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THE URINARY EXCRETION OF SILICA BY PERSONS EXPOSED TO SILICA DUST

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It has been demonstrated by numerous researches that silicosis is caused by the inhalation of silica dust. Not only has an excessive amount of silicosis been found associated with an exposure to such dust, but autopsy material has furnished additional proof, in that it has been possible to recover excessive amounts of silica in the ash of the lungs of silicotic persons. More recently, King (1) has demonstrated, as a result of his work on the metabolism of silica, that the urinary excretion of silica is at a higher level in persons exposed to silica dust than in normal individuals. King says, in part: "In the case of human beings it is probable that large numbers of extremely fine particles, smaller even than the very fine particles observable under the microscope in the lungs of individuals exposed to a dusty atmosphere, are constantly finding their way into the lung. In contact with the fluid in the lung these smallest of particles may suffer rapid solution, the larger particles slower and only partial solution. In this way there may be constant drainage of silica from the lung, the dissolved silica being carried away by the blood to be excreted in the urine."

The present brief study was undertaken for the purpose of obtaining further evidence that the lung changes associated with the inhalation of dust in the anthracite coal industry are caused by an exposure to both coal and silica dust. In a recent study of the health of workers in the anthracite coal industry (2) conducted by the Office of Industrial Hygiene and Sanitation of the Public Health Service, it was found that the workers were subjected to the inhalation of dust varying in total silica content from 11 to 63 percent, and in quartz content ranging from 4 to 43 percent. Pathological studies of some of these workers showed their lungs to contain silica and carbonaceous material in excess of the amounts present in

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normal lungs. All the evidence gathered seemed to point to the fact that the condition found among these workers may be attributed in part to the silica dust to which they were exposed; and as a result of these findings this condition in the anthracite workers was termed "anthraco-silicosis." It was felt, therefore, that the recovery of excessive amounts of silica in the urine of these mine workers, whose silica dust exposure had been established in a quantitative manner, would furnish further proof of the abnormal intake of silica dust.

PLAN OF STUDY

The present study was conducted on a group of men whose exposure had been previously evaluated as to the composition, size, and quantity of dust, and whose years of trade life were also known. Table 1 shows the distribution of the men in the different occupations entailing varying degrees of exposure to silica dust in the mines studied.

|--|

	Number	Silica dust perc	exposure, cent
Occupational Broub	of men	Total silica	Quartz
Miners Rock workers. Inside transportation men Outside workers. Former miners.	36 24 20 23 20	11. 1 63. 2 33. 7 13. 5 11. 1	3. 1 35. 2 13. 0 4. 3 3. 1
Total	123		

Urine specimens were collected in most cases in 2-quart capacity cans and were immediately analyzed for silica at the mines by the method described by King and Dolan (1). Of the 123 samples obtained, 73 (59 percent) were 24-hour specimens. Specific gravity, albumin, and sugar were included in the analysis.

RESULTS OF STUDY

The silica content of the urine in milligrams per 100 cc varied from 0.6 to 11.7 and averaged 2.5. Urine specimens of 11 laboratory and office workers were analyzed for control purposes and showed an average silica content of 1.0 milligram per 100 cc. These findings are in agreement with those reported by King and Dolan. Through the courtesy of Assistant Sanitary Engineer J. M. DallaValle, of this Office, it was possible to examine 20 specimens of urine from steel-foundry workers. The results of these analyses showed the foundry workers to be excreting an average of 2.6 milligrams of silica per 100 cc. The specific gravity determinations showed no relationship to the silica

content of the urine. This result is also in agreement with King's work on the excretion of silica by gold miners.

In the study of the health of anthracite coal workers it had been possible to obtain excellent correlations between clinical findings and the composition and amount of dust, together with the years of exposure, when the latter three factors were expressed in one term; namely, silica particles-years. Consequently, a similar procedure was used in an attempt to determine the relationship between the total silica dust exposure and the amount of urinary silica. The results of such an analysis are presented in table 2.

 TABLE 2.—The relationship between the silica dust *xposure of anthracite coal workers

 and urinary silica

		N	filligrs	ums of s	silica exc	reted j	per 100	cc of u	rine		
Exposure in millions of silica-dust particles-years	Num	ber of ;	person	s in eac	h group	Perce	ent of p	ersons	in eac	h group	Average silica excretion
SUICE-UUSE PALECOS-Years	Less than 1.0	1-1.9	2-2.9	3 or more	Total	Less than 1.0	1-1.9	2-2.9	3 or more	Total	per 100 cc urine
Less than 500 500-999. 1,000-1,999. 2,000 or more	14 1 2 0	22 2 6 6	12 7 0 3	8 4 9 7	56 14 17 16	25 7 12 0	39 14 35 38	21 50 0 19	15 29 53 43	100 100 100 100	1.7 2.9 3.4 3.6

It appears from these results that there is a definite relationship between the amount of silica dust inhaled over a period of years and the urinary silica found in the workers. The actual correlation is 0.48, and the probable error 0.04. It is interesting to note that aside from the gradual increase in urinary silica with an increase in exposure, as shown in the last column, no person with an exposure to more than 2,000 million silica dust particles-years was excreting less than the amount of silica found in normal persons (1.0 milligrams per 100 cc of urine), and that 62 percent of the workers in this group were excreting silica in excess of 2.0 milligrams per 100 cc. On the other hand, 64 percent of the persons with an exposure to less than 500 million silica particles-years were excreting silica in their urine in amounts less than 2.0 milligrams per 100 cc.

Table 1 indicated that 20 former miners were included in this study. These men were residing in a sanatorium for chronic diseases; and since they were all living under similar conditions, the factor of diet, which was shown by King to influence the urinary silica excretion, would not enter into the present picture. These former mine workers were found to have had an exposure to anthracite coal dust averaging 37 years and had been out of the industry an average of 7 years. The average urinary silica of these men was 2.1 milligrams per 100 cc, and was greater than the amounts found in non-miners at the same institution. This finding is also in agreement with that of King and Dolan, who obtained corresponding data on a group of 6 gold miners not exposed to dust at the time of examination. The anthracite mine workers who had been free from dust exposure for less than 5 years were found to be excreting slightly more silica than those who had been away from the industry for a longer period.

The present brief inquiry does not furnish sufficient data to determine the value of the urinary silica examination as an aid in the diagnosis of anthraco-silicosis. Excessive silica excretion probably merely indicates an abnormal intake of silica. It does, however, furnish additional evidence of the etiology of the disease.

SUMMARY

One hundred and twenty-three anthracite coal workers, 20 of whom had been out of the industry an average of 7 years, were examined for urinary silica by the method of King and Dolan. The amounts of silica found in the urine varied from 0.6 to 11.7, and averaged 2.5 milligrams per 100 cc. Normal individuals were found to be excreting only an average of 1.0 milligram per 100 cc. A close correlation was found between the silica dust exposure of these men for a specified number of years and the amount of urinary silica. A study of former anthracite coal workers showed that even after a lapse of several years away from any silica dust exposure, an increased amount of silica is being excreted by them. These findings furnish additional evidence of the etiology of the disease.

REFERENCES

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MOTTLED ENAMEL IN TEXAS

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INTRODUCTION

Since 1916 there have been occasional references (1), (2), (3), (4), in the literature inviting attention to the presence of mottled enamel in west Texas. In 1932 (5) a detailed questionnaire survey by the United States Public Health Service indicated that the Panhandlewest Texas region was probably the largest mottled enamel area in the United States with more people affected. This report showed that there were at least 26 west Texas counties in which mottled enamel was endemic and that such large centers of population as the cities of Amarillo, Lubbock, and Plainview were seriously affected. In addition, the possibilities of other affected areas in Texas became evident when mottled enamel was reported as endemic at Taylor, in Williamson County. Lemmon (6), a pediatrician, has recently called to the attention of the Texas medical profession the relationship between mottled enamel and child hygiene and nutrition.

METHOD OF SURVEY

This survey was a cooperative study made by the United States Public Health Service and the Texas State Department of Health during November and the early part of December 1934. Each of the communities hereinafter referred to was visited, and subsequently, with the cooperation of the local superintendent of education, school children, generally of the fourth, fifth, and sixth grades, were examined. A total of 66 cities, towns, or rural communities in 44 counties was visited and 3,723 school children were examined. The purpose of the survey was to obtain general information relative to the extent of the affected territory and a rough index of the degree of severity of the mottled enamel being produced.

Upon visiting a classroom, the purpose of the survey was first explained, and those children who had lived in the community continuously since birth and who had always used the city water for domestic purposes (cooking and drinking) were assembled in a separate group. This group was further questioned to determine whether there had been any breaks in the continuity of their residence and water consumption. Under good illumination each child was examined by one of us (H. T. D.) and the presence or absence of mottled enamel recorded. The degree of severity was noted in accordance with a standard of classification previously described (7). In many instances the children with variable residences and water histories were likewise examined under the same conditions.

