensas Terrebonne Washington Webster West Carroll
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MAINE

Motbov Union ¹ Rumford ² Sanford ³ Vassalboro ³	Motbov Union ¹ Rumford ² Sanford ³ Vassalboro ³	Motbov Union ¹ Rumford ² Sanford ³ Vassalboro ³	Bar Harbor Bucksport Cooperative Health Union ⁴ Motbov Union ² Rumford ² Sanford ³	Bar Harbor Cooperative Health Union ⁴ Motbov Union ² Rumford ² Sanford ³
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¹ Parishes.

² Including municipalities of Orono, Milford, Bradley, Veazie, and Old Town.

³ Town (township) wholly or partly rural.

⁴ Including towns of Avon, Chesterville, Eustis, Livermore, Phillips, Rangeley, Strong, Temple, Weld, and Wilton.

TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

MARYLAND

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Allegany Baltimore Calvert Carroll Frederick Harford Montgomery Prince Georges Talbot	Allegany Baltimore Calvert Carroll Cecil Frederick Harford Montgomery Prince Georges Talbot Wicomico	Allegany Anne Arundel Baltimore Calvert Carroll Cecil Frederick Harford Kent Montgomery Prince Georges Talbot Washington Wicomico	Allegany Anne Arundel Baltimore Calvert Carroll Cecil Dorchester Frederick Garrett Harford Kent Montgomery Prince Georges Queen Annes Talbot Washington Wicomico Worcester	Allegany Anne Arundel Baltimore Calvert Carroll Cecil Charles Dorchester Frederick Garrett Harford Howard Kent Montgomery Prince Georges Queen Annes Somerset Talbot Washington Wicomico Worcester

MASSACHUSETTS

Barnstable	Barnstable	Barnstable	Barnstable Nashoba Southern Berkshire	Barnstable ¹ Nashoba Southern Berkshire ²
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MICHIGAN

Oakland Saginaw Wexford	Genesee Oakland Saginaw Wexford	Alcona ¹ Alpena ¹ Antrim ¹ Charlevoix ¹ Cheboygan ¹ Crawford ¹ Emmet ¹ Genesee Iosco ¹ Isabella Kalkaska ¹ Kent Midland Missaukee ¹ Montmorency ¹ Oakland Ogemaw ¹ Oscoda ¹ Otsego ¹ Ottawa Presque Isle ¹ Roscommon ¹ Saginaw Wexford	Alcona ¹ Alpena ¹ Antrim ¹ Barry Charlevoix ¹ Cheboygan ¹ Crawford ¹ Emmet ¹ Genesee Iosco ¹ Isabella Kalkaska ¹ Kent Midland Missaukee ¹ Montmorency ¹ Oakland Ogemaw ¹ Oscoda ¹ Otsego ¹ Ottawa Presque Isle ¹ Roscommon ¹ Saginaw Wexford	Alcona ¹ Allegan Alpena ¹ Antrim ¹ Barry Charlevoix ¹ Cheboygan ¹ Crawford ¹ Emmet ¹ Genesee Iosco ¹ Isabella Kalkaska ¹ Kent Lake ² Midland Missaukee ¹ Montmorency ¹ Newaygo ² Oakland Oceana ² Ogemaw ¹ Oscoda ¹ Otsego ¹ Ottawa Presque Isle ¹ Roscommon ¹ Saginaw Wexford
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MINNESOTA

St. Louis	St. Louis	St. Louis	St. Louis	St. Louis
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¹ Included in 4 districts of 4 counties each.
² Included in 1 district of 3 counties.

¹ Represents 14 towns.
² Represents 16 towns.

TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

MISSISSIPPI

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Adams Bollivar Clarke Coahoma Copiah Forrest Hancock Harrison Hinds Holmes Humphreys Issaquena Jackson Jones Lamar Lauderdale Lee Leflore Lincoln Monroe Pearl River Perry Sharkey Sunflower Tishomingo Union Warren Washington Yazoo	Adams Bollivar Clarke Coahoma Copiah Forrest Hancock Harrison Hinds Holmes Humphreys Issaquena Jackson Lamar Lauderdale Lee Leflore Lincoln Monroe Pearl River Perry Sharkey Sunflower Tishomingo Union Warren Washington Yazoo	Adams Bollivar Clarke Coahoma Copiah Forrest Hancock Harrison Hinds Holmes Humphreys Issaquena Jackson Lamar Lauderdale Lee Leflore Lincoln Monroe Pearl River Perry Sharkey Sunflower Tishomingo Union Warren Washington Yazoo	Adams Bollivar Clarke Coahoma Copiah Forrest Hancock Harrison Hinds Holmes Humphreys Jackson Lamar Lauderdale Lee Leflore Lincoln Monroe Pearl River Perry Pike Sunflower Union Warren Washington Yazoo	Adams Bollivar Coahoma Copiah Forrest Hancock Harrison Hinds Holmes Humphreys Jackson Lamar Lauderdale Lee Leflore Lincoln Monroe Pearl River Perry Pike Sunflower Union Warren Washington Yazoo

MISSOURI

Boone Dunklin Greene Jackson Marion Mississippi New Madrid Nodaway Pemiscot St. Francois St. Louis Scott	Boone Buchanan Dunklin Greene Jackson Marion Mississippi New Madrid Nodaway Pemiscot St. Francois St. Louis Scott	Boone Buchanan Dunklin Greene Jackson Marion Miller New Madrid Nodaway Pemiscot St. Francois St. Louis Scott	Boone Buchanan Dunklin Greene Jackson Marion Miller New Madrid Pemiscot St. Louis Scott	Boone Buchanan Dunklin Greene Jackson Marion Miller New Madrid Pemiscot St. Louis
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MONTANA

Cascade Lewis and Clark Missoula	Cascade Gallatin Lewis and Clark Missoula	Cascade Gallatin Lewis and Clark Missoula	Cascade Gallatin Lewis and Clark Missoula	Cascade Gallatin Lewis and Clark Missoula
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NEW MEXICO

Bernalillo Chaves Dona Ana Eddy Santa Fe Union Valencia	Bernalillo Chaves Dona Ana Eddy McKinley Union Valencia	Bernalillo Dona Ana Eddy Lea McKinley Santa Fe Union Valencia	Bernalillo Dona Ana Eddy Santa Fe Union Valencia	Bernalillo Dona Ana Eddy Santa Fe Union Valencia
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TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

NEW YORK

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Cattaraugus Suffolk	Cattaraugus Cortland Suffolk Westchester	Cattaraugus Cortland Suffolk Westchester	Cattaraugus Cortland Suffolk Westchester	Cattaraugus Cortland Suffolk Westchester

NORTH CAROLINA

Beaufort Bertie Bladen Brunswick Buncombe Cabarrus Cherokee Columbus Craven Cumberland Davidson Durham Edgecombe Forsyth Gaston Granville Guilford Halifax Henderson Johnston Lenoir Mecklenburg Moore Nash New Hanover Northampton Pamlico Pitt Randolph Richmond Robeson Rowan Rutherford Sampson Surry Vance Wake Wayne Wilkes Wilson	Beaufort Bertie Bladen Buncombe Cabarrus Cherokee Columbus Craven Cumberland Davidson Durham Edgecombe Forsyth Gaston Granville Guilford Halifax Henderson Johnston Lenoir Mecklenburg Moore Nash New Hanover Northampton Pitt Randolph Richmond Robeson Rowan Rutherford Sampson Surry Vance Wake Wayne Wilkes Wilson	Beaufort Bertie Bladen Buncombe Cabarrus Cherokee Columbus Craven Cumberland Davidson Durham Edgecombe Forsyth Franklin Gaston Guilford Guilford Granville Halifax Henderson Johnston Lenoir Mecklenburg Moore New Hanover Northampton Pitt Randolph Richmond Robeson Rowan Rutherford Sampson Surry Vance Wake Wayne Wilkes Wilson	Beaufort Bladen Buncombe Cabarrus Columbus Cumberland Davidson Durham Edgecombe Forsyth Franklin Gaston Granville Guilford Halifax Johnston Lenoir Mecklenburg Moore New Hanover Northampton Pitt Randolph Richmond Robeson Rowan Rutherford Sampson Stokes Surry Vance Wake Wayne Wilkes Wilson Yadkin	Beaufort Bladen Buncombe Cabarrus Columbus Cumberland Davidson Durham Edgecombe Forsyth ¹ Franklin Gaston Granville Guilford Halifax Lenoir Mecklenburg Moore New Hanover Northampton Pitt Randolph Richmond Robeson Rowan Rutherford Sampson Stokes ¹ Surry Vance Wake Wayne Wilkes Wilson Yadkin ¹
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OHIO

