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THE QUANTITATIVE DETERMINATION OF QUARTZ ("FREE SILICA") IN DUSTS

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Research in the field of dust inhalation has demonstrated that, in general, the degree of health hazard associated with the inhalation of any dust, all other factors remaining constant, is dependent upon the mineral composition of the dust. For example, it has been found that the harmfulness of a quartz-containing dust is usually in direct proportion to its quartz content. For this reason, in attempting to evaluate the harmfulness of a dust it is of great importance to ascertain its exact mineral composition.

The present contribution describes the technique employed in studying the mineral composition of quartz-containing dusts and indirectly demonstrates the principle involved in similar analysis of other dusts, although it is impossible to present any one technique that will apply to all dusts irrespective of their composition.

SILICA

Silica is the name given to the chemical compound silicon dioxide (SiO_2). It occurs in nature most commonly in the crystalline form as the mineral quartz. Several other minerals are also composed of silica, for example, tridymite, cristobalite, opal, and chalcedony; but in comparison with quartz they are relatively rare.

A long-established convention has led to the reporting of chemical analyses of rocks and minerals in terms of certain chemical compounds (usually oxides) rather than in terms of chemical elements. During analysis the silicon is isolated in the form of silica, and consequently the chemical analysis of an average granite, for example, is reported as containing 70 per cent of silica. About 30 per cent, or roughly one-third, of the entire granite consists of quartz, whereas the other two-thirds of the granite is made up chiefly of minerals that are complex salts of silicon-bearing acids. Such minerals are known as silicates. The remainder of the silica reported in the chemical analysis of the

granite, amounting to 40 per cent, is locked up in these silicate minerals, chiefly feldspar and mica.

The distinction between free silica and combined silica.—This arbitrary convention of reporting rock and mineral analyses in terms of oxides has necessitated the use of the expressions "free silica" and "combined silica" to distinguish between the silica that makes up quartz (or the few other minerals that are composed of silica alone) and the silica that is combined with other elements in the various silicate minerals. In the granite just cited the 70 per cent of total silica is the sum of 30 per cent of free silica plus 40 per cent of combined silica.

As the danger of silicosis to workers in certain dusty trades is attributed chiefly to the amount of *free* silica present in the dust in the form of quartz rather than to the silica that is in chemical combination, it has become necessary to devise a method for determining accurately how much of the dust in a given sample consists of quartz. For example, in the dust arising from cutting a granite whose chemical analysis shows 70 per cent of total silica the percentage of free silica will be far less than 70, since only one-third of the granite is made up of quartz. Furthermore, rocks and minerals can show as much as 68 per cent of silica, although they contain no free silica (quartz). In short, the total silica reported in customary chemical analysis is no measure of the amount of free silica.

Determination of free silica (quartz) in rocks.—In general, it is comparatively easy to determine the percentage of quartz in a rock specimen by petrographic methods, because it is easy for a petrographer to distinguish between quartz and other minerals by the use of a polarizing microscope, or petrographic microscope, as it is more commonly called.

Preparation of material.—The determination can be made in two ways, viz, (1) by examining a thin section of the rock ground to a thickness of approximately 0.03 mm and mounted in Canada balsam upon a glass slide, or (2) by studying a pulverized fragment of the rock, prepared by crushing the material to a powder whose individual grains are about 0.06 mm in thickness. Portions of the powder are then successively immersed in oils of known refractive indices until a point is reached where in one position of the microscopic stage the boundary between the grains and the liquid disappears. This occurs when a refractive index of the mineral is the same as the index of the liquid in which it is immersed. In this way the refractive index (if the mineral is uniaxial) or refractive indices (if biaxial) can be numerically determined, together with other optical properties. This method of studying powdered rock and mineral fragments is known as the immersion method.

Criteria for petrographic identification of minerals.—The petrographic identification of minerals depends upon the following optical properties:

1. Color.
2. Pleochroism, in minerals that show selective absorption of light.
3. Crystal form.
4. Cleavage.
5. Refractive indices and relief.
6. Birefringence: Numerical value.
7. Isotropy or anisotropy: Extinction (complete, parallel, or inclined).
8. Optical character of the mineral.
9. Optical elongation of principal zones.
10. Optical orientation of mineral.
11. Value of optic axial angle.
12. Twinning.
13. Inclusions.
14. Alteration products.

No one of the preceding criteria alone is sufficient to determine a mineral, although one criterion may be enough to distinguish it from some other mineral with which it is associated. Some minerals can be identified by determining three or four optical properties; others require more for conclusive determination.

The methods of determining the optical properties require a familiarity with the difficult principles of optics and a special laboratory training in petrography. The reader who desires further information about the detailed technique of the petrographic identification of minerals is referred to the standard works on optical mineralogy, such as Rosenbusch's Mikroskopische Physiographie der petrographisch wichtigen Mineralien, vol. 1, part 1, revised by Wülfing; Elements of Optical Mineralogy, by A. N. Winchell; Rock Minerals, by J. P. Iddings; Manual of Petrographic Methods, by A. Johannsen; or Dana's Textbook of Mineralogy, fourth edition, by W. E. Ford. For a comprehensive description of the immersion method of studying minerals the reader is referred to The Microscopic Determination of the Nonopaque Minerals, by E. S. Larsen.

Quantitative determination.—An easy and satisfactory way to determine the percentage of any mineral in a rock section is by the Rosiwal method. This method consists in measuring the linear intercepts of a given mineral along numerous parallel lines. The ratio between the sum of all the intercepts of quartz to the length of the measured traverse gives the percentage of quartz, because, as can be shown mathematically, the linear intercepts are proportional to volumes. The measurement is carried out by the use of a screw micrometer, ocular, or a mechanical stage. The Rosiwal method can be applied both to rock sections and to rock powders examined by the immersion method.

DETERMINATION OF QUARTZ IN DUSTS

It is comparatively easy for the petrographer to apply the methods described above in making a quantitative determination of quartz in thin sections of rocks or in rock powders; but in dusts where the indi-

vidual particles are of the order of magnitude of 0.005 mm (5 microns) in diameter, petrographic examination of the material must be supplemented by other methods, because the minimum grain size that can be conclusively identified under the petrographic microscope is about 0.010 mm (10 microns) in diameter.

The results of quantitative dust analysis can be conclusive only when several methods are used on the same material, thereby checking one against the other; and the accuracy of the final result depends largely on the skill and experience of the analyst, because each sample to be analyzed presents an individual problem.

The general method that has been found highly satisfactory is a combined chemical and petrographic procedure by which all the constituents other than quartz are eliminated from the material. The accuracy of any method of quantitative estimate is much greater where the estimate is applied to two constituents than where many constituents are present. Therefore, by concentrating the quartz a large factor of error in quantitative determination is eliminated. If the dust is chiefly composed of quartz, the elimination of foreign constituents is not difficult. If the quartz is in smaller amount than the other constituents, a clean concentration may be more difficult. But a satisfactory quantitative estimate can always be made on a moderately clean quartz concentrate, because the mineral present in marked excess can be much more accurately determined than the other constituents.

For the fine dusts whose individual particles can not be satisfactorily determined, chemical methods are necessary in order to remove the constituents other than quartz. Various methods are used, dependent upon the composition of the dust; but the first step in the analysis is to examine a small portion of the material under the petrographic microscope.