The basis upon which the various degrees of mottle enamel were classified is, briefly, as follows:

NORMAL (FIG. 1)

The enamel presents the usual translucent semivitriform type of structure. The surface is smooth, glossy, and usually of a pale, creamy white color. In addition to those teeth showing normal calcification, for purposes of mottled enamel classification there is also included under this heading all individuals with permanent teeth showing hypoplasias *other* than mottled enamel. Such hypoplasias of the enamel are, in the main, those characteristic of Hutchinson's teeth and the hypoplasias concomitant with the exanthematous diseases and nutritional disturbances during the period of the enamel development of the permanent teeth. If an examination of a person reveals the presence of one of the previously mentioned hypoplasias *and* mottled enamel, the examination is recorded solely on the basis of the mottled enamel present and is listed under its proper mottled enamel classification.

GUESTIONABLE (FIG. 2)

In areas of relatively high endemicity, over 75 percent, there are at times cases which the experienced investigator occasionally hesitates to classify either as apparently normal or very mild. Such cases are listed as questionable. In studying a "border line" area, or a community where the causative factor of mottled enamel is present in the water supply quantitatively somewhere between the maximum harmless amount and the minimum capable of producing the "very mild" and "mild" type of mottled enamel in 35 percent or more of the children who have used the particular water exclusively from birth, this classification is frequently needed. In such areas there is generally a higher percentage of individuals classed as normal than the combined group of "very mild" and "mild." There is, however, always a certain percentage of those individuals with comparable histories, that discloses slight aberrations in the translucency of normal enamel ranging from a few white flecks to occasional white spots. Furthermore, in some instances, thin, irregular, white, opaque streaks, or veining, are noted on the incisal third of the superior incisors. In other cases the tip of the summit of the bicuspids shows an unusual white opacity two or three millimeters in extent. the remainder of the tooth being apparently normal. As such cases are not sufficiently developed to be classed as "very mild", and are definitely not "normal", they are listed as questionable.

VERY MILD (FIG. 3)

Small, opaque, paper-white areas are scattered irregularly or streaked over the tooth surface. This mottling is principally observed on the labial and buccal surfaces and involves up to 25 percent of the tooth surface of the particular teeth affected. Small, pitted, white areas are frequently found on the summit of the cusps. Brown stain is rarely observed in the mottled enamel of this classification and, if present at all, is so faint as to be almost indistinct.

In areas of high endemicity, mottled enamel is not infrequently observed on the deciduous molars and occasionally the deciduous cuspids. Mottled enamel in deciduous teeth is generally of the very mild type, even though the permanent teeth in the same individual may show moderate to severe mottling.

MILD (FIG. 4)

The white opaque areas in the enamel of the teeth involve at least half of the tooth surface. The surfaces of molars, bicuspids, and cuspids subject to attrition show thin white layers worn off and the bluish shades of underlying normal enamel. Light brown stains are sometimes apparent, generally on the superior incisors.

MODERATE (FIGS 5 AND 6)

No change is observed in the form of the tooth, but generally all tooth surfaces are involved. Surfaces subject to attrition are definitely marked. Minute pitting is often present, generally on the labial and buccal surfaces. Brown stain is frequently a disfiguring complication. For the most part the stain ranges from tan to chocolate in color and not infrequently involves as much as half of the labial surface. It must be remembered, however, that the incidence of brown stain varies greatly in different endemic areas and many cases of white opaque mottled enamel, without brown stain, are classified as "moderate" and listed in this category.

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PLATE I



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PLATE II



MODERATELY SEVERE (FIG. 7)

Macroscopically a greater depth of enamel appears to be involved. A smoky white appearance is often noted. Pitting is more frequent and generally observed on all tooth surfaces. The pits are discrete and may be 1 to 2 millimeters in diameter. Brown stain, if present, is generally deeper in hue and involves more of the tooth surface. The diagnostic sign of this classification is, however, the discrete pitting.

SEVERE (FIGS. 8 AND 9)

The hypoplasia is so marked that the form of the teeth is at times affected; the older children often present a mild incisal-occlusal pathological abrasion. The pits are deep and very often confluent. As a result of confluent pitting, which is the diagnostic sign of this classification, the outer surface of the enamel is lost in places and the tooth often presents a corroded-like appearance. Stains are widespread and range in color from chocolate brown to almost black.

MOTTLED ENAMEL INDEX OF A COMMUNITY

The various degrees of mottled enamel severity having been defined, the application of this classification to the determination of a mottled enamel index of a community is necessary for epidemiological purposes and subsequent correlation with chemical and other studies.

Accordingly the following indexes have been arbitrarily defined in terms of the degree of severity of mottled enamel observed clinically:

- NEGATIVE: When less than 10 percent of the children show "very mild" or more severe types of mottled enamel.
- BORDER LINE: When 10 percent or more, but less than 35 percent, show "very mild" mottled enamel or worse.
- SLIGHT: 35 percent or more show "very mild" or worse, but less than 50 percent are mild or worse, and less than 35 percent "moderate" or worse.
- MEDIUM: 50 percent or more are mild or worse, but less than 35 percent are "moderate" or worse.
- **RATHER MARKED:** 35 percent or more, but less than 50 percent are "moderate" or worse, but less than 35 percent are "moderately severe" or worse.
- MARKED: 50 percent or more are "moderate" or worse, but less than 35 percent are "moderately severe" or worse.
- VERY MARKED: 35 percent or more are classified as "moderately severe" or worse.

All children included in a group utilized in the determination of a mottled enamel index of a community refer to children whose time of risk of exposure had been constant, meaning that the children were born in the community, had lived there all their lives (short vacations totaling less than 30 days in one calendar year excepted), and had always used the municipal or common water supply for cooking and drinking purposes. In certain west Texas communities the mottled enamel index could be determined only tentatively at this time. The reason for a tentative index will be made apparent in the section dealing with the factor of population influx.

FACTOR OF POPULATION INFLUX

The factor of population changes and its relation to changes of water supply are obviously of paramount importance in mottled enamel investigation. The pertinent facts concerning population movements have a direct bearing on the west Texas survey. There has been a rapid growth and development of west Texas during the period between 1920 and 1930. The marked migration into west Texas during this decade is well illustrated by an examination of the reports of the Bureau of the Census (8). The percentage increase in



population between 1920 and 1930 for the State of Texas was 24.9, while the population of the 37 west Texas counties covered by this report increased from 138,851 in 1920 to 379,881 in 1930, or 173.6 percent.

As a result of the unusual increase in population in west Texas during the period between 1920 and 1930, a large number of children disclosed histories of residence in nonendemic and endemic areas, or of having lived continuously since birth in a community where the municipal water supply had been installed or changed during the life of the child. It was not infrequent to find that smaller cities or towns had installed municipal water only as late as 6 to 8 years ago; previous to that time the few inhabitants depended on individual windmill wells.

In all of such places the attempt was made to determine whether the municipal water supply was producing mottled enamel by an examination of those children in the fifth and sixth grades who had used the municipal water exclusively for at least the past 6 years. In such groups the examination was limited to the cuspids, bicuspids, and second molar teeth, and the presence or absence of mottled enamel recorded on the basis of these observations. Under such conditions the mottled enamel index given to such communities is necessarily tentative. Each community should be resurveyed 3 or 4 years hence to determine its actual or approximate mottled enamel index.

WATER SUPPLIES

In the west Texas phase of the survey, another of us (R. M. D.) obtained all relative data available concerning the municipal supply from the local water superintendent, and collected one or more samples of the supply. When the municipal supply was a composite water from more than one stratum, two or more samples were collected whenever possible. These samples were forwarded to the Texas State Department of Health in whose laboratories the fluoride determinations are being made. The report of the chemical determination of these waters associated with endemic mottled enamel will be made the basis of a separate report. The information included in this report regarding municipal water supplies of the affected communities in the east central Texas area has been obtained by another of the authors (C. C.).

In west Texas there are apparently three strata of water-bearing sands, in general not widely separated in depth. Practically all wells in this region are drilled, and it is customary to refer to drilled wells obtaining water from the first stratum as "shallow," and from the second or third stratum as "deep." Consequently in one county the term "shallow" may be applied to a 300-foot drilled well because water from the second or third stratum is not obtained until a depth of 450 or 500 feet is reached, while in another county, the term "deep" well may be applied to a 125-foot well because the first stratum of water in that particular locality is reached at 80 feet.