Allen Ashtabula Belmont Butler Clinton Columbiana Coshocton Crawford Cuyahoga Darke Delaware Erie Fayette Franklin Geauga Hamilton Hancock Hocking Huron Jefferson Lake Lorain	Allen Ashtabula Belmont Butler Clinton Columbiana Coshocton Crawford Cuyahoga Darke Delaware Erie Fayette Franklin Hamilton Hancock Hocking Huron Jackson Jefferson Lorain Lucas	Allen Ashtabula Belmont Butler Clinton Columbiana Coshocton Crawford Cuyahoga Darke Delaware Erie Fayette Franklin Hamilton Hancock Hocking Huron Jackson Jefferson Lorain Lucas	Allen Ashtabula Belmont Butler Clinton Columbiana Coshocton Crawford Cuyahoga Darke Delaware Erie Fayette Franklin Guernsey Hamilton Hancock Hocking Huron Jackson Jefferson Lorain	Allen Ashtabula Belmont Butler Clinton Columbiana Coshocton Crawford Cuyahoga Darke Delaware Erie Fayette Franklin Hamilton Hancock Hocking Huron Jackson Jefferson Lorain Lucas
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¹ Included in one district of 3 counties.

TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

OHIO—Continued

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Lucas Mahoning Marion Meigs Mercer Miami Montgomery Morrow Perry Preble Richland Ross Sandusky Scioto Seneca Shelby Stark Summit Trumbull Tuscarawas Washington Wayne Wood	Lucas Mahoning Marion Meigs Mercer Miami Montgomery Morrow Perry Pickaway Preble Richland Ross Sandusky Scioto Seneca Shelby Stark Summit Trumbull Tuscarawas Washington Wayne Wood	Mahoning Marion Meigs Mercer Miami Montgomery Morrow Muskingum Perry Pickaway Preble Richland Ross Sandusky Scioto Seneca Shelby Stark Summit Trumbull Tuscarawas Washington Wayne Wood	Lucas Mahoning Marion Medina Meigs Mercer Miami Montgomery Morrow Perry Pickaway Preble Richland Ross Scioto Seneca Shelby Stark Summit Trumbull Tuscarawas Washington Wayne Wood	Mahoning Marion Medina Meigs Mercer Miami Montgomery Morrow Perry Pickaway Preble Richland Ross Scioto Seneca Shelby Stark Summit Trumbull Tuscarawas Washington Wayne Wood

OKLAHOMA

Carter Kay Le Flore McCurtain Muskogee Okmulgee Osage Ottawa Pittsburg Seminole	Carter Le Flore McCurtain Muskogee Okmulgee Osage Ottawa Pittsburg Seminole	Carter Le Flore McCurtain Muskogee Okmulgee Ottawa Pittsburg Pottawatomie Seminole	Carter Le Flore McCurtain Muskogee Okmulgee Ottawa Pittsburg Pottawatomie Seminole	
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OREGON

Clackamas Coos Douglas Jackson Klamath Marion Multnomah	Clackamas Coos Douglas Jackson Klamath Marion Multnomah	Clackamas Coos Douglas Jackson Klamath Lane Marion Multnomah	Clackamas Coos Douglas Jackson Klamath Lane Marion Multnomah	Clackamas Coos Douglas Jackson Klamath Lane Marion
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PENNSYLVANIA

		Allegheny Bucks Luzerne	Allegheny Bucks Luzerne	Allegheny Bucks Luzerne
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SOUTH CAROLINA

Aiken Anderson Beaufort Berkeley Charleston Cherokee Darlington Dillon Dorchester Fairfield Georgetown	Aiken Anderson Beaufort Berkeley Charleston Cherokee Darlington Dillon Dorchester Fairfield Florence	Aiken Anderson Beaufort Berkeley Charleston Cherokee Darlington Dillon Dorchester Fairfield Florence	Aiken Anderson Beaufort Berkeley Charleston Cherokee Darlington Dillon Dorchester Fairfield Florence	Aiken Anderson Beaufort Berkeley Charleston Cherokee Darlington Dillon Dorchester Fairfield Florence
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TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

SOUTH CAROLINA—Continued

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Greenville Greenwood Horry Marion Newberry Oconee Orangeburg Richland Spartanburg	Georgetown Greenville Greenwood Horry Kershaw Lexington Marion Newberry Oconee Orangeburg Richland Spartanburg	Georgetown Greenville Greenwood Horry Kershaw Lexington Marion Newberry Oconee Orangeburg Richland Spartanburg	Georgetown Greenville Greenwood Horry Kershaw Lexington Marion Newberry Oconee Orangeburg Pickens Richland Spartanburg	Georgetown Greenville Greenwood Horry Kershaw Lexington Marion Newberry Oconee Orangeburg Pickens Richland Spartanburg

SOUTH DAKOTA

Pennington	Pennington	Pennington	Pennington	Pennington
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TENNESSEE

Blount Bradley Carter Davidson Dyer Gibson Greene Hamilton Knox Lake Lauderdale Monroe Montgomery Obion Roane Rutherford Sevier Shelby Sullivan Washington Weakley Williamson Wilson	Bledsoe Blount Bradley Carter Clay Davidson Dyer Fentress Gibson Giles Greene Grundy Hamilton Hardeman Jackson Knox Lake Lauderdale Lincoln Meigs Monroe Montgomery Obion Overton Pickett Rhea Roane Rutherford Sevier Shelby Sullivan Sumner Tipton Washington Weakley Williamson Wilson	Bledsoe Blount Bradley Carter Clay Davidson Dyer Fentress Gibson Giles Greene Grundy Hamilton Hardeman Humphreys Jackson Knox Lake Lauderdale Lewis Lincoln Maury Meigs Monroe Montgomery Obion Overton Pickett Rhea Roane Rutherford Sevier Shelby Sullivan Sumner Tipton Unicoi Washington Weakley Williamson Wilson	Bledsoe ¹ Blount Bradley Carter Clay ² Cumberland Davidson ² Dyer Fentress ² Gibson Giles Greene Grundy ¹ Hamilton Hardeman Humphreys Jackson ² Knox Lake Lauderdale Lewis Lincoln Maury Meigs ² Monroe Montgomery Obion Overton ² Pickett ² Rhea ² Roane Rutherford Sevier Shelby Sullivan Sumner Tipton Unicoi Washington Weakley Williamson Wilson	Bledsoe ¹ Bradley Carter Clay ² Davidson ² Dyer Fentress ² Gibson Giles Greene Grundy ¹ Hamilton Hardeman Humphreys Jackson ² Knox Lake Lauderdale Lewis Lincoln Maury Meigs ² Monroe Montgomery Obion Overton ² Pickett ² Rhea ² Roane Rutherford Sevier Shelby Sullivan Sumner Tipton Unicoi Washington Weakley Williamson Wilson
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¹ Included in 1 district of 3 counties.² Included in 4 districts of 2 counties each.

TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

TEXAS

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Cameron Hidalgo McLennan Tarrant	Cameron Hidalgo Jefferson McLennan Nolan Tarrant	Cameron Hidalgo Jefferson McLennan Nolan Potter Tarrant	Cameron ¹ Cass Hidalgo ¹ Jefferson McLennan Nolan Potter Starr ¹ Willacy ¹	Cameron Gregg Hidalgo McLennan Nolan Potter Starr Tarrant

UTAH

Box Elder Davis Utah	Box Elder Davis Utah	Davis Utah	Davis Utah	Davis Utah

VIRGINIA

Accomac Albermarle Arlington Augusta Brunswick Greensville Halifax Henrico Isle of Wight Nansemond Norfolk Northampton Princess Anne Rockbridge Southampton Wise	Accomac Albermarle Arlington Augusta Brunswick Fairfax Greensville Halifax Henrico Isle of Wight Nansemond Norfolk Northampton Princess Anne Rockbridge Southampton Wise	Accomac Albermarle Amelia ¹ Appomattox ¹ Arlington Augusta Brunswick Buckingham ¹ Charlotte ¹ Cumberland ¹ Fairfax Greensville Halifax Henrico Isle of Wight Lunenburg ¹ Nansemond Norfolk Northampton Nottoway ¹ Powhatan ¹ Prince Edward ¹ Princess Anne Rockbridge Southampton Wise	Accomac ¹ Albermarle Amelia ¹ Appomattox ¹ Arlington Augusta Brunswick ¹ Buckingham ¹ Charlotte ¹ Cumberland ¹ Fairfax Greensville ¹ Halifax Henrico Isle of Wight ¹ Lunenburg ¹ Nansemond ¹ Norfolk ¹ Northampton ¹ Nottoway ¹ Pittsylvania Powhatan ¹ Prince Edward ¹ Princess Anne ¹ Rockbridge Southampton Wise	Accomac ¹ Albermarle Amelia ¹ Appomattox ¹ Arlington Augusta Brunswick ¹ Buckingham ¹ Charlotte ¹ Cumberland ¹ Fairfax Greensville ¹ Halifax Henrico Isle of Wight ¹ Lunenburg ¹ Nansemond ¹ Norfolk ¹ Nottoway ¹ Pittsylvania Powhatan ¹ Prince Edward ¹ Princess Anne ¹ Rockbridge Southampton
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WASHINGTON

Chelan King Snohomish Spokane Walla Walla Whitman Yakima	Chelan Clark King Snohomish Spokane Walla Walla Whitman Yakima	Chelan Clark King Snohomish Spokane Walla Walla Whitman Yakima	Chelan Clark King Snohomish Spokane Walla Walla Whitman Yakima	Chelan Clark King Snohomish Spokane Walla Walla Whitman Yakima
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¹ Included in 1 district of 9 counties.
² Included in 1 district of 4 counties.

³ Included in 4 districts of 2 counties each.

TABLE 1.—List of counties, townships, or districts in which as of Jan. 1, 1929, 1930, 1931, and 1932, respectively, and Dec. 31, 1932, rural sections were provided with health service under local whole-time health officers—Continued

WEST VIRGINIA

Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932
Berkeley	Berkeley	Berkeley	Berkeley	Berkeley
Boone	Boone	Boone	Boone	Boone
Brooke	Brooke	Brooke	Brooke	Brooks
Fayette	Fayette	Fayette	Doddridge ¹	Fayette
Gilmer	Gilmer	Gilmer	Fayette	Hancock
Hancock	Hancock	Hancock	Hancock	Harrison
Harrison	Harrison	Harrison	Harrison	Kanawha
Kanawha	Kanawha	Kanawha	Kanawha	Logan
Logan	Logan	Logan	Logan	Marion
Marion	Marion	Marion	Marion	Marshall
Ohio	Monongalia	Marshall	Marshall	Monongalia
Preston	Ohio	Monongalia	Monongalia	Ohio
Raleigh	Preston	Ohio	Ohio	Preston
Wood	Raleigh	Preston	Pleasants ¹	Raleigh
	Wood	Raleigh	Preston	Wood
		Wood	Raleigh	
			Ritchie ¹	
			Tyler ¹	
			Wetzel ¹	
			Wood	

WYOMING

Natrona				
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RÉSUMÉ OF TABLE 1

State	Number of counties					Increase or decrease in—			
	Jan. 1, 1929	Jan. 1, 1930	Jan. 1, 1931	Jan. 1, 1932	Dec. 31, 1932	1929	1930	1931	1932
Alabama	50	51	54	54	54	+1	+3		
Arizona	3	3	6	5	4		+3	-1	-1
Arkansas	24	21	24	30	27	-3	+3	+6	-3
California	11	12	13	14	14	+1	+1	+1	
Colorado	1	1	1	1	1				-1
Connecticut	1	1	1	1	2				+1
Delaware	3	3	3	3	3				
Florida	3	2	3	2	3	-1	+1	-1	+1
Georgia	31	34	30	35	31	+3	-4	+5	-4
Idaho		2	1	1	1	+2	-1		
Illinois	4	2	2	1	1	-2		-1	
Iowa			2	3	3		+2	+1	
Kansas	10	11	12	10	6	+1	+1	-2	-4
Kentucky	39	45	43	81	79	+6	-2	+38	-2
Louisiana	29	31	31	32	31	+2		+1	-1
Maine	4	4	4	6	5			+2	-1
Maryland	9	11	14	18	21	+2	+3	+4	+3
Massachusetts	1	1	1	3	3			+2	
Michigan	3	4	24	25	20	+1	+20	+1	+4
Minnesota	1	1	1	1	1				
Mississippi	29	28	28	29	25	-1		+1	-4
Missouri	12	13	13	11	10	+1		-2	
Montana	3	4	4	4	4	+1			-1
New Mexico	7	7	8	6	6		+1	-2	
New York	2	4	4	4	4	+2			
North Carolina	39	38	39	36	35	-1	+1	-3	-1
Ohio	45	46	46	46	45	+1			-1
Oklahoma	10	9	9	9	9	-1			-9
Oregon	7	7	8	8	7		+1		-1
Pennsylvania			3	3	3		+3		
South Carolina	20	23	23	24	24	+3		+1	
South Dakota	1	1	1	1	1				
Tennessee	23	38	42	43	41	+15	+4	+1	-2
Texas	4	6	7	9	8	+2	+1	+2	-1
Utah	3	3	2	2	2		-1		
Virginia	16	17	26	27	25	+1	+9	+1	-2
Washington	7	8	8	8	8				
West Virginia	14	15	16	20	15	+1	+1	+4	-5
Wyoming	1					-1			
Total	470	507	557	616	581	+37	+50	+59	-35

¹ Included in 1 district of 5 counties.

Within the period January 1, 1932, to December 31, 1932, whole-time health service was established in 9 units and was discontinued in 44—a net loss of 35 units. The largest gain in one State was that

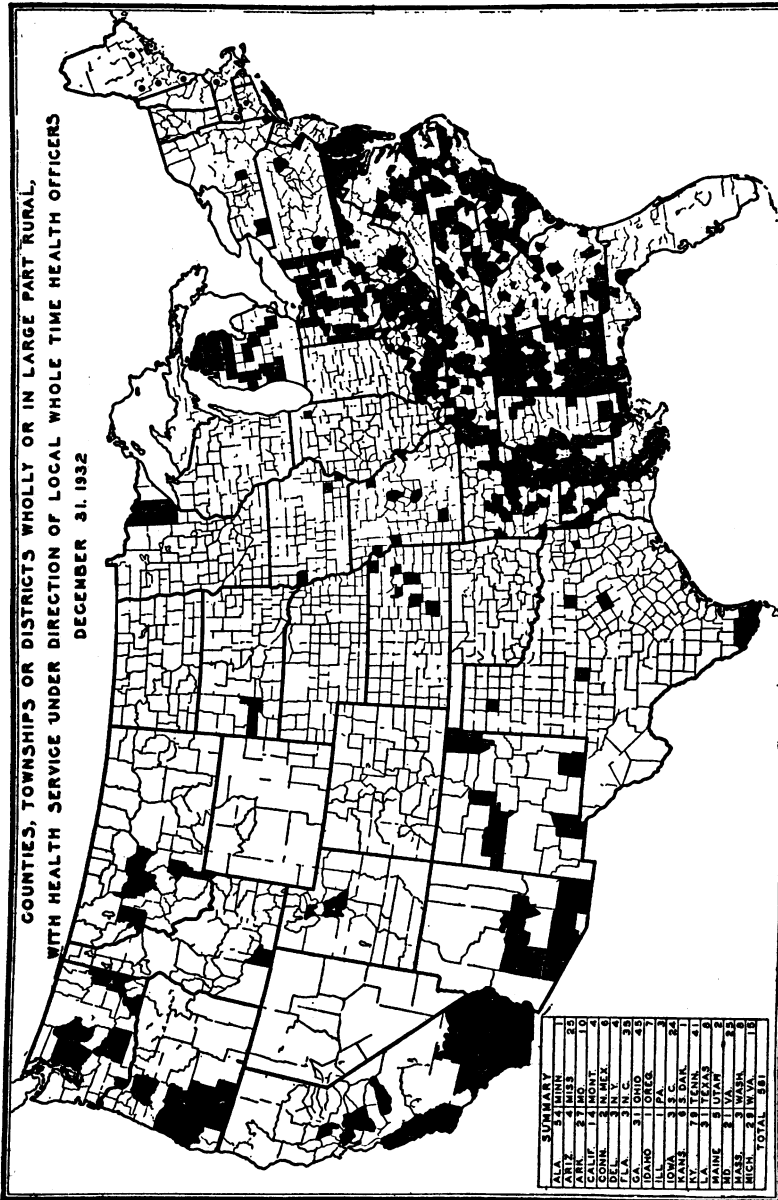


FIGURE 1.—Rural areas having whole-time health officers, December 31, 1932.

of 4 units in Michigan, while the greatest loss sustained was 9 units in the State of Oklahoma, all counties in this State discontinuing their full-time health service on June 30, 1932.