Preliminary petrographic examination of the dust.—It is a common practice to cite the percentage of silica in the chemical analysis of a dust as a measure of the quartz present. The erroneous nature of this conclusion has been already emphasized. The only value of the chemical analysis to the dust analyst is based upon the fact that the amount of silica locked up in the various silicate minerals in the dust can be calculated from the percentages of bases (K_2O, Na_2O, CaO, etc.) that are shown by the analysis. The percentage of silica that remains after all the bases in the various silicate minerals have been satisfied should represent the free silica present.

This method of computation is useless, however, unless the mineral composition of the dust has been determined petrographically. For example, in potassium feldspar, which is a common constituent of all granites, every molecule of potash is combined with 6 molecules of silica. If the only minerals in the dust are quartz and potassium

feldspar, obviously the silica left over after the potash in the analysis is computed as feldspar will be an accurate measure of the quartz present. But if, as is often true, the dust is made up of several potassium-bearing minerals, such as potassium feldspar, biotite, and muscovite, it is impossible to compute how much silica is required to satisfy the potash, because neither the relative proportions of the various minerals are known nor are their compositions known. Most rock-forming silicate minerals have wide ranges in their chemical composition.

As the chemical analysis of a dust can serve only as a rough guide to the possible amount of quartz present, it can not be too strongly emphasized that a careful petrographic examination is an indispensable prerequisite to the quantitative determination of quartz in a dust sample; for, although it may be impossible to make an accurate quantitative determination of extremely minute individual grains by petrographic methods, it has proved possible in all the samples so far examined to obtain a clear idea of the general composition of the dust by a petrographic examination. The analytical method best suited to the individual sample can then be selected. For example, if the dust shows under the microscope a large admixture of organic material, a preliminary sample should be ignited and the residue again examined under the microscope in order to decide on the further procedure. If the dust shows a large amount of metallic mineral, free iron may be extracted by a magnet or the sample may be heated with hydrochloric acid to remove the iron oxide and such metallic particles as brass shavings from brass-work dust. Dust from marble works containing chiefly particles of carbonate minerals should be heated with hydrochloric acid to dissolve the carbonate, and the residue should then be examined with the petrographic microscope. The most difficult problem is the separation of quartz in rock or mineral dusts that contain silicate minerals, such as granite, slate, or asbestos dust. The procedure employed to separate the quartz in such material depends upon the fact that cold hydrofluosilicic acid, H_2SiF_6, will in time decompose the silicate minerals but will not attack quartz.

After the preliminary petrographic examination, the procedure in the chemical separation of quartz is as follows:

Grinding.—In order to facilitate the action of the hydrofluosilicic acid, the material is ground to pass a 150-mesh sieve, thus insuring uniformity of size and a large surface for treatment.

Weighing.—It is then weighed in a platinum crucible. About half a gram makes a convenient amount to work with.

Ignition.—If the preliminary microscopic examination indicates the presence of any organic material, the platinum crucible and its contents are carefully heated to white heat for 30 minutes to burn off the organic matter. It is then cooled. Dusts that are strongly contami-

nated with oil are digested for 5 minutes with ether, then filtered, and ignited for half an hour to an hour.

Hydrochloric acid treatment.—If the preliminary examination shows the presence of carbonate minerals, hydrochloric acid is added to the contents of the platinum crucible and the crucible is gently heated. The contents of the crucible are filtered, washed, and the filter paper and precipitate are ignited in the same platinum crucible, which is then allowed to cool.

Hydrofluosilicic acid treatment.—After these operations hydrofluosilicic acid in moderate excess is added to the material in the platinum crucible. If the composition of the dust is such that the ignition and hydrochloric acid treatment are unnecessary, the hydrofluosilicic acid is added to the substance to be analyzed immediately after the first weighing. The crucible is carefully covered and set away in a place where the temperature is reasonably constant and *not above room temperature.* Care must be exercised not to raise the temperature during the hydrofluosilicic acid treatment, because hydrofluosilicic acid (H_2SiF_6) decomposes on heating into silicon tetrafluoride (SiF_4) and hydrofluoric acid (HF), which will readily attack the free silica. It is left for a time that ranges in different specimens from 24 to 48 or even 72 hours.

It is then carefully decanted into an ashless filter paper, and the crucible contents are thoroughly washed on to the filter paper. The precipitate is washed until the wash water gives no precipitate in a clear mixture of dilute KCl with 95 per cent alcohol. The precipitate is dried, ignited in the platinum crucible, and weighed, and the percentage loss in weight noted.

The hydrofluosilicic acid treatment is repeated until the weight of the residue remains unchanged.

Microscopic examination of residue.—A small portion of the residue is then examined under the petrographic microscope. If minerals other than quartz are present, the amount of quartz in the residue can be estimated with a reasonable degree of accuracy. If quartz is the only mineral indicated by the microscopic examination, the percentage of quartz in the sample can be calculated directly from the weight of the residue.

Volatilization of residue with hydrofluoric acid.—A check on the microscopic determination of quartz is given by volatilizing the residue with hydrofluoric acid in the platinum crucible. Free silica volatilizes completely with hydrofluoric acid. Combined silica in silicate minerals volatilizes with hydrofluoric acid, but after the treatment a residue remains made up of the bases that were in combination in the silicates. If no residue is left after the hydrofluorization, the material was all quartz.

RATE OF DECOMPOSITION OF QUARTZ ON PROLONGED TREATMENT WITH HYDROFLUOSILICIC ACID

As the rate of decomposition was found to differ considerably in different silicates, a control test was run on pure quartz in order to determine the error introduced into quantitative analyses by prolonged treatment of quartz with H_2SiF_6 at room temperature during analyses of dusts that contain refractory silicates requiring a week or more to decompose.

The following table shows the results of a test[1] on 0.509 gm of pure quartz ground to pass a 150-mesh screen:

Quartz (original weight before treatment with H_2SiF_6=0.509 gm)

Time in days	Loss after treatment	Per cent loss in weight	Rate of loss in weight per day in per cent of original weight
	Grams		
5	0.015	2.9	0.59
7	.024	4.7	.67
10	.037	7.3	.73 Average=0.7 per cent per day is rate of loss in original weight.
12	.049	9.6	.80
14	.057	11.1	.78

By using the above factor of error it is possible to compute at the end of an analysis the maximum possible loss in weight of quartz originally present, thus obtaining a maximum figure for quartz.

SUMMARY

The quartz content of fine dusts is determined by a combination of petrographic and chemical methods.

A preliminary petrographic examination is essential in order to determine the mineral composition of the dust. It is impossible to estimate the amount of quartz in a dust from a chemical analysis alone, because the silica reported in the chemical analysis comprises not only the free silica occurring in the form of quartz but also the combined silica locked up in various silicate minerals. Therefore, the actual minerals making up a dust must always be determined, and this can generally be done readily by petrographic methods.

It is difficult to make a reliable quantitative estimate of extremely minute particles by a microscopic examination. Therefore, chemical methods are used to separate the quartz from the associated constituents in dusts of mixed composition. The quartz is then weighed and this result is checked by petrographic examination and by chemical methods in order to insure that the separated material has been correctly identified. The few minerals other than quartz that may occur in the residue can readily be estimated quantitatively under the microscope, and this estimate is subtracted as a minor correction. Petrographic examination of the dust both at the beginning and the end of the analysis is an indispensable check upon the progress of the

[1] By Eleanora F. Knopf.

chemical treatment. In the case of dusts carrying a relatively small proportion of quartz and containing difficultly soluble silicates and, hence, requiring a long time for chemical decomposition, it has proved desirable to check the procedure by petrographic examination at frequent intervals during the course of the treatment.