SURVEY FINDINGS

The results of this survey are summarized as follows:

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Table 1 details the mottled enamel findings and history of common water supplies in certain cities of the Panhandle, west Texas, and

FIG. II SEVERITY OF MOTTLED ENAMELIN CHILDREN OF CERTAIN SELECTED PLACES OF THE PANHANDLE AND WEST TEXAS

Children in continuous residence and uninterrupted use of municipal water

D ()	69	Percentage Distribution of Sample	Mottled
Place	N E	According to Severity of Affection.	Enamel
	390 890	10 20 30 40 50 60 70 80 90 10	o Index
Post	381		Very marked
Silverton	10		t Marked
Tulia	13		Marked
Slaton	34	2000000////AB	Marked
Spur	18		Marked
Lubbock	176		Marked
O'Donnell	10		+ Marked
Lamesa	56		Marked
Crosbyton	28		Marked
Littlefield	13		HRather marked
Amarillo	168		Rather marked
Brownfield	37		tRather marked
Plainview	78		Rather marked
Muleshoe 🖞	25		+ Medium
Hereford	21		Medium
Midland	18		Medium
Levelland	12		+ Medium
Farwell	10		Medium
Lockney			Medium
Tahoka	45		Slight
Stanton	14		+ Medium
Perryton	32		Medium
Odessa	19	XXXXXX////////////////////////////////	t Slight
Spearman	14		Slight
Pecos	51		Slight
Canyon	19 🛙		Slight
Dimmitt	120	88888888888888888888888888888888888888	+ Slight
Dalhart	70 🖸		Slight
Wink	16 🛛	******////////////////////////////////	† Slight
Stratford	22	*****	Slight
Fort Stockton	13 🛛		S/ight
Dumas	30 🛛	****//////////////////////////////////	+ Slight
Panhandle	14 🛛	8	+ Slight
Pampa	49		† Border Line
Borger	44 🕅		† Border Line
Big Spring	68 🛛		Negative
Legend:	6	10 20 30 40 50 60 70 80 90 10	0
Moder XXXXX Mild	ate to	Severe WiesTionable * Total num Normal in the 3	nber of children 6 samples: 1308
VIII Very n	nild	+ Tentative	

east central Texas. In these cities a sufficient number ¹ of children with a history of continuous residence and constant use of the city water were examined to warrant the development of an approximate² or tentative mottled enamel index of the community. Figures 11 and 12 illustrate the percentage distribution of that part of the sample having continuous residence and constant use of a common water supply listed according to severity of affection, and they also show either the approximate or tentative mottled enamel index of the community.

SEVERITY OF	MOTTLED ENAMEL IN CHILDREN OF GERTAIN SELECTED PLACES OF EAST CENTRAL TEXAS
Children in	continuous residence and uninterrupted use of municipal water
Place	Percentage Distribution of Sample Mottled According to Severity of Affection. Enamel 5,00 10 20 30 40 50 60 70 80 90 100 Index
Bartlett	29 Marked
Italy	34 Rather marked
Frost	13 Rather marked
Taylor	45 Medium.
Palmer	16 Medium
Ferris	26 Medium
Belton	43 Medium Medium
Ennio	71 Medium Medium
Gatesville	17 Slight
Granger	12 000000000000000000000000000000000000
Waxahachie	30 🗱 📶 Slight
West	25 Bullin Border Line
Hillsboro	46 Border Line.
Legend :	0 10 20 30 40 50 60 70 80 90 100
Moder	ate to severe 🖾 Questionable 🔺 Total number of
DSSSSS Mild	Normal children in the 13

FIG. 12

In table 2 are listed four small communities possessing municipal water supplies, but where an insufficient number of examinations were made to permit the computation of a mottled-enamel index.

samples : 407

1111 Very mild

Table 3 summarizes mottled enamel findings in certain communities and rural districts of the Panhandle and west Texas where common water supplies are either not available or, in two instances, not used.

¹ Ordinarily the mottled-enamel index of a community should not be determined unless the group examined consists of 25 or more children with a continuous residence since birth and a constant use of a common water supply. This minimum standard could not be adhered to in all instances in this survey owing to the factor of population changes or a smaller number of children available in the school showing a constant residence and water history.

^{&#}x27;It should be noted that an "actual mottled enamel index" is not given a community unless all histories as given by the child, with respect to both residence and water supplies, are rechecked and confirmed by an interview with the child's parents.

rtain cities of (1) Panhandle and west Texas and (2) east			Remarks		Sample represents all children in the fourth, fifth, and sixth grades who used city water continuously. Post is lo- cated east of the supply is obtained are from which the supply is obtained are 3 to 414 miles west of Post, and on the	Cap rock. Entire sixth grade examined: "B." also includes some children from immedi- ate rural districts.	Entire sixth grade examined: "B" also includes children from immediate rural district.	Bample represents all children of fourth, fifth, and sixth grades who used city water continuously.	Bample under "A" represents all children in fifth and sitch grades with constant history. Four normals under "B" used clistern water exclusively.	Bample represents all white children in fourth, fith, and strith grades of public schools whose histories indicated con stant use of city water since birth.
ply in certain cities of (1) Panhan. exas) WEST TEXAS		History of water supply		Present supply in constant use since prior to 1922; obtained from 13 wells 85 feet to 100 feet deep; apparently in first stratum.	Obtained from 120 feet (1924) and 150 feet (1928) wells in first stratum, similar to local windmill wells. City supply in	From North wall 198 (set (1923) and South From North wall 198 (set (1923) and South well 60 (set (1923). Apparently first stratum. Most of water supply at	From 1922-24, shallow wells, first stratum. From 1922-24, shallow wells, first stratum. First 2 takes water from first and second strats; third well from all 3	Municipal water supply is obtained from 3 walls, each 44 feet deep. Spur is located east of the cap rock, but is apparently drawing its water from the cap rock	Municipal water obtained from 8 drilled wells with standard steel casing the entire depth, and averaging 98 to 150 feet.
dns 1	DND	.9	80	Severe	£	0	0	ε	•	£
uter intro	E	Soug	iden tory	Moderately Severe	Û	4	1	ε	•	£
a s t	DN	l dis	r res r his	Moderate	ε	~	13	ε		ε
л о'	IH/	Dame	es ir wate	PIIM	ε.	60	13	Ξ		Э
istor	PAI	ed ei	ang d/or	Very mild	Θ	60	12	Ð	•	<u>e</u>
भू मू	1.	ottl	n di G	Question-	E	-	2	ε	•	3
an		ц 5	Ê	Normal	Ð	2	7	Ð	4	ε
s bu		ing	28	Bevere	2	0	•	7	0	-
ndi		cord	iden of ci	Severe Aleurerate	13	-	-	89	•	31
y is		od ac	res	Moderate	19	¢	90	19	Ħ	7
am		ssifie	ant	PIIM	4	-	~ ~	6	8	54
l en		l cla	tinu onsta	Very mild	0	8	2	က	-	Ħ
ttled		ldrei	ter cu	elda	0	•	•	69	0	61
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nar		-xə u	r of childre	edmun latoT			!			
T▲BLE 1.—Sum			City and population	(0601 10 STREAD)	Post (1,668)	Silverton (873)	Tulia (2,202)	Slaton (3,876)	Spur (1,899)	Lubbock (20,520)

"B" includes children from immediate	tural district and "A" sample, all chil- duren third, fourth, and fifth grades who used city water past 5 years. Sample represents all children in the third, fourth, and fifth grades who used city	water continuously since birth. Do.	"A" sample represents all children in fifth	and sixth grades who used city water continuously since installation. Sample consists of entire fourth, fifth, and	sixth grades in 3 white and 1 colored puo- lic schools. Sample represents all children in fourth,	fifth, and sixth grades who used city water continuously since 1925. Sample represents children in fifth, sixth,	seventh, and eighth grades, who used municipal water continuously since birth.	"A" sample represents all children in fifth, sirth, and seventh grades, who used city water continuously for past 6 years.	"B" sample includes many children using individual windmill wells, both city and immediate rural district.	Sample represents all children in fifth and sixth grades using city water contin- mustic city birth	Worksy survey on the two states of the formation of the sample represents all children in fifth and sixth grades who used city water for past 6 years.	"A." sample represents all children in fourth, fith, sixth, and seventh grades who used city water continuously.	"B" sample represents children using windmil well water continuously from birth in Lockney and immediate rural district.	34.
Obtained from seven 80-foot uncased wells,	akung wakar nom mus stranum. 5 were drilled in 1028 and 2 in 1932. No com- mon water supply prior to 1928. 1921 to 1929 obtained from 3 wells, 90, 140, 1921 to 1820 obtained from 3 wines 1929. 3	wells 140 feet, taking water from second stratum. From two 280-foot wells drilled in 1918 and	1930 and taking water from the second stratum. From four 120-foot wells drilled in 1928 and	1221, obtaining water from the first stra- tum. No common water supply prior 1926. From 10 wells (1927) 180 feet deep and 5	(1931) 230-1000 Wells. Frevrous 1927 from thirty-free 250-foot wells located in vari- ous parts of the dity. Since 1925 from 2 dug wells 103 and 117 feet,	taking water from first stratum. Prior 1926 no municipal supply. From 3 wells 96, 176, and 276 feet. Prior	to 1928 first 2 wells only were used; 1928-28 275-foot well used solely. Present sup- ply composite of all 3 wells.	From 1 well (1927) 90 feet deep, obtaining water from first stratum and apparently comparable with many local windmill	From three 60-foot wells drilled in 1919, From three 60-foot wells drilled in 1919, 1921, and 1925. Many individual wind- mill wells used prior to 1927 comparable	Since 1928. from 2 wells 130 feet; 1910-28, from wells approximately 90 feet.	From two 185-foot wells drilled 1928-29. Water obtained from second stratum; first stratum is cased off at 120 feet. No	Obtained from one 300-foot well drilled in 1922: due to perforated casing water is obtained from both strata. Same water supply is used in adjoining Terico,	Obtained from one 120-foot well drilled in 1928, cased to the first stratum. Prior to 1928 municipal supply from a well same depth but not cased.	² Rand McNally pocket map of Texas, 19
•	Ξ	Ξ	•	•	Ξ	Ξ		•	•	Ξ	•	•	•	
-	Ξ	Ξ	•	•	Ξ	Ξ		~~~~	ი 	Ξ		•	•	
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O'Donnell (1,026)	Lamesa (3,528)	Crosbyton (1,250)	Littlefield (3,218)	Amarillo (43,132)	Brownfield (1,907)	Plainview (8,834)	Medication (mm)	(A//) 9001991111W	Hereford (2,458)	Midland (5,484)	Levelland (1,661)	Farwell (647) ²	Lockney (1,466)	