The accompanying map (fig. 1) shows the location of the counties, townships, or districts in the United States in the rural sections of which health service under the direction of local whole-time health officers was in operation on December 31, 1932.

Table 2 presents, by States, the percentage of rural population having health service under the direction of local whole-time health officers at the end of the calendar year 1932.

TABLE 2.—Percentage of rural population having on Dec. 31, 1932, health service under local whole-time health officers

State	Rural population as of Dec. 31, 1932, (estimated from 1930 census)	Rural population with local health service under direction of whole-time health officers	Percentage of rural population with local health service under direction of whole-time health officers
Alabama.....	1,918,908	1,644,060	85.7
Arizona.....	304,250	171,248	56.3
Arkansas.....	1,474,259	642,072	43.6
California.....	1,629,741	789,453	48.4
Colorado.....	523,833	0	0
Connecticut.....	483,406	48,016	9.9
Delaware.....	118,721	118,721	100.0
Florida.....	734,131	46,039	6.3
Georgia.....	2,013,016	579,064	28.8
Idaho.....	316,248	21,300	6.7
Illinois.....	1,994,927	25,712	1.3
Indiana.....	1,442,611	0	0
Iowa.....	1,491,647	49,107	3.3
Kansas.....	1,151,165	103,923	9.0
Kentucky.....	1,824,276	1,278,256	70.1
Louisiana.....	1,294,276	720,610	55.7
Maine.....	477,922	53,275	11.1
Maryland.....	677,158	645,171	95.3
Massachusetts.....	476,167	69,458	14.4
Michigan.....	1,570,672	494,051	31.5
Minnesota.....	1,306,337	43,313	3.3
Mississippi.....	1,703,291	667,530	39.2
Missouri.....	1,770,248	370,464	21.4
Montana.....	356,570	35,139	9.9
Nebraska.....	892,068	0	0
Nevada.....	56,594	0	0
New Hampshire.....	199,965	0	0
New Jersey.....	707,758	0	0
New Mexico.....	322,165	88,703	27.5
New York.....	2,138,746	278,902	13.0
North Carolina.....	2,438,680	1,213,679	49.8
North Dakota.....	569,929	0	0
Ohio.....	2,154,637	1,330,159	61.7
Oklahoma.....	1,597,311	0	0
Oregon.....	483,267	189,195	39.1
Pennsylvania.....	3,097,139	379,607	12.3
Rhode Island.....	61,955	0	0
South Carolina.....	1,367,685	864,312	63.2
South Dakota.....	569,258	10,408	1.8
Tennessee.....	1,720,018	880,261	51.2
Texas.....	3,511,780	186,487	5.3
Utah.....	243,667	30,195	12.4
Vermont.....	240,845	0	0
Virginia.....	1,636,612	533,459	32.6
Washington.....	667,897	310,015	44.4
West Virginia.....	1,276,067	566,191	44.5
Wisconsin.....	1,385,163	0	0
Wyoming.....	160,409	0	0
Total.....	54,583,385	15,492,585	28.4

¹ 1920 census; no estimate made for Dec. 31, 1932.

Delaware leads in the percentage of rural population under whole-time health service, all of its three counties having been provided with local whole-time health organization by the State. Of the

States in which the local governmental units maintain the health organizations, with or without assistance from the State health department or other sources, Maryland, with 95.3, had the highest percentage of rural population under whole-time health service.

Of the 581 counties, townships, or districts with health service under local whole-time health officers at the end of the present calendar year, 551, or 94.8 percent, were receiving financial assist-

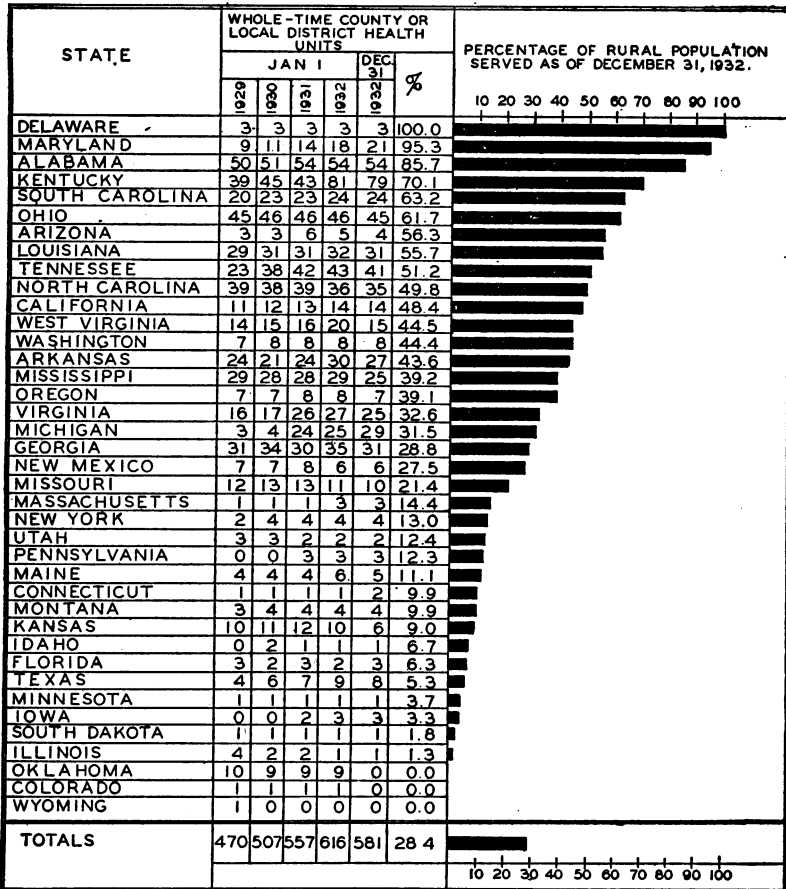


FIGURE 2.—Number of whole-time county or local district health units, by States, 1929-32, and percentage of rural population served on December 31, 1932.

ance for the support of their health service from one or more of the following agencies: The State board of health, the United States Public Health Service, the Rockefeller Foundation, the American Red Cross, the American Women's Hospital Fund, the Rosenwald Fund, the Commonwealth Fund, and the Millbank Fund.

The accompanying chart (figure 2) shows, by States, the number of counties, townships, or districts with health service under

the direction of local whole-time health officers on January 1, 1929, 1930, 1931, and 1932, and on December 31, 1932, and the percentage of the rural population of each State receiving such service at the close of the calendar year 1932. Also, it shows the total number of counties, townships, or districts in the United States having local whole-time health service, together with the percentage of the rural population of the entire United States served by local whole-time health organizations.

It will be noted that 71.6 percent of our rural population is as yet not provided with the form of health organization which is considered best adapted to rural areas.