Each dust presents individual problems in regard to the purification of the sample to be analyzed, the methods of eliminating the various mineral constituents, etc., and therefore the best procedure in analyzing a given dust must be selected after the minerals and other constituents making up the dust have been identified. Consequently, it is impossible to set forth any one technique that will apply to all dusts regardless of their composition.

COURT DECISION RELATING TO PUBLIC HEALTH

Quarantine of person believed to be venereally infected.—(California District Court of Appeal, Second District, Div. 2; Ex parte King, 16 P. (2d) 694; decided Dec. 2, 1932.) The following is the opinion in a case holding that a person may be detained in quarantine where there is probable cause to believe that such person is venereally infected:

The petitioner asks to be released through habeas corpus from detention by the chief of police of the city of Los Angeles. She was arrested on a morals charge, examined physically in the usual course by employees of the health department, and it appears that such examination indicated that she was afflicted with a venereal disease. This fact, however, she disputes, has demanded another examination, which has been denied, and refuses to undergo medical treatment. The health department has required her detention in quarantine until such time as she may safely be released. We are of the opinion that the law only requires that there be probable cause to believe that a person so held has an infectious disease which is communicable in order to justify the authorities in retaining such person in quarantine. The person so held may be detained legally until there is sufficient showing that the probable cause no longer exists.

An order has heretofore been made remanding the petitioner and dismissing the writ.

DEATHS DURING WEEK ENDED FEBRUARY 4, 1933

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

	Week ended Feb. 4, 1933	Corresponding week, 1932
Data from 85 large cities of the United States:		
Total deaths	8,635	8,285
Deaths per 1,000 population, annual basis	12.1	11.8
Deaths under 1 year of age	695	610
Deaths under 1 year of age per 1,000 estimated live births [1]	59	49
Deaths per 1,000 population, annual basis, first 5 weeks of year	12.9	12.0
Data from industrial insurance companies:		
Policies in force	69,100,292	74,038,950
Number of death claims	15,663	13,795
Death claims per 1,000 policies in force, annual rate	11.8	9.7
Death claims per 1,000 policies, first 5 weeks of year, annual rate	11.8	10.0

[1] 1933, 81 cities; 1932, 78 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

Reports for Weeks ended February 11, 1933, and February 13, 1932

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 11, 1933, and February 13, 1932

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932
New England States:								
Maine	4	4	228	31		625	1	0
New Hampshire		1				20	0	0
Vermont	1				5	143	0	0
Massachusetts	25	57	40	13	201	373	0	0
Rhode Island	1	8	11			991	0	0
Connecticut	3	6	87	9	148	207	2	0
Middle Atlantic States:								
New York	65	146	[1] 56	[1] 81	1,997	1,461	6	8
New Jersey	24	49	83	37	631	104	2	4
Pennsylvania	85	128			970	1,806	3	4
East North Central States:								
Ohio	28	102	40	97	709	678	0	2
Indiana	43	56	175	75	9	102	2	4
Illinois	42	128	74	167	169	144	18	13
Michigan	28	40	35	9	741	441	4	2
Wisconsin	6	12	341	122	316	199	1	0
West North Central States:								
Minnesota	4	8	3	2	644	26	0	0
Iowa	10	17		4		6	1	0
Missouri	31	39	18	40	159	48	4	0
North Dakota		1	28		73	116	1	0
South Dakota	3	3		1,200	13	18	0	0
Nebraska	13	12		16	4	32	0	4
Kansas	8	31	65	43	205	96	2	0
South Atlantic States:								
Delaware	2		3	1			0	0
Maryland [2]	10	34	132	14	4	21	0	0
District of Columbia	9	8	5	3	1	5	3	0
Virginia	24				414		3	
West Virginia	9	26	481	52	456	387	1	0
North Carolina	13	25	270	40	278	204	2	2
South Carolina	10	11	2,097	595	21	29	9	0
Georgia [3]	5	12	414	144	4	4	0	1
Florida	12	16	184	1	11	1	0	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 11, 1933, and February 13, 1932—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932
East South Central States:								
Kentucky	22	49	161	361	79	50	0	2
Tennessee	3	22	201	301	86	47	0	4
Alabama [3]	32	46	298	54	1	3	2	2
Mississippi	5	12					1	0
West South Central States:								
Arkansas	11	6	347	31	19	6	0	0
Louisiana [3]	17	35	16	14	14	26	2	3
Oklahoma [4]	9	44	273	804	10	19	1	0
Texas [3]	72	60	470	202	502	48	5	0
Mountain States:								
Montana		4	185	1,138	149	30	0	0
Idaho		2	3		25	2	0	1
Wyoming				202	30	2	0	0
Colorado	4	13	73		10	37	2	1
New Mexico	10	14	9	64	14	55	1	0
Arizona	7	5	40	58		2	1	0
Utah [3]	4				1		1	3
Pacific States:								
Washington	3	4		2	25	488	0	0
Oregon	5	3	175	323	140	55	0	0
California	64	64	183	371	363	358	2	5
Total	786	1,363	7,304	6,721	9,651	9,515	83	69

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932
New England States:								
Maine	0	0	35	32	0	0	1	0
New Hampshire	0	0	50	42	0	1	0	1
Vermont	0	0	13	19	0	29	0	1
Massachusetts	0	0	383	471	0	0	0	7
Rhode Island	0	0	32	53	0	0	0	0
Connecticut	0	0	98	71	2	12	2	1
Middle Atlantic States:								
New York	1	6	783	1,213	0	1	8	6
New Jersey	0	2	334	244	0	0	3	3
Pennsylvania	0	0	846	833	0	0	1	23
East North Central States:								
Ohio	0	1	355	501	5	45	3	7
Indiana	0	1	129	106	0	13	5	2
Illinois	1	4	393	462	9	6	3	17
Michigan	1	1	527	364	0	2	4	2
Wisconsin	0	1	122	123	8	3	2	0
West North Central States:								
Minnesota	0	0	83	129	0	0	1	4
Iowa	0	0	38	59	51	79	0	0
Missouri	1	0	77	49	0	17	2	2
North Dakota	0	1	8	19	0	6	0	0
South Dakota	0	0	11	9	2	8	0	0
Nebraska	0	0	23	33	3	16	0	1
Kansas	0	0	59	64	0	1	1	0
South Atlantic States:								
Delaware	0	1	8	17	0	0	0	2
Maryland [3]	0	1	97	108	0	0	3	6
District of Columbia	0	0	11	23	0	0	0	1
Virginia	0		42		0		4	
West Virginia	4	2	38	46	0	0	5	13
North Carolina	1	1	48	52	1	2	2	4
South Carolina	0	1	5	5	0	1	0	8
Georgia [3]	0	0	10	24	0	0	2	14
Florida	0	0	14	4	0	0	9	5