dle and west Texas and (2) east			Remaria		"A" sample, all children in second, third, fourth, fith, and sixth grades using city	waket controlously show out an object of pleasant consists of children in fourth. Bample consists of children in fourth. fifth, and sixth grades using municipal	water continuously since 1927. Entite fifth and sixth grades, Perryton and rural school district.	Both samples from third and fourth grades. 'A' used city water con- stantly past 6 years. 'B' used indi-	vidual wells constantly since birth. All of fifth and sixth grades examined, Spearman and rural school district.	Sample consists of all children in third, fifth, sixth, and seventh grades using	City water excitance of there were 14 children from immediate rural district who always used water from individual windmill wells. They show a more severe type of motified enamel than	"A sample represents all children in fifth and sith frades using city water constantly for past 6 years. In sample "B" there were 9 children from imme-
oply in certain cities of (1) Panhan Continued	ST TEXA8Continued		History of water supply		From 11 wells 80 to 100 feet deep obtaining water from first stratum. First well	trincy 1225, outsequent went actual as needed; 9 wells are "gravel backed." From 3 wells, 2 drilled 1927, 1 in 1930, eech 135 feet; first stratum cased off. No	common water supply prior to 1927. From two 400-foot "gravel backed" wells installed 1927. Offy water is a com-	provide function and a strates. Anumerical supply in use since 1923. From six 140-foot wells: 6 drilled 1928. 1 in 1833. No city water prior to 1928.	From two 350-foot wells drilled 1924 and 1927. Stratum from which water is	Prom 2 wells 280 feet deep drilled 1914. The first stratum is cased off.	Since 1928 from 500-foot well of West Teras Utility Co. Prior to 1928 from 4 city wells, 250 to 500 feet. No data procured on sitratum or strats from which these waters were and are obtained.	From one 230-foot well drilled 1927. No data on stratum from which water is obtained. Prior to 1927 there was no common water supply.
as_	WE	sis	nce	Severe	•	Ξ	•	•	0	ε	•	•
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ury e		-xə u	r of childre ined	9dmua letoT me	58	14	137	32	107	51	88	8
TABLE 1.—Summe			City and population	(0081 ID STISTING)	Tahoka (1,620)	Stanton (1,384)	Perryton (2,824)	Odessa (2,407)	Spearman (1,580)	Pecos (3,304)	Сапуоп (2,821)	Dimmitt (829)

884.	1803 and May 1924 1927 group of weils also shut down. Wells located 2, 6, and 9 miles, respectively, south of Big Spring. • Rand McNally pocket map of Texas, 16	0	ន	152	283	367	123	637		nine 80	322 6XBI	325 Vone	17 264	8	226	893
Bample consists of all children in fifth and sixth grades whose history indicated constant residence and continuous use of city water.	Auturicipatsuppy consusts of 23 wells. 20ne- third of supply from 13 wells 260 feet drilled in 1923. Two-thirds of supply from 8 wells 280 to 380 feet, drilled 1927. Between 1894-1923 all municipal water from "Old Park" supply, which was supplemented untril 1927 with 1923 group of wells. Between 1927-63 "Old Park"	Ξ	e	e 	E	Ð	Ξ	Ð	>	>	>		N	0	8	8
All of fifth and sixth grades examined. "A" sample represents children using city water for the past 6 years.	From wells 260 to 600 feet, located 18 miles south in Carson County (Plain Station) and installed 1928. No common water supply prior 1928.	• :	• (•	eo (9 (9 ÷	22	• •	• •	• •	≓ (xx xx	° °	8	124
All children in sixth grade examined. "A" sample represents children using city water for the past 6 years or longer.	Present supply from 3 wells, 384 feet, cased entire depth, and taking water from third stratum. There are 6 other wells not being used at present.	•	•	•	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	a	o,	46	•	•	.		D.	2	2	117
All children in sixth grade examined. "A" sample represents children using city water for the past 6 years.	From 2 wells each 550 feet, installed 1927. No information on stratum from which water is obtained. No common water sumply mrior 1927.	•	•	•	ю.	×	6	9	•	•	•	-	9	•	~	42
All children in the fourth and fifth grades were examined.	supply was composite of an wears. From 2 wells 530 and 550 feet, installed in 1930. No information regarding stratum from which water is obtained.	•	•	-	3	6	4	39	•	•	•	4	16	m	7	98
Sample represents all children in fourth fifth, and sixth grades who used city water continuously.	From 175-foot well, drilled 1927. Between 1923-30 water was obtained from 2 wells 306 and 305 feet. These wells were aban- doned in 1930. Between 1927-30 the sunniv was commostia of all wells	ε	ε	Ξ	£	Ξ	Ξ	Ξ	•	0	0	8	*	~	*	13
Examinations included all children of fourth, fifth, and sixth grades.	From the 302-toor well, drilled 1930, and owned by the West Texas Utility Co. No information obtained concerning pre- vious municipal supply	•	•	-	9	9	9	5	•	•	•	4.	8	-	~	76
Sample taken from fourth grade, none over 10 years of age and had used city water for at least past 6 years.	From 5 wells 220 feet deep, drilled 1927: first stratum is cased off. At present only 1 wells being used. No common water simply prior 1927	ε	ε	Ξ	ε	Ξ	Ξ	ε	•	•	•	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~	۰ ۲	4	16
Dimmitt city water. Examinations were made of childrea in fourth, fifth, and sixth grades.	From 2 wells 340 feet deep, drilled 1928. Prior 1928 water obtained from wells of similar denth.	•	0	5	52	43	90	8 <u></u>	•	•	•	15	27	90	8	248
diate rural district who from birth con thnousy used water from individual wells. All showed a more severe type of motified ensuel than those using Diremits of water																

		Bemaris		Sample consists of all children in fifth, sixth, and seventh grades with a contin- uous residence since birth and constant	use of city water. Sample consists of all children in fourth, fifth, sixth, and seventh grades who comply with "A" classification.	Sample consists of all children in fith, sixth, and seventh grades who comply	when an classified and the sixth Bample consists of all children in the sixth grade coming under "A."	Bample consists of all children in the third, fourth, and fifth grades who comply with "A" classification.	Sample consists of all children in the fourth, fulth, and sitth grades who com- ply with "A" classification. During the examination in Ferris, 6 pupplis who had always lived in the nearby commungity of India, but who stiended syspol in Ferris, were observed. All 5 showed motible enamel moderate in severity. These 5 are not included in the Ferris totals.			
AL TEXAS		History of water supply	•	From a 2,005-foot well drilled 1901 and in constant use since. Apparently obtain- ing water from different strata.	From \$50-foot well drilled 1912 and in con- stant use since. According to local data water is obtained from second Woodbine	From 1,184-foot well drilled 1903 into the Trinity sands. This is the only supply	From a 3,280-foot well drilled 1913 and a 3,280-foot well drilled 1913. Due to high subbur content of city water some inhab- tiants use cistent water for certain dome-	Between 1900 and 1928 supply obtained from 1,170-foot well; 1928 to date, entire dry supply obtained from 1,172-foot well	Bines 121 entry water supply ob- tained from a 1,400-foot artesian well.			
NTR	sis	D C O	Severe	ε	ε.	ε	ε	ε	ε			
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	Ö	3 b b	Normal	•	•	•	ю. 		ო 			
	-xə u	r of childre	ədmun latoT ma	53	34	13	45	16	56			
		City and population		Bartlett (1,873)	Italy (1,230)	Frost (748)	Taylor (7,463)	Palmer (758)	Ferris (1,438)			

TABLE 1.—Summary of mottled enamel findings and history of water supply in certain cities of (1) Panhandle and west Texas and (2) east central Texas—Continued