COURT DECISION RELATING TO PUBLIC HEALTH

Action to recover damages for injuries from lead poisoning held barred by statute of limitations.—(Arkansas Supreme Court; *Field v. Gazette Pub. Co.*, 59 S.W. (2d) 19; decided Mar. 27, 1933.) The plaintiff began working for the defendant publishing company as a linotype operator in January 1924. He continued in this employment until April 1926, at which time the malady from which he suffered first appeared. He received medical treatment and resumed work for various periods until July 1928, when he discontinued his employment. On June 10, 1929, the plaintiff brought action against the company, the complaint being that the defendant had been negligent in furnishing him an unsafe and dangerous place in which to work. It was the plaintiff's contention in the lower court that he had contracted lead poisoning during his employment with the defendant, which poisoning was the proximate cause of his injuries. One of the defenses was that the plaintiff's injury, if any, occurred prior to June 10, 1926, and the 3-year statute of limitations was pleaded specially in bar of plaintiff's right to recover. On the question of the statute of limitations, the trial court instructed the jury that "If you find that the plaintiff contracted the malady of which he complains previous to June 10, 1926, then you will find for the defendant." Verdict and judgment in the trial court were for the defendant, and plaintiff appealed.

On appeal, it was conceded on behalf of the plaintiff that, if the trial court's quoted instruction was correct, the case should be affirmed. The contention of the plaintiff, however, was that the statute of limitations was held in abeyance until he or his physicians determined the specific malady from which he was suffering and that this information was not obtained until sometime in 1928. The supreme court, however, said that, as it viewed the situation, "the great weight of American authority is to the effect that the cause of action arises and the statute of limitations begins to run from the

date of the negligent act and not from the time the full extent of the injury may be ascertained." It reached the conclusion that "the lower court made correct application of the 3-year statute of limitations and, therefore, did not commit error in giving the instructions complained of."

DEATHS DURING WEEK ENDED SEPT. 16, 1933

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

	Week ended Sept. 16, 1933	Correspond- ing week 1932
Data from 85 large cities of the United States:		
Total deaths.....	6, 785	6, 503
Deaths per 1,000 population, annual basis.....	9.5	9.3
Deaths under 1 year of age.....	430	569
Deaths under 1 year of age per 1,000 estimated live births (81 cities).....	41	47
Deaths per 1,000 population, annual basis, first 37 weeks of year.....	10.9	11.2
Data from industrial insurance companies:		
Policies in force.....	67, 772, 681	70, 636, 403
Number of death claims.....	11, 835	12, 516
Death claims per 1,000 policies in force, annual rate.....	9.1	9.3
Death claims per 1,000 policies, first 37 weeks of year, annual rate.....	9.9	9.7

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

Reports for Weeks Ended September 23, 1933, and September 24, 1932

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 23, 1933, and Sept. 24, 1932

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932
New England States:								
Maine.....		1					0	0
New Hampshire.....							0	0
Vermont.....							0	0
Massachusetts.....	8	19			19	20	0	3
Rhode Island.....	1	3			1	5	0	0
Connecticut.....	1	3	1	3	4	4	1	0
Middle Atlantic States:								
New York.....	32	49	16	17	53	49	1	7
New Jersey.....	8	36	4	4	5	44	4	0
Pennsylvania.....	22	62		4	18	46	2	3
East North Central States:								
Ohio.....	38	51	12		12	31	0	2
Indiana.....	47	61	33	26		11	1	4
Illinois.....	31	82	6	7	12	9	3	0
Michigan.....	12	13	1	1	10	26	1	0
Wisconsin.....	1	9	10	15	14	16	0	1
West North Central States:								
Minnesota.....	4	10		2	4	11	1	3
Iowa.....	11	16				4	0	1
Missouri.....	44	63	12		6		0	2
North Dakota.....	6	2			7	5	0	0
South Dakota.....	4	2			3	3	0	0
Nebraska.....		11			1	10	0	0
Kansas.....	9	18		3	5	8	0	0
South Atlantic States:								
Delaware.....		6			2		0	0
Maryland.....	7	20	5	11	3	3	1	0
District of Columbia.....	4	3		1	2	1	1	0
Virginia.....	64	48			12	10	2	0
West Virginia.....	54	38	15	13	10	9	4	1
North Carolina.....	117	67	44	5	39	16	1	1
South Carolina.....	28	39	131	209	25	10	3	0
Georgia.....	45	56		15	21	1	0	0
Florida.....	6	24		1	3		0	0

See footnote at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 23, 1933, and Sept. 24, 1932—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932
East South Central States:								
Kentucky.....	78	81					1	1
Tennessee.....	65	103	14	7	3	1	0	3
Alabama ¹	56	80	10	8	20	1	0	1
Mississippi ¹	25	39					0	0
West South Central States:								
Arkansas.....	26	43	4	8	6		0	1
Louisiana.....	12	24	8	8	6	1	2	0
Oklahoma ¹	50	74	2	15	1	1	4	0
Texas ¹	83	86	107	43	15	1	2	1
Mountain States:								
Montana ¹	2	2	1		2	45	0	0
Idaho.....		13	2			2	0	1
Wyoming.....					1	2	0	0
Colorado.....	4	4			19	4	1	2
New Mexico.....	8	8			1	3	0	0
Arizona.....	3				1		0	0
Utah ¹	1				2	2	0	0
Pacific States:								
Washington.....	3	2			45	7	0	1
Oregon.....	3	1	5	6	9	31	0	0
California.....	31	49	27	252	119	18	3	2
Total.....	1,053	1,421	400	670	541	472	39	41

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932
New England States:								
Maine.....	15	5	7	9	0	0	2	13
New Hampshire.....	0	2	3	10	0	0	0	0
Vermont.....	1	0	1	2	0	0	0	0
Massachusetts.....	19	2	76	94	0	0	3	6
Rhode Island.....	1	0	15	12	0	0	0	0
Connecticut.....	10	0	15	20	0	0	4	5
Middle Atlantic States:								
New York.....	84	18	111	141	0	0	45	51
New Jersey.....	21	51	30	56	0	0	8	10
Pennsylvania.....	26	156	125	100	0	0	51	100
East North Central States:								
Ohio.....	20	0	149	176	0	11	51	61
Indiana.....	1	0	71	70	0	0	15	17
Illinois.....	12	8	136	155	0	5	27	49
Michigan.....	3	5	121	92	0	0	22	10
Wisconsin.....	2	2	27	25	4	0	0	6
West North Central States:								
Minnesota.....	36	2	38	37	0	0	2	9
Iowa ¹	5	1	19	20	0	2	4	7
Missouri.....	3	0	52	61	1	0	27	13
North Dakota.....	8	0	16	2	0	0	3	8
South Dakota.....	2	0	2	9	0	0	2	
Nebraska.....	1	0	19	21	0	0	3	1
Kansas.....	5	5	69	48	0	0	9	7
South Atlantic States:								
Delaware.....	0	0	4	6	0	0	1	4
Maryland ¹	4	2	17	28	0	0	13	31
District of Columbia.....	1	2	9	5	0	0	5	2
Virginia ¹	2	3	57	50	0	0	25	39
West Virginia.....	5	3	82	44	0	1	55	67
North Carolina ¹	2	2	57	70	0	0	16	21
South Carolina ¹	1	2	11	7	0	0	22	27
Georgia ¹	2	0	13	31	0	2	37	38
Florida ¹	0	0	3	4	0	0	3	7

See footnote at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 23, 1933, and Sept. 24, 1932—Continued

Division and State	Polio-myelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932	Week ended Sept. 23, 1933	Week ended Sept. 24, 1932
East South Central States:								
Kentucky.....	0	2	91	86	0	0	47	98
Tennessee.....	0	2	43	56	0	0	38	40
Alabama ¹	0	2	49	67	0	0	20	19
Mississippi ¹	1	0	17	15	0	0	6	5
West South Central States:								
Arkansas.....	1	0	4	11	0	1	9	27
Louisiana.....	1	3	14	6	0	0	16	7
Oklahoma ¹	1	2	26	18	1	0	41	27
Texas ¹	0	0	26	35	1	0	48	36
Mountain States:								
Montana ¹	3	0	10	8	0	0	8	6
Idaho.....	0	0	2	2	1	0	0	1
Wyoming.....	3	0	1	2	0	0	1	1
Colorado.....	0	0	7	41	0	1	19	29
New Mexico.....	1	1	2	9	1	0	6	9
Arizona.....	0	1	5	2	0	0	2	3
Utah ¹	1	0	6	4	0	0	0	2
Pacific States:								
Washington.....	4	5	12	20	1	3	5	7
Oregon.....	2	1	14	6	1	0	8	1
California.....	4	3	116	62	3	4	6	5
Total.....	314	293	1,800	1,915	14	30	735	932

¹ New York City only.

² Week ended earlier than Saturday.