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended February 11, 1933, and February 13, 1932—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932	Week ended Feb. 11, 1933	Week ended Feb. 13, 1932
East South Central States:								
Kentucky	0	2	40	66	0	5	6	17
Tennessee	0	0	26	44	0	31	3	8
Alabama [3]	2	2	23	18	0	2	4	13
Mississippi	0	0	11	8	2	14	0	5
West South Central States:								
Arkansas	1	0	17	37	10	16	1	6
Louisiana [3]	2	0	12	16	2	5	5	7
Oklahoma [4]	1	0	23	58	7	3	2	6
Texas [3]	2	0	48	72	45	16	9	6
Mountain States:								
Montana	0	0	13	44	1	3	0	2
Idaho	0	0	1	10	8	3	0	0
Wyoming	0	0	4	4	0	0	0	0
Colorado	0	0	26	23	0	0	1	2
New Mexico	0	1	11	15	0	8	2	0
Arizona	0	0	25	3	0	0	2	0
Utah [2]	0	0	8	7	0	0	0	0
Pacific States:								
Washington	0	2	42	28	6	18	4	0
Oregon	0	0	27	20	2	18	0	1
California	1	2	195	129	39	8	5	7
Total	18	32	5,224	5,777	203	392	105	210

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, week ended February 11, 1933, 8 cases: 4 cases in Georgia, 2 cases in Alabama, 1 case in Louisiana and 1 case in Texas.
[4] Figures for 1933 are exclusive of Oklahoma City and Tulsa, and for 1932 are exclusive of Tulsa only.

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	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
January, 1933										
Connecticut	2	29	1,158		375		0	475	4	3
Indiana	18	226	2,431		53	1	1	511	12	10
Iowa	19	62	1,497		10		0	142	88	7
Maine		5	3,457		3		6	139	0	2
Nebraska	5	51	627		41		2	143	45	1
New Mexico	2	35	27		17	1	1	67	0	12
Pennsylvania	19	476			2,233		4	3,582	0	34
Vermont		11			7		0	91	0	1
Wyoming		2	26		81		0	39	1	0

January, 1933

Anthrax:	Cases
Nebraska	1
Pennsylvania	1
Chicken pox:	
Connecticut	630
Indiana	386
Iowa	204
Maine	251
Nebraska	184
New Mexico	90
Pennsylvania	4,465
Vermont	200
Wyoming	23
Conjunctivitis, infectious:	
Connecticut	1
New Mexico	1
Dysentery:	
Iowa (amebic)	1
German measles:	
Connecticut	3
Maine	17
New Mexico	3
Pennsylvania	45
Impetigo contagiosa:	
Iowa	1

Lethargic encephalitis:	Cases
Connecticut	2
Iowa	1
Pennsylvania	5
Mumps:	
Connecticut	250
Indiana	145
Iowa	129
Maine	41
Nebraska	82
New Mexico	115
Pennsylvania	1,809
Vermont	193
Wyoming	2
Ophthalmia neonatorum:	
Pennsylvania	5
Puerperal septicemia:	
Pennsylvania	10
Rabies in animals:	
Connecticut	1
Maine	4
New Mexico	2
Septic sore throat:	
Connecticut	2
Iowa	2
Maine	4
Nebraska	6
Vermont	8

Tetanus:	Cases
Pennsylvania	4
Trachoma:	
Indiana	1
Trichinosis:	
Pennsylvania	1
Tularaemia:	
Indiana	1
Pennsylvania	4
Undulant fever:	
Connecticut	4
Indiana	6
Iowa	5
Maine	2
Pennsylvania	2
Vermont	1
Vincent's angina:	
Maine	10
New Mexico	1
Whooping cough:	
Connecticut	337
Indiana	117
Iowa	34
Maine	99
Nebraska	16
New Mexico	38
Pennsylvania	877
Vermont	105
Wyoming	17

WEEKLY REPORTS FROM CITIES

City reports for week ended February 4, 1933

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								
Maine:											
Portland	0	3	0	0	4	8	0	0	1	15	27
New Hampshire:											
Concord	0		2	0	3	0	0	2	0	0	16
Manchester	0		0	0	2	9	0	1	0	0	12
Nashua	0		0	0	0	0	0	0	0	0	
Vermont:											
Barre	0		0	0	0	0	0	0	0	0	1
Burlington	0		0	0	0	3	0	0	0	0	14
Massachusetts:											
Boston	12	8	6	49	52	78	0	12	0	58	278
Fall River	0	9	8	2	5	6	0	2	0	5	50
Springfield	0	2	2	2	5	5	0	2	0	5	38
Worcester	3		0	4	7	25	0	3	0	10	65
Rhode Island:											
Pawtucket	0		0	0	1	0	0	0	0	0	17
Providence	5	6	3	0	14	20	0	1	0	5	71

City reports for week ended February 4, 1933—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								
Connecticut:											
Bridgeport	1	13	3	4	7	4	0	0	0	0	36
Hartford	1	8	1	0	15	3	0	1	0	5	50
New Haven	0	1	2	2	4	8	0	0	0	12	58
New York:											
Buffalo	2	-------	8	4	19	38	0	2	0	43	126
New York	41	81	30	812	216	231	0	96	9	75	1,570
Rochester	0	16	2	0	7	10	0	2	0	5	86
Syracuse	0	35	2	3	5	27	0	0	0	2	46
New Jersey:											
Camden	6	2	2	0	0	14	0	2	0	0	39
Newark	1	28	1	202	17	26	0	3	1	26	121
Trenton	1	9	1	8	5	22	0	6	0	2	41
Pennsylvania:											
Philadelphia	6	46	18	40	51	146	0	27	1	6	537
Pittsburgh	7	8	3	4	13	52	0	8	0	37	159
Reading	3	-------	0	67	4	5	0	1	0	6	32
Scranton	0	-------	0	1	-------	12	0	-------	0	4	-------
Ohio:											
Cincinnati	4	-------	7	0	7	13	0	4	1	5	104
Cleveland	6	82	0	0	10	136	0	10	0	37	164
Columbus	3	3	3	101	2	8	0	2	0	2	69
Toledo	0	2	1	114	5	28	0	6	0	17	71
Indiana:											
Fort Wayne	6	-------	0	0	1	2	0	1	0	0	16
Indianapolis	4	-------	2	12	18	10	0	6	0	20	-------
South Bend	0	-------	0	0	2	2	0	2	1	6	13
Terre Haute	1	-------	0	0	2	6	0	0	0	0	20
Illinois:											
Chicago	6	13	6	166	62	266	0	41	1	34	688
Springfield	2	1	0	0	1	2	0	0	0	0	19
Michigan:											
Detroit	17	10	6	215	26	132	0	21	1	93	242
Flint	2	29	1	1	4	3	0	1	1	1	27
Grand Rapids	0	-------	4	0	2	9	0	0	0	38	34
Wisconsin:											
Kenosha	0	-------	0	0	0	1	8	0	0	14	7
Madison	0	-------	-------	29	-------	2	0	-------	0	1	-------
Milwaukee	1	4	5	2	3	40	0	7	0	44	109
Racine	2	1	1	0	1	6	0	0	0	5	10
Superior	0	-------	0	0	0	1	0	1	0	1	8
Minnesota:											
Duluth	0	-------	0	10	1	0	0	0	0	19	15
Minneapolis	4	-------	5	593	11	27	0	2	0	10	105
St. Paul	1	1	1	47	6	8	0	2	0	50	58
Iowa:											
Des Moines	9	-------	-------	0	-------	3	0	-------	0	0	22
Sioux City	2	-------	-------	0	-------	0	0	-------	0	2	-------
Waterloo	0	-------	-------	0	-------	3	0	-------	0	0	-------
Missouri:											
Kansas City	2	-------	4	247	19	46	0	5	0	6	116
St. Joseph	2	-------	1	0	4	3	0	0	0	0	21
St. Louis	24	4	3	3	7	26	0	12	1	5	238
North Dakota:											
Fargo	0	-------	0	0	1	1	0	0	0	0	4
Grand Forks	0	-------	0	1	0	1	0	0	0	0	-------
South Dakota:											
Aberdeen	0	-------	0	0	0	6	0	0	0	0	-------
Sioux Falls	0	-------	0	0	0	0	0	0	0	0	8
Nebraska:											
Omaha	3	-------	0	4	6	15	3	3	0	1	56
Kansas:											
Topeka	0	-------	1	14	8	3	0	1	0	0	11
Wichita	1	-------	1	0	8	3	0	0	0	1	29
Delaware:											
Wilmington	1	-------	0	0	9	3	0	0	1	0	43
Maryland:											
Baltimore	5	35	5	3	30	53	0	14	0	21	244
Cumberland	0	-------	0	0	0	3	0	0	0	0	9
Frederick	1	-------	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	4	4	2	4	18	13	0	9	1	2	167
Virginia:											
Lynchburg	1	-------	0	0	1	0	0	0	0	0	9
Norfolk	1	-------	0	0	7	1	0	1	0	1	41
Richmond	1	-------	0	0	5	0	0	2	0	0	56
Roanoke	0	-------	1	155	1	0	0	0	1	0	7