March 29, 1935

Sample consists of all children in the fifth and sixth grades who comply with "A" Assettionation	Sample consists of all children in the third, fourth, and fifth grades who com- ply with "A" classification.			Sample consists of all children in the sixth grade who comply with "A" classifica-	Bample consists of all children in the sixth and seventh grades who comply with	Sample represents culldren from the fourth, sixth, and seventh grades of the Contral Ward School who comply with	Sample consists of all children in the fifth and sixth grades who comply with "A"	Sample consists of all children in the sirth grade who comply with "A" classifica- tion.			
From 2 wells, 1 drilled 1903, 980 feet in the first Trinity sands, and 1 drilled 1915, 1 180 feet into the second Trinity cands	From 1908–25 supply obtained from two 1,325-foot wells drilled to the first Wood- bine sand. August 1925 well installed, obtaining water from the second Wood-	bine sand between 1,700 and 1,798 feet deep: 1930 the smaller of the first 2 wells was abandoned. Present supply comes from one 1,325-foot well and one 1,798	feet, the latter in the second Woodbine stratum, and furnishing the major por- tion of the water supply since 1926.	From two 700-foot wells drilled in 1910 and in constant use since that date.	From a 2,531-foot well drilled 1906 or 1907 and in constant use since that year.	Since 1913 from 3 wells, 2,900 to 3,000 feet, drilled into the Trinity sands. These wells were drilled 1913, 1925, and 1931, wearbactront.	From a well, 2,200 feet deep, drilled 1894 in- to the second Trinity sands and in con-	Since 1923 city water supply obtained from 14 wells. There is considerable va- riation in the depth and strata from which the water is and was obtained. Limited space precludes detailed de- scription of this supply.			^a Rand McNally pocket map of Texas, 1
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°	<b>00</b>			61	•	=	1	19	8	292	
43	1			11	12	30	55	4	404	300	
Belton (3,779)	Ennis (7,069)	0°3:		N Gatesville (2,601)	Granger (1,703)	Waxahachie (8,042)	West (1,807)	Hillsboro (7,823)	Total	Grand total (1 ; plus 2).	

with a common water supply but enamel index				Bample "A" represents all children in the third and lourth grades who used city water for the past if yeavs. Barnple "B" represents children who have used con- tinuously waker from local or nearby trural	windmil wells. Bample "A" represents chuldren from the second, third, fourth, and fith grades. Bample "B" "Presents children who have used continuously waker from near-	by turia buidantil wells. Bampie "A," represents all children of the sixth grade coming under that classifica- tion. Effet percentarge of cludters abov- ing normal esicification warrants a de-	tailed opidemiological survey. Sitth and seventh grades examined. "B" lincludes children from immediate rural districts.	
of the Panhandle and west Texas uded the computation of a mottled			History of water supply	Municipal water supply obtained from one 280-toot well, drilled in 1928. First stratum cased off.	From 1 well, drilled in 1925, 136 feet. First stratum cased off and city supply obtained from second stratum.	From one 399-foot well, drilled in 1926, cased entire depth and obtaining water from the "bottom" stratum only.	From 2 wells, one 240-foot, drilled in 1921, and one 386-foot, drilled in 1928. The latter supplies practically all the water.	
ities orecl	s	8	Severe	0	•	•	0	•
unu l su	gnos	sider ry	Moderately Severe		•	•	•	-
ome atio	l dia	n re histo	Moderate	ę	12	•	8	11
in c nin	ame	es i ater	DIIM	4	©		•	8
rtai	od er	DBID OF W	Very mild	4	\$	~	80	8
of o	ottle	and/	Questionable	4	-	•	~~~~~	~
per ber	ton	Ê)	Normal	5	-	18	10	31
ding vum	ling	ater	Severe	0	0	0	•	0
fin nt n	ccord	sider ty w	Moderately Moderately	0	8	•	•	8
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ena suf	asiâ	uous	Mild	4	8	•	~	8
led in	n cli	ntin stant	Very mild	1	-	0	T	8
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of n here	5	¥tth	Normal	0	•	9	0	8
ary w	dren	of child	rədmun latoT imaxə	R	33	8	37	123
TABLE 2.—Summ		Oity and population	(census of 1830)	Готепзо (739)	Idalou (538)	White Deer (1,010)	Vega (519)	Total

March 29, 1935

of the Panhandle and west Texas with no common water supply. (See ler ''Remarks'')	DIVIDUAL WINDMILL WELLS IS USED	Sis	History of water supply and remarks	0 Sample represents all children in fourth and fifth grades who stated they had either lived in Southland or immediate runal sobol district all laber lives and had awayy used water from windmill wells. Individual wond mill wells in this matterial	area are approximately 100 to 125 feet in depth. Brannations were made in 2 tural schools, one 4 miles south of Lockney, the other 12 miles west and 2 miles south of Floydada; 14 of the children stated they hav always used water from individual windmil wells located within the borders of	their respective school districts. Description of the second districts of the second schools, located at Bushland, River Road, and England. Park, respectively, 10 miles west, 6 miles north, and 10 miles east of Amarillo. Sample contains children with a history of continuous residence in the district and others horn elsewhere. Water'is obtained from individual wind	mill wells apparently from the first stratum. 0 Although Happy has a municipal water supply installed in 1928, it was not possible to find more than 3 children in the grades examined who had used the city water for at least the next means of the inhebitence continuity to use	wells. Most of the sampler represents children from the immediate rural districts wells. Most of the sampler spresents children from the immediate rural districts 0 Children in this sample stated they had lived continuously either in Monroe of the immediate rural district and had used water from individual windmil	Weuts. There is no municipal water supply in Abernathy and sample represents children who stated they had always fived either in Abernathy or in the school district and who had always used water from individual windmill wells, which vary	from 118 to 130 feet in depth. 0 This sample represents children from the third, fourth, fifth, sixth, and seventh grades and contains many with both continuous and variable histories. Indi	vidual windmill wells are approximately 150 feet deep. 8 Sample represents children in the fourth, fifth, atth, atth, and seventh grades and includes children from both Farnsworth and the immediate rural district. Wats histories in this group vary. Water is obtained from individual windmill wells	
unities ons und	ROM IN	nel díagno	lod- ately vere	<b>1</b> 20		1	1	0	1	0	0	-
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in certa two	HERE W	ling to me	pliM		2	28	ю.	67	4	10	4	
rdings	IES WI	ed accord	Very mild	0	ø	16	7	9	2	8	4	
amel fi	LINUM	n classifi	Ques- tion- able	0	5	œ	9	9	12	10	5	
tled-en	сом	Childre	Nor- mal	0	0	8	ŝ	ŝ	3	9	~	
of mot		Total num-	ber of chil- dren exam- ined	21	ន	88	8	17	34	30	8	
TABLE 3.—Summary			City and population (census of 1930)	Southland (400) ¹	Two Floyd County rural districts.	Three Potter County rural districts.	Happy (724)	Monroe (50) ¹	Abernathy (858)	Wildorado (105) ¹	Farnsworth (25) ¹	

¹ Rand McNally pocket map of Texas, 1934.

e Panhandle and west Texas with no common water supply. (See 'ks'')—Continued	S IS USED FOR DOMESTIC PURPOSES		History of water supply and remarks	The 6 examined represent children who had lived in Jayton all their lives and had used continuously water from cisterns for domestic purposes. Afternoon schoo dismissal of the pupils prevented examination of any additional number. The city has a common water supply, but it is of a type which obviates its use for domestic purposes, and the inhabitants of this town use disterne water for cookin	and drinking. Sample represents children from the fourth, fifth, and sixth grades with a histor. So of continuous residence in Gall or nearby rural districts for the major part of of continuous residence of motide channel had lived at O'Donnall, an andenni stres. from birth to 2 years of age. Watar for domestic purposes is obtained from cisterns and occasionally surface sources.	
ies of th ''Remar	BTERN	agnosis	Severe	0	0	0
nmunit under	tom CI	amel dis	Mod- erately severe	0	0	8
ain con ptions	rer fi	iottled er	Mod- erate	0	0	45
in cert vo exce	RE WAT	ling to m	Mild	0	0	11
ndings tr	WHEF	ed accord	Very mild	0	1	8
amel fi	NITIES	n classifi	Ques- tion- sble	0	1	47
tled-en	оммо	Childre	Nor- mal	¢	15	2
of mot	Õ	Total	ber of chil- dren exam- ined	5	11	295
TABLE 3.—Summary			City and population (census of 1930)	Jayton (623)	Gali (100) ¹	Total

### DISCUSSION

This survey presents definite evidence that the Panhandle-west Texas region constitutes the largest mottled-enamel area in the United States. There is no doubt that a detailed survey would disclose many additional smaller communities and rural districts where mottled enamel is endemic. Since this territory is generally affected through all gradations from a slight to a marked degree, the influence of the causative factor of mottled enamel is operative over a vast area, with the result that many thousands of the inhabitants are affected.

The area known as the "Llano Estacado" is apparently the most severely affected. From observations made during this survey, the region of the greatest severity centers in and around the city of Lubbock and extends in an easterly direction toward Spur and Post, northward toward Plainview and Amarillo, and southward toward Lamesa. The fact that such large cities as Amarillo, Lubbock, and Plainview are located in the region of the greatest severity makes this a serious problem of keen public-health interest. Although definite manifestations of endemic mottled enamel are readily demonstrable in communities located north of the Canadian River and south of the eastward prolongation of the southern boundary of the State of New Mexico (Edwards Plateau), the type of mottled enamel being developed in these two regions is markedly less severe, the community index generally being slight.