³ Typhus fever, 58 cases, as follows: Maryland, 1; South Carolina, 1; Georgia, 13; Florida, 1; Alabama, 41; Texas, 1.

⁴ Rocky Mountain spotted fever, 3 cases, as follows: Virginia, 1; North Carolina, 1; Montana, 1.

⁵ Exclusive of Oklahoma City and Tulsa.

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	Me-ningo-coccus-menin-gitis	Diph-theria	Influ-enza	Mala-ria	Mea-sles	Pol-lagra	Polio-my-e-litis	Scarlet fever	Small-pox	Ty-phoid fever
<i>August 1933</i>										
Delaware.....	2	2			1		3	13	0	16
Idaho.....	1	1	3		2			9	1	11
Kansas.....	2	27	3	4	25		13	141	1	54
Maryland.....	2	20	17	2	15	1	7	77	0	100
Montana.....		9	5		9		3	20		30
Oklahoma ¹	1	55	19	191	15	17	3	20	0	122
Puerto Rico.....		66	45	4,464	96		0		3	50
Washington.....	5	4	9		25		7	74	6	24
West Virginia.....	4	114	60	1	66		19	109	8	214
Wisconsin.....	2	17	102		116		6	63	26	9

¹ Exclusive of Oklahoma City and Tulsa.

August 1933		August 1933—Continued		August 1933—Continued	
Chicken pox:	Cases	Mumps:	Cases	Trachoma:	Cases
Idaho.....	10	Delaware.....	1	Kansas.....	1
Kansas.....	15	Kansas.....	83	Montana.....	2
Maryland.....	20	Maryland.....	38	Oklahoma.....	6
Montana.....	19	Montana.....	1	Puerto Rico.....	1
Oklahoma ¹	8	Puerto Rico.....	27	Washington.....	1
Puerto Rico.....	3	Washington.....	57	Tularaemia:	
Washington.....	76	Wisconsin.....	50	Kansas.....	2
West Virginia.....	18	Ophthalmia neonatorum:		Typhus fever:	
Wisconsin.....	119	Oklahoma ¹	2	Maryland.....	2
Diarrhea:		Puerto Rico.....	9	Undulant fever:	
Maryland.....	50	Paratyphoid fever:		Idaho.....	6
Dysentery:		Kansas.....	4	Kansas.....	4
Maryland.....	52	Washington.....	1	Maryland.....	2
Oklahoma ¹	56	Puerperal septicaemia:		Montana.....	2
Puerto Rico.....	261	Puerto Rico.....	5	Washington.....	2
Washington.....	2	Rabies in animals:		Wisconsin.....	7
West Virginia.....	36	Maryland.....	3	Vincent's angina:	
Filariasis:		Washington.....	5	Kansas.....	11
Puerto Rico.....	6	Rabies in man:		Maryland.....	12
German measles:		Washington.....	1	Montana.....	1
Kansas.....	2	Rocky Mountain spotted		Oklahoma ¹	2
Maryland.....	10	fever:		Washington.....	3
Montana.....	1	Maryland.....	5	Whooping cough:	
Washington.....	6	Montana.....	1	Delaware.....	10
Wisconsin.....	8	Scabies:		Idaho.....	6
Impetigo contagiosa:		Maryland.....	2	Kansas.....	199
Kansas.....	5	Montana.....	6	Maryland.....	327
Maryland.....	8	Oklahoma ¹	2	Montana.....	120
Montana.....	7	Septic sore throat:		Oklahoma ¹	8
Washington.....	2	Idaho.....	3	Puerto Rico.....	160
Leprosy:		Kansas.....	1	Washington.....	123
Puerto Rico.....	1	Maryland.....	6	West Virginia.....	99
Lethargic encephalitis:		Oklahoma ¹	22	Wisconsin.....	1,333
Idaho.....	2	Tetanus:		Yaws:	
Kansas.....	27	Kansas.....	4	Puerto Rico.....	9
Maryland.....	1	Maryland.....	4		
Montana.....	2	Puerto Rico.....	17		
Oklahoma ¹	2	Tetanus, infantile:			
Washington.....	2	Puerto Rico.....	17		
West Virginia.....	5				
Wisconsin.....	5				

LETHARGIC ENCEPHALITIS, ST. LOUIS, MO.²

A report dated September 25, 1933, stated that since July 31, 1933, there had been 455 cases of lethargic encephalitis in St. Louis City, Mo., with 95 deaths and 491 cases with 78 deaths in the county of St. Louis. Only 14 cases had been reported in both areas during the preceding 48 hours.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 16, 1933

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Small-pox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Maine:											
Portland.....	0	-----	1	0	2	0	0	0	1	10	27
New Hampshire:											
Concord.....	0	-----	0	0	0	0	0	0	0	0	7
Vermont:											
Barre.....	0	-----	0	0	0	0	0	1	0	0	4
Burlington.....	0	-----	0	0	0	1	0	0	0	0	5
Massachusetts:											
Boston.....	4	-----	0	7	6	13	0	7	1	44	156
Fall River.....	2	-----	0	0	0	3	0	1	0	0	25
Springfield.....	0	-----	0	0	0	1	0	1	1	5	24
Worcester.....	5	-----	1	0	10	3	4	0	2	10	41

¹ Exclusive of Oklahoma City and Tulsa.

² For other reports of lethargic encephalitis see table above and p. 1246.

City reports for week ended Sept. 16, 1933—Continued

State and city	Diph- theria cases	Influenza		Meas- les cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths, all causes
		Cases	Deaths								
Rhode Island:											
Pawtucket.....	0		0	0	0	0	0	0	0	0	14
Providence.....	1		0	0	0	7	0	1	1	44	43
Connecticut:											
Bridgeport.....	0		0	1	0	0	0	2	0	1	19
Hartford.....	0		0	0	1	3	0	0	0	2	34
New Haven.....	2	1	0	0	2	0	0	0	1	1	27
New York:											
Buffalo.....	0		0	3	9	4	0	8	4	29	120
New York.....	31	5	4	14	69	32	0	73	21	161	1,191
Rochester.....	0		0	0	1	3	0	1	0	12	47
Syracuse.....	0		0	0	0	2	0	0	0	7	35
New Jersey:											
Camden.....	2		0	0	2	2	0	0	1	0	15
Newark.....	1	2	0	0	3	2	0	8	0	31	66
Trenton.....	0	1	0	2	0	0	0	0	1	1	35
Pennsylvania:											
Philadelphia.....	0	3	2	7	16	20	0	24	4	15	373
Pittsburgh.....	1		0	2	9	5	0	6	0	46	111
Reading.....	0		0	0	0	2	0	0	0	2	13
Ohio:											
Cincinnati.....	3	1	1	0	2	2	0	10	4	2	90
Cleveland.....	5	27	0	1	8	9	0	14	2	58	103
Columbus.....	2	1	0	0	2	11	0	4	3	5	67
Toledo.....	0		1	0	6	7	0	4	1	5	69
Indiana:											
Fort Wayne.....	2		0	0	0	0	0	0	0	0	14
Indianapolis.....	0		0	0	6	4	0	6	1	3	
South Bend.....	0		0	0	0	0	0	1	0	0	14
Terre Haute.....	0		0	0	1	1	0	1	0	0	22
Illinois:											
Chicago.....	1	1	4	8	30	41	0	36	3	27	672
Springfield.....											
Michigan:											
Detroit.....	5	1	0	2	5	19	0	11	0	51	161
Flint.....	1		0	0	1	1	0	1	0	0	12
Grand Rapids.....	0		0	0	0	0	0	1	0	3	26
Wisconsin:											
Kenosha.....	0		0	0	0	0	0	0	0	5	7
Madison.....	0		0	0	0	2	0	0	0	24	8
Milwaukee.....	0		0	2	3	8	0	2	1	90	72
Racine.....	0		0	1	0	0	0	0	0	6	12
Superior.....	0		0	3	0	0	0	0	0	9	7
Minnesota:											
Duluth.....	0		0	2	2	2	0	0	0	3	13
Minneapolis.....	4		0	0	1	4	0	2	1	12	82
St. Paul.....	0		0	0	2	2	0	1	0	13	50
Iowa:											
Des Moines.....	5		0	0	0	3	0	0	0	0	30
Sioux City.....	0		0	0	0	2	3	0	1	1	
Waterloo.....	0		0	0	0	0	0	0	0	2	
Missouri:											
Kansas City.....	3		0	0	4	8	0	4	1	2	77
St. Joseph.....	2		0	1	1	1	0	0	0	0	13
St. Louis.....	2		0	7	4	5	0	10	2	6	254
North Dakota:											
Fargo.....	0		0	4	1	0	0	0	0	3	5
Grand Forks.....	0		0	0	0	0	0	0	0	0	
South Dakota:											
Aberdeen.....	0		0	0	0	0	0	0	0	0	
Sioux Falls.....	0		0	0	0	0	0	0	0	0	7
Nebraska:											
Omaha.....	1		0	4	1	1	0	1	1	7	47
Kansas:											
Topeka.....	0		0	1	1	1	0	0	1	2	15
Wichita.....	1		0	1	1	1	0	1	0	3	22
Delaware:											
Wilmington.....	1		0	0	1	1	0	0	0	0	20
Maryland:											
Baltimore.....	0	1	0	0	11	8	0	9	1	56	162
Cumberland.....	1		0	0	0	0	0	1	0	0	7
Frederick.....	0		0	0	0	1	0	0	0	0	1
District of Col.:											
Washington.....	6		0	3	3	2	0	10	3	7	128