City reports for week ended February 4, 1933—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	1	0	0	1	0	0	1	0	1	7
Huntington	1	------	0	29	0	1	0	0	0	0	------
Wheeling	0	------	0	218	3	5	0	1	0	21	23
North Carolina:											
Raleigh	0	------	0	1	4	4	0	1	0	0	15
Wilmington	0	------	0	27	2	0	0	0	0	3	10
Winston-Salem	0	1	1	0	0	2	0	0	0	1	11
South Carolina:											
Charleston	0	206	3	0	1	1	0	1	0	0	30
Columbia	1	------	0	0	8	0	0	2	0	0	26
Greenville	0	------	0	0	0	0	0	0	0	1	------
Georgia:											
Atlanta	9	28	1	1	5	7	0	6	9	0	63
Brunswick	0	------	0	0	2	0	0	0	0	0	6
Savannah	0	130	3	1	1	0	0	0	0	0	24
Florida:											
Miami	2	5	3	0	1	0	0	2	0	3	19
Tampa	1	2	3	0	4	0	0	0	0	0	28
Kentucky:											
Ashland	0	1	0	1	0	1	0	0	0	0	------
Lexington	0	------	0	2	2	0	0	2	0	0	16
Louisville	8	2	0	1	12	8	0	0	2	1	91
Tennessee:											
Memphis	4	------	1	0	5	9	0	6	2	3	76
Nashville	0	------	4	0	3	5	0	2	0	0	39
Alabama:											
Birmingham	3	10	1	0	3	3	0	5	1	3	53
Mobile	0	------	2	0	0	0	0	0	1	0	24
Montgomery	0	------	0	0	------	2	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	0	1	0	------	0	0	------
Little Rock	0	------	1	0	6	0	0	3	1	0	10
Louisiana:											
New Orleans	6	9	9	0	8	3	0	14	0	3	149
Shreveport	0	------	0	0	9	1	0	5	0	0	36
Oklahoma:											
Muskogee	0	5	0	0	0	0	0	0	0	0	------
Tulsa	1	------	0	0	0	2	2	0	0	3	1
Texas:											
Dallas	14	3	3	16	8	3	1	4	0	0	61
Fort Worth	0	------	0	29	7	2	1	1	0	0	37
Galveston	1	------	0	0	1	0	0	1	1	0	11
Houston	4	------	1	23	10	9	1	5	7	0	71
San Antonio	2	------	2	3	8	2	0	7	0	0	65
Montana:											
Billings	0	------	0	1	0	0	0	0	0	0	7
Great Falls	0	------	0	24	0	0	0	1	0	0	7
Helena	0	16	0	0	0	0	0	0	0	0	3
Missoula	0	------	0	0	2	0	0	0	0	0	6
Idaho:											
Boise	0	------	1	16	0	0	6	0	0	0	7
Colorado:											
Denver	1	------	3	6	11	11	0	8	0	0	96
Pueblo	0	------	0	0	3	0	0	1	0	4	8
New Mexico:											
Albuquerque	0	------	0	0	2	0	0	7	0	2	19
Arizona:											
Phoenix	0	------	0	4	2	4	0	1	0	0	------
Utah:											
Salt Lake City	0	------	1	0	1	3	0	2	0	0	27
Nevada:											
Reno	0	------	0	0	0	0	0	0	0	0	3
Washington:											
Seattle	2	------	------	0	------	3	1	------	0	2	------
Spokane	0	------	------	0	------	0	0	------	0	0	------
Tacoma	0	------	0	0	5	2	1	0	0	0	38
Oregon:											
Portland	1	5	2	1	5	0	1	2	1	0	85
Salem	0	6	------	20	------	0	0	------	0	0	------
California:											
Los Angeles	23	73	4	124	27	68	32	20	1	25	283
Sacramento	0	------	0	0	6	0	0	3	0	5	37
San Francisco	0	96	4	1	21	7	0	11	0	46	186

City reports for week ended February 4, 1933—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
New York:			
New York	9	2	0
Pennsylvania:			
Philadelphia	3	2	0
Indiana:			
Indianapolis	2	1	0
Illinois:			
Chicago	12	5	0
Michigan:			
Detroit	2	2	0
Wisconsin:			
Milwaukee	1	0	0
Minnesota:			
Duluth	0	1	0
Iowa:			
Sioux City	2	0	0
Missouri:			
Kansas City	1	0	0
St. Joseph	1	0	0
St. Louis	1	0	0
Nebraska:			
Omaha	1	0	0
Kansas:			
Topeka	0	1	0
District of Columbia:			
Washington	0	1	0
West Virginia:			
Wheeling	0	0	2
Georgia:			
Atlanta	1	0	0
Kentucky:			
Louisville	1	0	0
Louisiana:			
New Orleans	1	1	0
Oklahoma:			
Tulsa	0	1	0
Texas:			
Fort Worth	1	0	1
Oregon:			
Portland	0	1	0
California:			
Sacramento	0	1	0

Dengue.—Cases: Charleston, S. C., 1.
Lethargic encephalitis.—Cases: Chicago, 1; Detroit, 1.
Pellagra.—Cases: Charleston, S. C., 3; Savannah, 1; Birmingham, 1; New Orleans, 1.
Typhus fever.—Cases: Savannah, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended January 28, 1933.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended January 28, 1933, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				1	5					6
Chicken pox	2	7		135	282	46	3	3	66	544
Diphtheria			5	41	10	4	6		2	68
Dysentery					1		1			2
Erysipelas		1		4	1	1		1	2	10
Influenza	3	51		41	503	2			57	657
Lethargic encephalitis				1						1
Measles		12	7	44	389	7	1	3	45	508
Mumps					243	6	1		28	278
Pneumonia		2			25		1		2	30
Poliomyelitis			1	5						6
Scarlet fever		7	15	77	98	20	9	7	10	243
Smallpox							3			3
Trachoma									1	1
Tuberculosis			2	49	39	6	2	7	13	118
Typhoid fever			4	12	4	7	1	1	2	31
Whooping cough				136	47	29	11	1	26	250