Examination of numerous children, who spent the first 5 or 6 years of their lives in eastern New Mexico, indicates definitely that mottled enamel comparable to that found in west Texas is likewise being developed in eastern New Mexico.

The east central Texas area should be further studied and the boundaries of endemicity determined. Endemic mottled enamel has now been definitely demonstrated in numerous localities between Austin and Dallas. In certain communities, such as Bartlett, Italy, and Frost, a type of mottled enamel is being produced that is comparable in severity with some of the more seriously affected cities and towns of west Texas.

### SUMMARY

### (A) THE PANHANDLE AND WEST TEXAS

1. The Panhandle-west Texas region constitutes the largest mottled-enamel area in the United States. As a result of the unusual population influx between 1920 and 1930, the number of children affected has correspondingly increased.

2. Of 53 communities surveyed in 37 counties, only 6 could be classified as "negative" or "border line."

3. The fact that the municipal water supplies of such large cities as Amarillo, Lubbock, and Plainview contain the causative factor of mottled enamel in sufficient concentration to produce this hypoplasia in a high percentage of their children has developed an acute and urgent public health problem.

### (B) EAST CENTRAL TEXAS

4. An endemic area of unknown size is reported in east central Texas between Austin and Dallas.

5. Of 13 communities surveyed, only 2 were classified as "border line" and none was classified as "negative."

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### OBSERVATIONS ON THE EPIDEMIOLOGY OF LEPROSY IN HAWAII

A study¹ of some of the epidemiological features of leprosy was undertaken in Hawaii because statistics of the certification of leprous persons and of the general population have been recorded for many years, and the modern development of this insularly isolated community seemed to offer a unique opportunity for such researches. Data have been collected and analyzed and investigations have been made in an effort to contribute to the knowledge of the following aspects of the subject: The trend of the local prevalence or incidence; probable age of infection; ratio of the affection in the sexes; degree of communicability; susceptibility of races; relation of contact with infection to the development of the disease; and the correlation of the economic and environmental status of the affected people with the prevalence of the disease among them.

¹ Leprosy: Observations on its epidemiology in Hawaii. By N. E. Wayson and Theodore R. Rhea. Public Health Bulletin No. 212,

The analyses and deductions are based on the records of admissions to segregation during the period of the last 40 years, upon researches into the occurrence of the disease in 400 to 500 family groups, and upon detailed field investigations of the immediate environmental circumstances of approximately 100 of these families.

The average number and rate of annual admissions from both the general and specific populations have declined rather steadily and continuously. In the decade 1890 to 1900 the annual admission rate per thousand among the native Hawaiians was approximately 3.5, while in the quinquennium 1926 to 1930 it was less than 1 per thousand. This specific group lends itself to more accurate study because its total number has not been directly affected by immigration or emigration during this period. The decrease noted has been proportionately greater in the younger age groups, in which formerly the higher admission rates had prevailed; and it is believed that the declining rate of all admissions reflects a diminished incidence of the This suggested decline in the incidence seems to be consedisease. quent to, or at least coincidental with, general biological and environmental influences which are put in evidence by falling death rates from other causes rather than as a result of specific control measures. During the past 40 years and just prior to the beginning of that period. there were importations of relatively large numbers of people from localities in which leprosy has been endemic for a long time. These immigrations have directly influenced the racial composition of the population and have probably brought about other biological changes It is found that the proportionate distribution of the indirectly. cases of leprosy among the different races has changed, so that in later years approximately 40 percent of the admissions have come from among the people more recently imported, whereas formerly 90 percent of admissions were of the native people.

The incidence of the disease is somewhat higher in certain racial groups, but no evidence is found of a definite racial susceptibility and the disproportions may apparently be attributed with reason to environmental factors which obtain in the different groups.

Inquiries into the frequency of leprosy within family groups in Hawaii reveal the fact that it is readily communicable and that the percentage of those affected in such groups is often greater than that which was found to occur in clinical pulmonary tuberculosis among certain families studied in the United States. Thus, in a total of 996 members of 122 families, in each of which there was more than 1 child, 302 cases of leprosy were admitted during the past 20 years. This represents more than 30 percent of the total family membership. From 14 of these families in which there were 4 or more children 43 percent of the 137 family members were admitted.

Children who are exposed to leprosy when they are younger than 15 years of age are found to be affected more frequently than those individuals who are older when exposed; and the readiness with which they or others develop the disease seems to be influenced by their age at the time of exposure, the period of time through which the exposure prevails, and the intimacy of the exposure. These deductions are supported by the facts that, among 71 families from which a parent or child was admitted with leprosy during the past 15 years, there were 72 children of the age of 0-4 years remaining after the original case was admitted, and 44.4 percent of those children remaining were subsequently admitted; of 64 children of the age of 5-9 years remaining, 32.8 percent were admitted subsequently; of 50 children of the age of 10-14 years remaining, 22 percent were subsequently admitted; and of 27 children of the age of 15-19 years remaining, 11.1 percent were subsequently admitted. After reviewing the statistics of all admissions and the clinical experiences in Hawaii, it appears probable that 40 percent or more of those who develop the disease were infected before reaching 15 years of age.

The rates of admission point to a ratio of infection of about 1 female to 1.5 males.

The incidence of leprosy is higher in the rural sections than in the urban districts; and in the former locations a lower average economic, sanitary, and dietary status prevails among the affected families and a greater frequency of contact with cases occurs within them.

The average economic status of approximately 100 families in which leprosy has occurred is found to be low when measured by local relief standards, and their average dietary is chiefly that of carbohydrates, is low in milk and meat proteins and butter fat, and seemingly low in calcium and vitamins B and C, when comparisons are made with standards regarded as adequate in Hawaii and in continental United States. No direct correlation, however, between the rate of leprosy and these conditions has been determined among this group of families.

### DEATHS DURING WEEK ENDED MAR. 1935

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

	Week ended Mar. 9, 1935	Correspond- ing week, 1934
Data from 86 large cities of the United States:         Total deaths.         Deaths per 1,000 population, annual basis.         Deaths under 1 year of age.         Deaths under 1 year of age per 1,000 estimated live births.         Deaths under 1 year of age per 1,000 estimated live births.         Deaths per 1,000 population, annual basis, first 10 weeks of year.         Data from industrial insurance companies:         Policies in force         Number of death claims.         Death claims per 1,000 policies in force, annual rate.         Death claims per 1,000 policies, first 10 weeks of year, annual rate.	9,060 12.7 665 60 12.9 67,519,370 15,131 11.7 10.9	9, 451 18. 2 687 64 12, 7 67, 571, 251 15, 707 12, 1 11, 0

### **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 Mar. 16, 1935, and Mar. 17, 1934

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 16, 1935, and Mar. 17, 1934

	Diph	theria	Infit	ienza	Me	asles	Meningococcus meningitis	
Division and State	Week ended Mar. 16, 1935	Week ended Mar. 17, 1934						
New England States: Maine New Hampshire	1		15	1	14	30 223 54	0	0
Massachusetts Rhode Island	4 2	13			338 64 878	2,003 5 38	200	0
Middle Atlantic States: New York New Jersey	25 20	35 13	¹ 12 25	¹ 29 13	2, 627 1, 106	1, 223 514	17 2	3
Pennsylvania East North Central States: Ohio	51 60	59 38	149	 1 <b>44</b>	5, 234 1, 148	3, 697 1, 384	3 13	2 2 1
Illinois Michigan Wiseonsin	61 15 6	22 28 10 7	20 70 5 77	37 5 55	3, 202 3, 447 2, 068	1, 419 86 1, 307	25 1 5	1 4 1 2
West North Central States: Minnesota Iowa	1 10	5 6		2 7	1, 599 1, 305	224 160	3 0	0
Missouri North Dakota South Dakota	29 2 8	48 10 2	172 3	153 29 6	892 170 56	1, 010 173 478 257	18 0 0	1 1 0
Nebraska Kansas South Atlantic States:	8 7	3 15 3	14	1	1, 379	257 255 181	3	ŏ
Maryland ¹ District of Columbia Virginia	4 6 26	10 8 21	34 2	25	59 49 1.081	776 606 1, 697	5 9 6	0 0 7
West Virginia North Carolina South Carolina	19 15 2	14 16 17	254 55 334	55 61 757	506 699 46	45 3, 369 572	8 2 1	1 1 0
Georgia ¹ Florida		11 2	225 29	7	100	1, 490 235	0	1

See footnotes at end of table.

### Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 16, 1935, and Mar. 17, 1934.—Continued

	Dipl	ntheria	Infl	uenza	м	easles	Menin men	gococcus ingitis
Division and State	Week ended Mar. 16 1935	Week ended Mar. 17 1934	Week ended Mar. 16 1935	Week ended Mar. 17 1934	Week ended Mar. 16 1935	Week ended Mar. 17 1934	Week ended Mar. 16 1935	Week ended Mar. 17, 1934
East South Central States: Kentucky Tennessee Alabama ³ Mississippi ³	10 15 10 1	25 12 9 8	78 220 303	69 161 125	605 115 373	481 1, 425 832	2 5 2 1	
Arkansas Louisiana ³ Oklahoma ⁴ Texas ³	3 26 4 46	3 26 10 113	106 18 198 737	35 8 78 652	37 241 278 155	374 293 1, 025 3, 106	0 0 5 4	01116
Mountain States: Montana Idaho Wyoming Colorado	· 8	1 5 5	145		273 70 100 893	18 74 54 214	1 0 0 0	000000000000000000000000000000000000000
New Mexico Arizona Utah ³ Pacific States:	7	5	26 53	2 31	35 38 19	124 55 608	3 2 0	000000000000000000000000000000000000000
Oregon California	38	26 26	83 215	87 48	168 885	155 70 1, 363		0
	5/9	0/0	3, 744	2, 704	33, 095	34, 217	159	49
	Polion	oyelitis	Scarle	t fever	Sma	llpox	Typho	id fever
Division and State	Week ended Mar. 16, 1935	Week ended Mar. 17, 1934	Week ended Mar.16, 1935	Week ended Mar. 17, 1934	Weak ended Mar. 16, 1935	Week ended Mar. 17, 1934	Week ended Mar. 16, 1935	Week ended Mar. 17, 1934
New England States: Maine New Hampshire	0	0	15 20	25 12	0	0	20	 1 0
Vermont Massachusetts Rhode Island Connec ieut	0 0 0 0	0 0 0 0	20 277 22 95	18 275 14 92	0 0 0 0	0 0 0 0	0 1 0 0	0 1 0 0
New York. New Jersey. Pennsylvania. East North Central States:	0 0 0	1 0 0	1, 102 190 643	902 206 834	0 0 0	000	7 5 5	10 5 9
Ohio Indiana Illinois Michigan Wisconsin	0 0 1 0 2	1 1 1 0 1	1, 034 212 1, 227 427 523	978 229 663 876 277	0 0 1 0 26	0 2 3 11 35	1 0 12 0 1	2 0 5 0
West North Central States: Minnesota Iowa Missouri North Dakota South Dakota North Dakota	1 0 1 0 0	0 0 2 0	187 83 87 105 10	69 86 125 41 13 29	13 0 4 0 0	3 11 15 4 4	0 1 1 1 0	0 0 1 0
Kansas South Atlantic States: Delawaro Maryland 2 District of Columbia	0 0 1	0	84 27 95 100	111 19 79 14	*1 8 0 0 0	3 0 0 0		
Virginia. West Virginia. North Carolina. South Carolina. Georgia ³	0 0 1 0 0	1 0 1 0 1	85 126 33 4 10 9	45 58 42 5 6 5	0 0 0 2 0	0 0 0 0 0	3 3 0 0 0	2 1 3 5 4

See footnotes at end of table.

	Polion	nyelitis	Scarle	t fever	Sma	llpox	Typho	id fever
Division and State	Week ended Mar. 16, 1935	Week ended Mar. 17, 1934						
East South Central States:								
Kentucky	1	1	24	108	0	6	1 3	
Tennessee	l õ	Ō	33	29	l ŏ	Ž	Ž	
Alabama 3	ŏ	l i	13	12	ž	i õ	ī	
Mississippi 1	Ŏ	Ō	6	25	Ī	l ŏ'	ž	
West South Central States:	i ·	1						
Arkansas	0	0	6	8	1	2	0	1
Louisiana 3	i	Ŏ	30	24	ī	5	ě l	10
Oklahoma 4	ō	ŏ	18	10	ō	3	ž	
Teras !	i	ŏ	84	133	ž	35	12	10
Mountain States	-	, v	0.		•	~		
Montana	0	6	11	18	0	0	0	
Idaho	ŏ	ŏ	-5	2	ŏ	3	ŏ	1 7
Wyoming	ŏ	ŏ	Ř	7	ž	ň	Ň	1 2
Colorado	ŏ	ŏ	307	26	6	15	i i	. 2
New Merico	ŏ	ŏ	7	20	Ă	2	2	
Arizona	ŏ	ŏ	24	20	ī	ō	ā	2
Titah 1	ň	ŏ	94	6	7	ŏ	ŏ	
Pacific States	, i	v	•••	Ű	•	v	, v	
Weshington	0	1	52	60	25	11	2	1
Oregon	ň	Ô	66	31	Ĩ	10	2	
California	9	Ğ	269	207	8	17	Å	
Total	21	20	7, 966	6, 893	169	200	92	118

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Mar. 16, 1985, and Mar. 17, 1984.—Continued

New York City only.
 Week ended earlier than Saturday.

³ Typhus fever, week ended Mar. 16, 1935, 10 cases, as follows: Georgia, 1; Alabama, 2; Louisiana, 1; Teras, 6. ⁴ Exclusive of Oklahoma City and Tulsa.

### SUMMARY OF MONTHLY REPORTS FROM STATES

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

State	Menin- gococ- cus menin- gitis	Diph- theria	Influ- enza	Malaria	Measles	Pel- lagra	Polio- mye- litis	Scarlet fever	Small- pox	Ty- phoid fever
February 1985										
Connecticut Delaware District of Columbia Indiana Iowa Minnesota Nebraska New Jersey New Mexico	2 27 12 10 8 21 6 4	16 67 152 33 40 35 65 28	103 8 18 407 435 107 37 98 352		2, 633 6 39 2, 107 5, 640 8, 924 1, 827 2, 113 81		0 2 2 3 1 3 1	221 74 150 1,069 372 552 154 581 79	0 1 14 12 17 165 0 3	3 0 5 5 6 1 0 3 12
North Carolina South Carolina Tennessee	13 6 39	75 95 64	883 3, 575 1, 654	191 22	3, 058 138 148	5 45 4	1 1 2	136 24 151	0 0 1	5 6 8

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### Summary of monthly reports from States-Continued

February 1935		February 1935-Continu	ed	February 1935-Continu	ued
Actinomycosis:	Cases	German measles-Con.	Cases	Septic sore throat:	Cases
South Carolina	1	New Jersey	. 594	Connecticut	. 15
Conjunctivitis:		New Mexico	. 293	Iowa	. 4
Connecticut	1	North Carolina	. 25	Minnesota	. 3
New Mexico	2	Tennessee	. 4	Nebraska	. 7
Chicken pox:		Hookworm disease:		New Mexico	. 3
Connecticut	622	South Carolina	31	North Carolina	. 8
Delaware	45	Impetigo contegiose:		Tennessee	. 13
District of Columbia	240	Tomo		Trachoma:	
Indiana	526		. 4	New Mexico	. 1
Iowa	196	Tennessee	. 2	North Carolina	. 1
Minnesota	326	Mumps:		Trichinosis:	
Nebraska	222	Connecticut	. 220	Iowa	. 1
New Jersey	1, 753	Delaware	. 28	Minnesota	. 1
New Mexico	114	Indiana	. 69	Tularaemia:	
North Carolina	417	Iowa	. 776	North Carolina	. 3
South Carolina	51	Nebraska	. 225	Tennessee	. 4
Tennessee	153	New Jersey	417	Typhus fever:	
Dengue:		New Mexico	58	North Carolina	. 2
South Carolina	4	South Carolina	. 287	South Carolina	. 4
Diarrhea:		Tennessee	. 84	Undulant fever:	
South Carolina	138	Ophthalmia neonatorum:		Connecticut	. 3
Dysentery:		Minnesota	1	Delaware	. 4
Connecticut (amoebic)	1	New Jersey	6	Iowa	. 5
Connecticut (bacillary)	Â	South Carolina	ğ	Minnesota	. 5
Minnesota (amoebic)	8	Tennessee	5	New Jersey	. 1
New Jersey (amoebic)	ž	Paratyphoid favor		North Carolina	. 2
New Mexico (unspeci-	-	Connecticut	1	South Carolina	. 2
fied)	9	Connecticut	1	Tennessee	. 1
New Mexico (bacillary)	Ř	New Jersey	z	Vincent's infection:	-
Tennessee:	5	Tennessee	1	Tennessee	. 5
Enidemic encephalitis	•	Puerperal septicemia:		Whooping cough:	
Indiana	1	New Mexico.	6	Connecticut	279
Iowa	1	Tennessee	2	Delaware	22
Minnesota	2	Pabies in animals:	-	District of Columbia	10
New Jersev	õ	Tables in animals.		Indiana	150
South Carolina	3	Indiana	38	10wa	47
Food poisoning:	Ŭ,	New Jersey	4	Minnesota	162
New Mexico	1	South Carolina	62	Nebraska	. 23
Cormon massion	-	Rabies in man:		New Jersey	1, 440
Connections	104	Indiana	1	New Mexico	87
Delemen	124	Scables.	- 1	North Carolina	1, 246
Lowo	Z	Terresee	1.	South Carolina.	139
10%8	37	1 ennessee	10	Tennessee	228

### CASES OF VENEREAL DISEASES REPORTED FOR JANUARY 1935

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

	Syp	hilis	Gond	orrhea
State	Cases re- ported dur- ing month	Monthly case rates per 10,000 population	Cases re- ported dur- ing month	Monthly case rates per 10,000 population
Alabama 1				
Arizona	42	93	133	2 04
Arkansas	442	2 36	128	89
California	1.640	2 71	1.388	2 20
Colorado 1	1,010	2.71	1,000	2.20
Connecticut	234	1 42	154	04
Delaware	197	8 17	32	1 33
District of Columbia	151	3 05	122	2 48
Florida	574	3 69	64	41
Georgia	365	1.25	282	. 97
Idaho	0			
Illinois	1, 305	1.67	1, 291	1.65
Indiana	204	. 62	212	. 64
Iowa	148	. 60	172	.69
Kansas	155	. 82	74	. 39
Kentucky	199	. 75	293	1.11
Louisiana	186	. 86	106	. 49
Maine	67	. 84	49	. 61
Maryland	811	4.88	259	1.56
Massachusetts	410	. 95	468	1.09

See footnotes at end of table.