1 Nonresident.

City reports for week ended Sept. 16, 1933—Continued

State and city	Diph- theria cases	Influenza		Mea- sles cases	Pneu- monia deaths	Scar- let fever cases	Small- pox cases	Tuber- culosis deaths	Ty- phoid fever cases	Whoop- ing cough cases	Deaths, all causes
		Cases	Deaths								
Virginia:											
Lynchburg											
Richmond	2		0	0	1	5	0	2	1	6	46
Roanoke	2		0	0	0	1	0	0	1	0	7
West Virginia:											
Charleston	2		0	0	2	0	0	1	0	1	14
Huntington	1		0	0	0	2	0	0	0	0	
Wheeling	0		0	0	1	0	0	1	1	5	16
North Carolina:											
Raleigh	1		0	0	0	1	0	1	0	0	13
Wilmington	1		0	0	3	0	0	0	0	0	15
Winston-Salem	3		0	0	0	1	0	0	0		15
South Carolina:											
Charleston	0	2	0	0	2	0	0	3	2	0	29
Columbia	0		0	0	1	0	0	4	0	0	26
Greenville	1		0	0	0	0	0	1	2	0	11
Georgia:											
Atlanta	10	1	1	2	3	4	0	6	0	3	77
Brunswick	0		0	0	0	0	0	0	0	0	3
Savannah	0		0	3	0	0	0	0	1	0	27
Florida:											
Miami	0		0	0	1	0	0	3	0	5	26
Tampa	2		0	0	0	0	0	1	0	0	25
Kentucky:											
Ashland	0		0	0	0	1	0	0	2	14	
Lexington	1		0	1	1	0	0	1	0	1	14
Louisville	4	1	1	0	5	7	0	2	6	3	93
Tennessee:											
Memphis	10		0	1	5	3	0	6	4	10	81
Nashville	2		1	0	0	1	0	0	2	1	37
Alabama:											
Birmingham	7		0	0	5	1	0	3	2	1	52
Mobile	0		0	0	0	0	0	1	1	0	21
Montgomery	1		0	0	0	2	0	0	0	0	
Arkansas:											
Fort Smith	1		0	0	0	1	0	0	0	3	
Little Rock	0		0	0	0	0	0	1	0	2	
Louisiana:											
New Orleans	7	1	1	0	6	3	0	13	2	4	141
Shreveport	4		0	0	0	0	0	5	0	1	32
Oklahoma:											
Tulsa	1		0	0	0	0	0	0	1	6	
Texas:											
Dallas	9		0	0	5	1	0	2	0	2	63
Fort Worth	1		0	0	1	3	0	1	2	1	27
Galveston	0		0	0	0	1	0	0	0	0	14
Houston	8		0	0	6	3	0	2	0	0	59
San Antonio	0		1	0	2	0	0	1	1	0	36
Montana:											
Billings											
Great Falls	0		0	1	0	2	0	0	1	10	3
Helena	0		0	0	0	0	0	0	0	0	3
Missoula	0		0	0	1	0	0	0	1	0	5
Idaho:											
Boise	0		0	0	0	0	0	0	0	0	4
Colorado:											
Denver	2	16	0	1	6	6	0	6	2	15	75
Pueblo	0		0	0	1	1	0	1	0	0	8
New Mexico:											
Albuquerque	1		0	0	0	0	0	2	1	1	9
Utah:											
Salt Lake City	0		1	4	2	1	0	1	1	11	18
Nevada:											
Reno	0		0	0	0	0	0	0	0	0	4
Washington:											
Seattle	0		0	1	3	3	0	3	0	14	73
Spokane	0			6		1	0		0	0	
Tacoma	0		0	1	1	1	0	1	0	2	26
Oregon:											
Portland	1		0	1	2	5	0	0	0	1	40
Salem	0	2	0	0	0	0	0	0	0	0	
California:											
Los Angeles	10	12	0	7	5	20	7	27	2	33	280
Sacramento	1		0	1	3	5	0	4	4	15	28
San Francisco	1	3	1	2	7	9	0	14	0	14	173

City reports for week ended Sept. 16, 1933—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Iowa:			
Boston.....	0	0	10	Des Moines.....	0	0	1
Fall River.....	0	0	1	Missouri:			
Worcester.....	0	0	2	St. Joseph.....	0	0	2
Connecticut:				North Dakota:			
Bridgeport.....	0	0	1	Fargo.....	0	0	1
Hartford.....	0	0	1	Nebraska:			
New York:				Omaha.....	1	0	0
New York.....	1	0	81	Delaware:			
Rochester.....	0	0	4	Wilmington.....	1	1	0
Syracuse.....	0	0	2	District of Columbia:			
New Jersey:				Washington.....	0	0	2
Camden.....	0	0	1	Virginia:			
Newark.....	0	0	5	Richmond.....	0	0	1
Trenton.....	0	0	1	West Virginia:			
Pennsylvania:				Wheeling.....	0	0	1
Philadelphia.....	0	2	0	North Carolina:			
Pittsburgh.....	0	0	3	Winston-Salem.....	1	0	0
Ohio:				Georgia:			
Cincinnati.....	0	0	1	Atlanta.....	1	0	0
Cleveland.....	0	0	7	Kentucky:			
Indiana:				Louisville.....	0	0	2
Indianapolis.....	1	0	0	Alabama:			
Illinois:				Birmingham.....	0	0	1
Chicago.....	2	1	13	Texas:			
Michigan:				Dallas.....	1	0	0
Detroit.....	0	0	4	Utah:			
Wisconsin:				Salt Lake City.....	0	0	1
Milwaukee.....	0	0	1	Washington:			
Racine.....	0	1	0	Tacoma.....	0	0	2
Minnesota:				Oregon:			
Duluth.....	0	0	3	Portland.....	0	0	2
Minneapolis.....	0	0	3	California:			
St. Paul.....	0	0	1	Los Angeles.....	1	2	2

Lethargic encephalitis.—Cases: Buffalo, N.Y., 1; New York, 6; Philadelphia, 1; Pittsburgh, 2; Cleveland, 6; Detroit, 5; Grand Rapids, 2; Sioux City, Iowa, 4; Kansas City, Mo., 8; St. Joseph, 9; St. Louis, 171; Omaha, 4; Ashland, Ky., 7; Houston, Tex., 1; Pueblo, Colo., 1; Salt Lake City, 1.

Pellagra.—Cases: Baltimore, 2; Charleston, S.C., 1; Atlanta, 1; Memphis, 1; Birmingham, 1; Dallas, Tex., 2.