CUBA

Provinces—Communicable diseases—Four weeks ended January 7, 1933.—During the four weeks ended January 7, 1933, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Chicken pox		2					2
Diphtheria	2	15	5	2	4	2	30
Hookworm disease						1	1
Malaria	6	26	107	424	80	12	655
Measles	2	2	1	4	47	1	57
Scarlet fever		2					2
Tuberculosis	13	7	6	7			33
Typhoid fever	3	11	1	12	3	6	36

MEXICO

Tampico—Communicable diseases—January, 1933.—During the month of January, 1933, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	1		Paratyphoid fever	1	
Enteritis, various	48	30	Tuberculosis		36
Influenza	83	30	Typhoid fever	2	1
Malaria	192	4	Whooping cough	19	

PANAMA CANAL ZONE

Communicable diseases—December, 1932.—During the month of December, 1932, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	5		Meningococcus meningitis	2	2
Diphtheria	8	1	Pneumonia		22
Dysentery (amebic)	14		Relapsing fever	1	
Dysentery (bacillary)	3	1	Scarlet fever	1	
Leprosy		4	Tuberculosis		33
Malaria	121	7	Typhoid fever	4	2
Measles	66		Whooping cough	1	

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

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

CHOLERA

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

Place		July 24–Aug. 20, 1932	Aug. 21–Sept. 17, 1932	Sept. 18–Oct. 15, 1932	Week ended— October, 1932		November, 1932				December, 1932					January, 1933				February, 1933	
					22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11
Baluchistan	C	59	1																		
	D	37	2																		
China:																					
Amoy	C	496	160	34									6								
	D	212	40	12																	
Canton	C	32	22	17								1									
Hankow	C	384	209	4																	
Hong Kong	C	88	25	2																	
Kwantung Leased Territory—District of Port Arthur	C	2		1																	
Macao	C	93	9	1																	
	D	92	9	1																	
Nanking	C	563	258	12																	
Shanghai	C	1,648	546	35																	
Swatow	C	238	33	30		3															
Tientsin	C	69	32	1																	
Tsinan—Shantung Province	C		P																		
Tsingtao	C	10	36	6																	
Chosen	C		17																		
India	C	6,270	6,312	3,626	785	482	543	601	648	711	1,045	1,049	1,004								
	D	3,423	3,477	2,072	453	289	268	326	404	326	592	585	591								
Bombay	C	3			3	1		1										1			
Calcutta	C	158	82	62	6	11	24	28	15	8	18	12	13	11	17	13	27	25			
Rangoon	C		1																		
India (French): Pondichery Territory	C	3																			
Indo-China (see also table below):																					
Pnom-Penh	C	1	1	5											1						
Saigon and Cholon	C		1	1	1																
Japan: Osaka Prefecture	C	1																			

Philippine Islands:																					
Bulacan Province	C	3																			
	D	2																			
Cebu Province	C			1																	
Iloilo Province	C		1	16																	
	D		1	11																	
Iloilo	C	1																			
	D	1																			
Leyte Province	C		43	4							6	1	6	17	14	43	24		31	55	21
	D		18	2							6	1	2	14	5	23	11		20	45	14
Manila	C			1																	
Samar Province	C		54	48	15	8	30	0	0	35				7	68	60		121			
	D		34	38	15	5	22	0	0	26				4	54	43		75			
Siam	C	1		1	1										1				1		
Straits Settlements: Singapore	C			1																	
On vessels:																					
S. S. Shanghai Maru at Kobe from Shanghai	C	1																			
S. S. Protesilus at Hong Kong from Shanghai	C	P																			
S. S. Nikawa Maru at Hong Kong from Shanghai	C	P																			
S. S. Yusang at Hong Kong from Shanghai	C	1																			
S. S. Taisan Maru en route Tsingtao to Moji	C		1																		

Place		July, 1932	August, 1932	September, 1932			October, 1932			November, 1932			December, 1932		
				1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (French) (see also table above):															
Annam [1]	C	8													
	D	4													
Cambodia [1]	C	18	10		4	2	3	1		1			1	1	
	D	16	5		2	2	3			1			1		
Cochin-China [1]	C	31	11	8	8	2	4	3	3				2	3	3
	D	27	8	7	7	2	4	1	2				2	3	1

[1] Reports incomplete.

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

PLAGUE[1]

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

Place		July 24–Aug. 20, 1932	Aug. 21–Sept. 17, 1932	Sept. 18–Oct. 15, 1932	Week ended— October, 1932		November, 1932				December, 1932					January, 1933				Feb. 4, 1933
					22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	
Angola: Naulila	C									P										
Argentina:																				
Chaco—Villa Angela	C		6																	
Cordoba Province	C												2							
La Rioja Province	D							4												
Salta Province	C						7				12									
San Luis Province [2]	C	1										P								
Santa Fe	C														1					
Belgian Congo	C												1							
British East Africa (see also table below):																				
Tanganyika	D			10					1											
Uganda	C	62	100	95	39	32	45	76	52	46	50	46	34							
	D	56	88	91	38	32	44	75	52	24	48	45	34							
Ceylon: Colombo	C	1	5	5	2	4	1	2	2	1	3	5	1	2		1	3	1		
	D		5	4	2	4	1	1	2	2	2	1	1	2			2			
Plague-infected rats		2	1	3	1	3	1							2		2				
Chile: Antofagasta—Plague-infected rats		3		1																
Dutch East Indies:																				
Surabaya	C	1	1																	
West Java	C	154	259	418	130	110	105	157	139	117	154	200	208	297						
	D	151	258	403	128	112	105	157	139	116	153	200	206	293						
Ecuador. (See table below.)																				
Egypt:																				
Alexandria	C	6	1	4									1			1	1			
Assiout	C	1												1	3	2	1	2		1
Behsira	C	1	2	2																
Beni Suef	C		1																	
Gharbieh	C			2																
Minieh	C		2	4			1													
France: Marseille	C														1					
Great Britain: Liverpool—Plague-infected rats				[3] 1																

Hawaii Territory:																				
Hawaii Island—Hamakua—Kukaiau	C																			1
	D																			1
Plague-infected rats															2	1	1	4		
Paavillo—Plague-infected rats								1				8	1	2						
Maui Island—Makawao	C	1	1																	
Plague-infected rats		2	2	1																
Omaopio—Plague-infected rats																		1		
India	C	2,545	3,775	6,028	1,464	903	1,779	1,276	1,356	1,811	1,509	1,428	1,958							
	D	1,482	2,208	3,481	780	550	966	778	813	988	825	434	1,224							
Bassein	C	4	1	1			1													1
Plague-infected rats		1		1			1					1	1							
Bombay	C		4	1	3															
Plague-infected rats		32	27	30	9	10	11	4	3	5	2	5	1	7	6	2	5			
Madras	C	5																		
Madras Presidency	C	247	315	343	73	61	65	67	94	174	114	164	102	115						
	D	122	110	153	17	26	21	28	32	50	47	68	48	69						
Rangoon	C	3	3				1	1	1	1	1				1					1
Plague-infected rats		5		2													1			
Indo-China. (See table below.)																				
Iraq: Baghdad	C	3	1	1		1	2			1										
Madagascar. (See table below.)																				
Morocco	C	1								10			2		8	6				
Peru. (See table below.)																				
Senegal. (See table below.)																				
Siam	C	1	6	1	4	1	2		1	5	3				2	10				
South-West Africa.[4]																				
Syria: Beirut	C	2	4	4	1	4	2	2	5	6	1									
Union of South Africa: Orange Free State	C		1	P				P	P				P	P	P					
United States: California—San Benito County—Plague-infected ground squirrels		2															1			
On vessels:																				
S. S. City of Oxford at Liverpool from Alexandria—Plague-infected rats			1																	
S. S. Figuig at Marseille from Bona and Phillippeville	C		1																	
S. S. Patris at Beirut	C							3												

[1] Including plague in the United States and its possessions.
[2] Several cases of plague with 1 death were reported at Quines, San Luis Province, Argentina, on Dec. 9, 1932.
[3] At dock where steamship City of London was berthed.
[4] 227 cases of plague with 53 deaths were reported in Ovamboland, South-West Africa, up to Dec. 17, 1932. Antiplague measures have been taken.

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

PLAGUE—Continued

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

Place		July, 1932	August, 1932	September, 1932	October, 1932	November, 1932	December, 1932	January, 1933
British East Africa (see also table above):								
Kenya	C	65	30	15	7	5	5	
Ecuador: Province—								
Loja	C	4		4				
Indo-China	C	2	2		1	2	3	4
	D	2	2		1	2	3	2
Madagascar:								
Province—								
Ambositra	C	20	9	30	35	41		
	D	20	8	28	34	35		
Antisirabe	C	31	45	42	73	25		
	D	30	45	41	73	25		
Maevatanana	C	1	1			8		
Miarinarivo	C	10	5	8	19	35		
	D	9	5	8	19	34		
Moramanga	C	15	4	52	225	229		
	D	15	4	49	208	228		
Tamatave	C	2	2		1	1	1	
	D	1	2		1	1	1	
Tananarive	C	24	35	75	178	209		
	D	24	35	75	173	199		

Place		July, 1932	August, 1932	September, 1932	October, 1932	November, 1932	December, 1932	January, 1933
Peru: Department—								
Ancachs	C					[5] 2		
Lambayeque	C		1					
Libertad	C				1	[5] 2		
Lima	C	1		2	5	8		
Piura	C					[5] P		
Senegal:								
Dakar [6]	C	10	37	7	3	6	19	
	D	9	28	7	2	4	17	
Louga [6]	C	4	1	2	9			
	D	3	1	2	6			
Rufisque [6]	C	28	23	8				
	D	27	21	5				
Thies [6]	C	16	5	15				
	D	13		11				
Tivaouane [6]	C			6				
	D			7				

SMALLPOX

Place		July 24–Aug. 20, 1932	Aug. 21–Sept. 17, 1932	Sept. 18–Oct. 15, 1932	Week ended— October, 1932		November, 1932				December, 1932					January, 1933				Feb. 4, 1933
					22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	
Algeria:																				
Algiers	C		1	1	1			1	1					1						
Southern Territories	C	2																		
Arabia: Aden	C				1				1	2			1							
Argentina:																				
Formosa Province	C		P																	
Jujuy Province	C					1														
Belgian Congo	C	180	288								51	71	88							
Belgium	C							1												
Bolivia: Potosi	C														5					
Brazil:																				
Parahyba—Joao Pessoa	C										P									
Pernambuco—Recife	C										P									
Porto Alegre (alastrim)	C	10	14	41	13	9	4			5	2	1	2	9						
British East Africa: Tanganyika	C	168	95	65	10	56	3	5	14	23	27	2	9							
British South Africa:																				
Northern Rhodesia	C	1					40								3					
Southern Rhodesia	C			1			26	1		1			1							
Canada:																				
Alberta	C									1										
Manitoba	C	1			1			1												
Ontario	C	3	3									3	10			3				
Toronto	C											3	3							
Saskatchewan	C		1	6							1	2		1					3	
Ceylon: Colombo	C										23	5	23	3	27	19	14	22	12	27
China:																				
Canton	C	4	1	2	6	4	5	13	14	15	79	72	130	213	198	221	189	151	101	63
	D		1		1		1		1	1	9	3	3	8	6	6	4		7	2
Foochow	C	P	P	P			P	P		P			P			P				
Hong Kong	C	2	P								1	1		3	5	10	10	22	14	32
Macao	C														P		1		1	1
Nanking	C			2							6				11		13			
Shanghai	C				1			4	1	7	4	1	4	5	4	10	14	6	12	9
Swatow	C			1				4	2		1	5		2		5		10		
Chosen. (See table below.)																				
Colombia: Cali	D	2									1									

[a] Suspicious cases. [b] Reports incomplete.

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

SMALLPOX—Continued

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

Place		July 24–Aug. 20, 1932	Aug. 21–Sept. 17, 1932	Sept. 18–Oct. 15, 1932	Week ended— October, 1932		November, 1932				December, 1932					January, 1933				Feb. 4, 1933
					22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	
Dahomey	C		6	2	6										5		7			
Dutch East Indies	C	1	1	1	1	1														1
Egypt:																				
Alexandria	C	9	12	17	7	5	5	6	8	15	12	42	79	131	154	219	237	231	192	327
	D	4	4	9	4	2	4	3	4	3	2	9	14	22	47	33	46	52	50	70
Cairo	C								1				1		2	5	4	14	14	
Gharbieh	C														13	24				
Port Said	C																	1		1
Suez	C																	1	1	
Finland	C	1																		
Great Britain:																				
England and Wales	C	76	51	59	38	34	21	23	16	14	27	15	28	16	19	16	18	16		
London	C	48	17	56		27	28	21	15	13	25	15	26	16	17	14	17	14		
London and Great Towns	C	67	38	53	33	34	21	22	16	14	26	15	27	16	18	15	18	16		
Greece. (See table below.)																				
Honduras:																				
Puerto Castilla	C			1					1											
Tegucigalpa	D		1																	
Tela	C		1	2			2			1				1		1		1	3	
India	C	5,722	3,955	3,234	915	947	1,133	1,184	1,706	1,606	2,057	2,550	2,616							
	D	1,534	1,035	722	201	217	307	288	425	448	614	752	754							
Bassein	C	1																		
Bombay	C	42	32	27	7	6	8	12	10	14	20	43	58	44	54	74	93	199		
	D	17	21	20	3	4	5	3	3	4	10	18	3	20	29	46	49	85		
Calcutta	C	29	23	22	6	28	9	10	19	14	26	44	59	70	91	81	119	259		
	D	20	8	14	5	8	6	5	8	5	16	18	40	36	80	57	65	200		
Cochin	C						1													
Karachi	C	2	2	1						4	1	9	9	2	2	12	6	11		
Madras	C	47	51	89	24	33	45	38	24	26	36	33	55	33	24	44	55	87		
Moulmein	C	1	3																	
Negapatam	C			2	1	1	1		2	2						2		2		
Rangoon	C	5		1	1		1	1	1		1		2		1		2			
Tuticorin	C		7	19	9			3	8		5									
Vizagapatam	C															1				