Typhus fever.—Cases: Savannah, 5; Houston, Tex., 2; San Antonio, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Two weeks ended September 9, 1933.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the 2 weeks ended September 9, 1933, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis					1		1			2
Chicken pox		3		19	58	17	20	1	18	136
Diphtheria		3	2	29	11	8	3			56
Dysentery				6	14		1			21
Erysipelas				7	2			2		13
Influenza				1		1	1		21	24
Lethargic encephalitis					2				1	3
Measles		1		72	8	2	3	4	4	94
Mumps					30	1	2	1	2	36
Paratyphoid fever					17	2				19
Pneumonia		1			5		6		3	15
Poliomyelitis		1		19	4	1	4	3		32
Scarlet fever		15	4	45	48	21	9	1	24	167
Smallpox										1
Trachoma					19		1		32	52
Tuberculosis	1		10	141	115	2	27	1	32	329
Typhoid fever			10	85	33	5	5	4	5	147
Undulant fever				1	8					9
Whooping cough		11	5	147	261	108	54	15	54	655

Ontario Province—Communicable diseases—Four weeks ended August 26, 1933.—The Department of Health of the Province of Ontario, Canada, reports certain communicable diseases for the 4 weeks ended August 26, 1933, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1	1	Puerperal septicemia		1
Chicken pox	133		Scarlet fever	68	
Diphtheria	30	2	Septic sore throat	1	
Erysipelas	4		Syphilis	71	
German measles	2		Trachoma	15	
Gonorrhea	76		Trichinosis	1	
Influenza		5	Tuberculosis	136	31
Measles	25		Tularaemia	1	
Mumps	66		Typhoid fever	62	2
Paratyphoid fever	39	1	Undulant fever	9	
Pneumonia		38	Whooping cough	584	7
Poliomyelitis	13				

Vital statistics—First quarter 1933.—The Bureau of Statistics of the Dominion of Canada has published statistics for the months of January, February, and March 1933. The rates are computed on an

annual basis. There were 21.2 live births per 1,000 population during the quarter in 1933 and 23.1 per 1,000 in 1932. The death rate was 10.8 per 1,000 population for the first quarter of each year. The infant mortality for the quarter was 84.9 per 1,000 live births in 1933 and 74.0 in 1932. The maternal death rate was 4.9 per 1,000 live births in the first quarter of 1933 and 5.4 in the corresponding quarter of 1932.

The accompanying tables give the numbers of births, deaths, and marriages and deaths from certain causes by Provinces for the first quarter of 1933:

Numbers of births, deaths, and marriages

Province	Live births	Deaths (exclusive of stillbirths)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada ¹	55,646	28,248	4,723	275	10,546
Prince Edward Island.....	480	293	42	-----	82
Nova Scotia.....	2,791	1,800	261	12	606
New Brunswick.....	2,553	1,470	244	17	359
Quebec.....	19,259	8,585	2,012	103	2,295
Ontario.....	15,938	9,763	1,019	85	3,791
Manitoba.....	3,470	1,525	265	18	739
Saskatchewan.....	5,076	1,743	431	17	1,022
Alberta.....	3,703	1,429	312	17	908
British Columbia.....	2,376	1,640	137	6	694

¹ Exclusive of Yukon and the Northwest Territories.

Deaths from certain causes in Canada for the first quarter of 1932 and 1933, and by Provinces for the first quarter 1933

Cause of death	Canada ¹ (first quarter)		Province—First quarter 1933								
	1932	1933	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents.....	181	145	-----	5	5	36	68	3	3	5	20
Cancer.....	2,566	2,568	20	167	120	663	964	160	125	137	212
Diarrhea and enteritis.....	581	526	5	8	12	330	78	21	27	30	15
Diphtheria.....	139	66	-----	1	2	36	12	3	7	4	1
Diseases of the arteries.....	1,865	1,887	24	113	60	356	962	113	61	68	130
Diseases of the heart.....	4,121	4,148	24	233	169	1,005	1,818	210	196	178	315
Homicides.....	46	34	-----	4	-----	14	7	4	3	1	-----
Influenza.....	1,382	2,586	33	193	165	787	798	177	234	136	63
Measles.....	111	48	-----	7	7	12	17	1	-----	-----	-----
Nephritis.....	1,564	1,430	16	82	58	576	464	52	70	53	59
Pneumonia.....	2,309	2,362	28	199	167	700	748	151	162	127	80
Poliomyelitis.....	18	15	-----	-----	-----	6	2	3	-----	-----	-----
Puerperal causes.....	320	275	-----	12	17	103	85	18	17	3	1
Scarlet fever.....	67	58	1	3	3	27	16	1	4	2	6
Smallpox.....	16	2	-----	-----	-----	-----	-----	-----	-----	-----	-----
Suicides.....	209	202	-----	6	4	28	87	14	20	13	20
Tuberculosis.....	1,886	1,803	19	120	100	765	383	120	70	91	135
Typhoid fever.....	68	42	-----	-----	5	20	4	5	3	3	2
Violent deaths.....	911	843	9	64	42	160	322	42	74	61	69

¹ Exclusive of Yukon and the Northwest Territories.

CUBA

Habana—Communicable diseases—Four weeks ended September 9, 1933.—During the 4 weeks ended September 9, 1933, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths
Diphtheria.....	3	1
Malaria.....	11	1
Measles.....	1	1
Tuberculosis.....	14	4
Typhoid fever.....	16	10

Cienfuegos—Typhoid fever.—According to a recent report there was an epidemic of typhoid fever in Cienfuegos, Cuba. Ten new cases, with 2 deaths, were reported during the week ended September 2, and 21 new cases with 2 deaths were reported for the week ended September 16. On the date of the report, September 19, 1933, it was stated that there were 150 cases of typhoid in the city. The outbreak was thought to have been caused by water.

JAMAICA

Communicable diseases—Four weeks ended September 9, 1933.—During the 4 weeks ended September 9, 1933, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox.....	—	8	Lethargic encephalitis.....	—	1
Diphtheria.....	—	1	Puerperal fever.....	—	1
Dysentery.....	5	12	Tuberculosis.....	41	76
Erysipelas.....	—	2	Typhoid fever.....	19	91
Leprosy.....	1	1			

STRAITS SETTLEMENTS

Singapore—Vital statistics.—During the year 1932, births, deaths, and deaths from certain diseases were reported in Singapore, Straits Settlements, as follows:

Population (estimated).....	470, 271	Deaths from—Continued	
Number of deaths.....	9, 480	Diseases of early infancy.....	603
Death rate per 1,000 population.....	20. 12	Dysenteries.....	382
Infant mortality per 1,000 births.....	180. 2	Infantile convulsions.....	786
Number of births.....	16, 589	Malaria (many nonresidents).....	463
Deaths from—		Nephritis, acute.....	77
Beriberi.....	509	Pneumonia and bronchitis.....	1, 539
Cancer.....	204	Syphilis.....	200
Diabetes.....	47	Tuberculosis.....	1, 088
Diarrhea and enteritis....	684	Typhoid fever.....	58

Cases of certain communicable diseases were reported in Singapore during 1932 as follows:

Disease	Cases	Disease	Cases
Cerebrospinal fever.....	6	Puerperal fever.....	16
Chicken pox.....	542	Scarlet fever.....	1
Diphtheria.....	124	Smallpox.....	8
Erysipelas.....	2	Typhoid fever.....	114
Paratyphoid fever.....	1		

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

(NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for Sept. 29, 1933, pp. 1189-1217. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued Oct. 27, 1933, and thereafter, at least for the time being, in the issue published on the last Friday of each month.)

Cholera

China—Hankow.—During the week ended September 9, 1933, 1 case of cholera was reported in Hankow, China.

Philippine Islands.—During the week ended September 23, 1933, cholera was reported in the Philippine Islands as follows: Cebu province, Barili, 4 cases, 2 deaths; Cebu city, 2 cases, 2 deaths; Olango Island, 2 cases, 2 deaths; Talisan, 3 cases, 3 deaths; Occidental Misamis province, Oroquieta, 1 case, 1 death.

Plague

Azores—St. Michael's—Ponta del Gada.—During the week ended September 23, 1933, 2 cases of plague with 1 death were reported in Ponta del Gada, St. Michael's, Azores.

China—Manchuria.—Under date of September 21, 1933, plague in epidemic form has been reported in Taonan, Nungan, and Tungchowliao districts, Manchuria.

India—Rangoon.—During the week ended September 16, 1933, 2 cases of plague were reported in Rangoon, India.

Yellow fever

Senegal—Bakel.—During the week ended September 23, 1933, 2 deaths from yellow fever were reported in Bakel, Senegal.