India (French): Pondichery Territory	C	16	18	13					2		1									
Indo-China (see also table below): Saigon and Cholon	C	8	4	2				1					1		1					
Iraq:																				
Baghdad	C	4	6	6	3	2	2	3	14	12	4	1	6	4	1	2	2	3	3	
Basra	C		6	33	18	17	21	29	27	22	19	13	11	4	6	4	1	1	1	3
Mexico:																				
Chihuahua	D	3																		
Mexico, D. F.	C	12	9	4	1		2	1	1	1							2			
Monterrey	C							1												
Saltillo	D	3	2		1			2	2	4	1	4	4	1	1	2	4			
San Luis Potosi	D					1		2												
Torreon	C			5		1														
Morocco. (See table below.)																				
Nigeria	C	402	83	58	1	57			1,288			293		489						
Persia	C		93	189	104	86	104	110	80	90	67	95	64	52	53	47	28			
	D		43	94	39	55	35	37	36	41	32	41	25	24	15	18	14			
Peru. (See table below.)																				
Poland	C	1											1							
Portugal:																				
Lisbon	C	16	9	9		4		1	1	3	1	4	7	3		2		1	1	
Oporto	C	23	18	5			1		4	2	4	4		3	4	2		1		
Siam: Bangkok	D																			1
Sierra Leone[1]	C	6	16							3		10				10				
Straits Settlements	C		2																	
Sudan (Anglo-Egyptian)	C		1		8					5								13		44
Syria. (See table below.)																				
Turkey. (See table below.)																				
Union of Socialist Soviet Republics. (See table below.)																				
Union of South Africa:																				
Cape Province	C			P	P	P		P	P	P	P	P	P	P						
Orange Free State	C		P	P		P	P				P									
Transvaal	C									P		P	P							
Upper Volta	C	1																		
On vessels:																				
S. S. Amassis at Alexandria	C																1			
S. S. British Engineer at Marseille	C											1								
S. S. Somersetshire at Suez	C																	1		
S. S. British Splendour en route to Gibraltar	C								1											
S. S. Jervis Bay en route to Southampton	C								1											
	D								1											
S. S. Star of Alexandria at Alexandria	C													1						
S. S. Kohistan at Aden from Basra	C								1											

[1] From Mar. 6 to July 9, 1932, 878 cases of smallpox, with 13 deaths, were reported in Sierra Leone.

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

SMALLPOX—Continued

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

Place		August, 1932	September, 1932	October, 1932			November, 1932			December, 1932			January, 1933		
				1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31
Indo-China (see also table above)	C	147	127	52	76	29	50	73	57	38	68	107			
	D	61	62	15	21	10	19	13	19	15	11	19			
Syria: Beirut	C	1					4	17	20	4	28	17	5	10	19

Place		July, 1932	August, 1932	September, 1932	October, 1932	November, 1932	December, 1932
Chosen	C	9	5				
	D	7	3				
Greece	C	2					
Morocco	C	11	19	24	33	53	81
Peru	C		35	166	75	67	

Place		July, 1932	August, 1932	September, 1932	October, 1932	November, 1932	December, 1932
Turkey (see also table above)	C	3	30	13	13		
	D		3	4	1		
Union of Socialist Soviet Republics	C	967	538				

TYPHUS FEVER

Place		June 26–July 23, 1932	July 24–Aug. 20, 1932	Aug. 21–Sept. 17, 1932	Sept. 18–Oct. 15, 1932	Week ended— October, 1932		November, 1932				December, 1932					January, 1933			
						22	29	5	12	19	26	3	10	17	24	31	7	14	21	28
Algeria:																				
Algiers	C	33	10	34	11		1	5	1		2								1	
Bone	C				2									1					1	
Constantine Department	C	102	20								2		1					1		
Argentina: Buenos Aires	C			1																
Bolivia (see table below).																				
British East Africa: Uganda	C				16	18		1		4			12							

Bulgaria	C	10	4	1								2	10	5						
Chile (see also table below):																				
Antofagasta	C						1													
Iquique	C	1																		
Santiago	C	15		22	61	11	7	6	17	4		90	72	45	48					
Talcahuano	D		1																	
China: Hankow	C	1																		
Chosen. (See table below.)																				
Colombia: Cali	D				1					1										
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C		1	5													1	1		
Beheira	C		15		21							2								
Gharbieh	C			1	1															
Port Said	C	3	3	1	1			1		1										
Provinces	C	122	49	6	3											33	26			
Greece. (See table below.)																				
Guatemala. (See table below.)																				
Irish Free State:																				
Cork County—																				
Bandon	C				1															
Schull	C		1																	
Dublin	C				2															
Kerry County—																				
Dingle	C			1																
Killarney district	C								1		16			2	3					
Lithuania. (See table below.)																				
Mexico:																				
Mexico, D. F	C	11	4	10	3	2	1	6	2	6	1	2	1	2	1					
Monterrey	C		1																	
Torreon	C	1		6						1	1									
Morocco	C	6	8	7	2					2	4	7	9	17	1	9	16	10	9	
Palestine	C	1		6	5		1	1			1	1				1		1		
Persia	C	54	7	6	16				2	1	6		4	3	4	2	7	3		
Peru. (See table below.)																				
Poland	C	101	29	26	120	21	15	7	20	13	14	17	21	32	11	55	54	40	68	
	D	8	2	2	9	7	3	1	2	2	1	2	1	4		3	1	6	9	
Portugal: Oporto	C				1															
Rumania	C	56	20	17	9	1	6			22	17	46	36	66	66	43				
Tunisia: Tunis	C	8	6										1		9			4	6	25
Turkey (see also table below): Istanbul	C	1	4	1	1				2					1		1				
Union of Socialist Soviet Republics. (See table below.)																				
Union of South Africa:																				
Cape Province	C	P	P	P	P	P	P	P	P	P	P		P	P	P	P				
Natal	C	1			P	P	P	P		P	P		P	P	P	P				
Orange Free State	C	P	P	P	P	P	P	P	P		P		P	P	P	P				
Transvaal	C	P									P					P				
Yugoslavia. (See table below.)																				
On vessels: S. S. Munplace at New Orleans from Progresso	C																			1

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

TYPHUS FEVER—Continued

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

Place		July, 1932	August, 1932	September, 1932	October, 1932	November, 1932	December, 1932	January, 1933
Bolivia	C						4	
Chile: Coquimbo Province	C					60		
Greece	C	3	14	15	4		7	
Guatemala	C		2	9			3	
Lithuania	C	7		5		1	10	22
Peru	C		37	50	81	75	111	
Turkey	C	7	8	6	11	15		
Union of Socialist Soviet Republics	C	6,054	2,068					
Yugoslavia	C		1			3	11	

YELLOW FEVER

Place		July 24–Aug. 20, 1932	Aug. 21–Sept. 17, 1932	Sept. 18–Oct. 15, 1932	Week ended— October, 1932		November, 1932				December, 1932					January, 1933	
					22	29	5	12	19	26	3	10	17	24	31	7	14
Brazil:																	
Ceara State	C		1	1			1					1					
	D	3	1	1													
Parahyba State	D		2	1													
Pernambuco State	D	1	3	1													
French West Africa: Guinea	C							2	1	2		1					
	D							2	1	2		1					
Guinea (Portuguese): Bissagos Islands	C																43
	D																13
Senegal	C				8												
	D				5												
Bakel—Kidira	C			6													
	D			5													
Upper Gambia	C			3													
	D			2													
Sudan (French): Keyes	C						3	1		1	1						
	D						3	1		1	1						