	Syp	hilis	Gond	orrhea
State	Cases re- ported dur- ing month	Monthly case rates per 10,000 population	Cases re- ported dur- ing month	Monthly case rates per 10,000 population
Michigan Minnesota	546 303	1.08 1.17	547 244	1.08
Mississippi	1,070	5.23	1,703	8.82
Missouri	201	1.92	21	1.20
Nabroska	47	. 02	97	80. EA
Nevede 1				
New Hempehire 1				
New Jarsev	510	1.22	246	. 59
New Mexico	74	1.71	36	.83
New York	5, 493	4.24	1,624	1.25
North Carolina	931	2.84	296	. 90
North Dakota	20	. 29	56	. 82
Ohio	777	1.14	213	. 31
Oklahoma	162	. 78	121	. 58
Oregon	71	. 72	80	. 81
Pennsylvania	321	. 33	283	. 29
Rhode Island	98	1.40	112	1.60
South Carolina	315	1.80	414	2. 37
South Dakota	5	. 07	38	. 54
Tennessee	1,010	3. 79	560	2, 10
Texas	184	. 31	46	. 08
Utah 1				
Vermont	19	. 53	29	. 80
Virginia ³	303	1.24	236	. 97
Washington	220	1.38	216	1. 35
West Virginia 1				
Wisconsin 4	38	. 13	111	. 37
Wyoming 1				
Totel	20.379	1.72	13,006	1. 10

### Cases of venereal diseases reported for January 1935-Continued

Not reporting.
 Has been reporting regularly but no report received for current month.

^{*} Incomplete.

• Only cases of syphilis in the infectious stages are reported.

Norg.—Surveys in which all medical sources have been contacted in representative communities through-out the United States have revealed that the monthly rate per 10,000 population is 6.6 for syphilis and 10.2 for gonorrhea.

### WEEKLY REPORTS FROM CITIES

City reports for week ended Mar. 9, 1935

[This table summarizes the reports received regularly from a selected list of 121 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference]

	Dinh-	Inf	luenza	Mea-	Pneu-	Scar-	Small	Tuber-	Ty-	Whoop-	Deaths
State and city	theria cases	Cases	Deaths	sles cases	monia deaths	fever cases	pox cases	culosis deaths	fever cases	cough cases	all causes
Maine:											
Portland	0	1	0	1	4	4	0	0	0	7	31
New Hampshire:								۱ .			
Concord	0		0	0	1	2	0	0	0	0	10
Nashna	0		0	0	0	0	0	0	0	0	0
Vermont:	-									_	-
Barre	0		0	0	0	0	0	0	Q	0	3
Burlington	Ō		0	29	0	9	0	0	0	0	9
Maccochneatte	•		-								
Boston	4		0	25	27	44	0	0	0	25	239
Fall Diver	i î		l ŏ l	70	3	1	0	1	0	8	32
Fail Rivel	ň		Ň	159	i	6	0	1	0	24	31
Wennesten	ŏ		ň	1	10	13	Ó	2	0	13	56
W OFCESVER	v		v	•				-			
Rilode Island:	•		<u>م</u>	٥	0	0	0	0	0	0	19
Pawtucket	Ň		i	50	7	13	ŏ	i	ŏ	8	55
Providence	U			00	• •	10	•	•	•	•	
Connecticut:				1	,	16	0	1	0	0	38
Bridgeport	2		Z		4	10 A	ŏ	1	ň	1Ŏ	
Hartford	0		Ŷ	80	U U				Ň	10	47
H aven	0		1	722	0		v			•	

	Diph	. Inf	luenza	Mea-	Pneu-	Scar-	Small	- Tuber	Ty-	Whoop	Deaths,
State and city	Cases	Cases	Deaths	Cases	deaths	fever cases	cases	deaths	fever cases	cough cases	causes
New York: Buffalo New York Rochester Syracuse New Jersev:	0 18 0 0	20	1 8 0 1	267 702 275 124	26 161 5 6	29 630 18 6	000000000000000000000000000000000000000	7 122 2 1	0 3 0 1	24 247 22 32	• 166 1, 632 73 59
Camden Newark Trenton Ponsylvania	2 0 0	5	0 1 0	0 241 28	4 9 5	4 23 9	0 0 0	1 5 1	0 0 0	5 76 3	47 111 39
Philadelphia Philadelphia Pittsburgh Reading Scranton	4 1 0 0	7 9 	6 1 0	10 737 15 377	51 47 1	111 37 5 2	0 0 0 0	29 3 1	0 0 0 0	91 29 2 6	531 179 25
Ohio: Cincinnati Cleveland Columbus Toledo	7 8 12 0	56 1 	4 0 1 0	3 247 117 49	21 19 7 8	34 40 39 13	0 0 0 0	9 14 4 3	0 0 0 0	2 58 1 4	151 216 88 73
Fort Wayne Indianapolis South Bend Terre Haute Illinois:	1 1 0 0	  1 	0 0 1 0	22 38 10 0	2 21 2 0	2 37 5 0	0 0 0 0	1 4 0 0	0 0 0 0	0 0 0 0	29 23 23
Chicago Springfield	3 0	9	8 1	1, 198 10	65 1	707 11	0	39 0	0 0	81 1	592 25
Detroit Flint Grand Rapids Wisconsin	7 3 0	5 	2 0 0	800 574 78	34 10 2	180 11 10	0 0 0	6 0 1	0 0 0	99 4 9	262 29 34
Kenosha Milwaukee Racine Superior	0 0 0 0	1 1 1	1 1 1 0	323 571 36 298	1 12 0 0	29 234 4 2	0 0 0 0	0 3 0 0	0 0 0 0	8 30 6 1	4 127 10 3
Minnesota: Duluth Minneapolis St. Paul Iowa:	0 2 1	 	0 0 1	0 1, 192 12	3 6 9	3 69 37	0 0 0	0 0 0	0 0 0	0 13 4	26 94 67
Davenport Des Moines Sioux City Waterloo Missouri:	0 4 0 1			1 66 11 1		1 24 1 5	0 0 0 0		0 0 0 0	0 0 3 2	48
Kansas City St. Joseph St. Louis North Dakota:	3 1 12	2 	0 0 0	194 7 11	14 4 8	11 2 20	0 0 0	4 1 5	0 0 1	4 1 5	96 12 184
Grand Forks South Dakota:	0			0		27	0		Ő	<b>4</b> 0	13
Aberdeen Sioux Falls Nebraska:	0			9 0		0 2	0 0		0	4	5
Omaha Kansas:	0		2	28	8	9	4	2	0	0	62
Wichita	0		0	337	4	2	0	2	0	2	36
Delaware: Wilmington Maryland	0		0	2	3	13	0	0	0	2	23
Baltimore Cumberland Frederick	3 0 0	16 1	2 1 0	9 9 0	35 1 1	54 2 2	000	16 1 0	1 0 0	17 0 0	241 19 7
District of Columbia: Washington	13	3	0	32	26	65	0	16	0	4	175
Virginia: Lynchburg Norfolk Richmond Roanoke	0.11.00.00.00.00.00.00.00.00.00.00.00.00	2	0 0 4 1	216 33 113 20	1 8 11 3	5 3 3 1	0 0 0	0 2 3 0	0 0 1	8 16 0 3	11 34 78 27
West Virginia: Charleston Huntington Wheeling	2 1 0		0	29 35 97	1	1 3 23	0	1	0	0 7 8	10 

### City reports for week ended Mar. 9, 1935-Continued

City reports for week en	ied Mar. 9,	, 1935—Continued
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Charles and the second s											
State and city	Diph- theria	Inf	luenza	Mea- ales	Pneu- monia	Scar- let	Small- pox	Tuber- culosis	Ty- phoid	Whooping	Deaths, all
	Cases	Cases	Deaths	Cases	deaths	Cases	C8365	deaths	Cases	Cases	Causes
North Carolina:											
Kaleigh Wilmington	0		0			0 1	0		0	0 8	18
Winston-Salem	ŏ	2	Ŏ	16	ĭ	ī	ŏ	ŏ	ŏ	26	iĭ
South Carolina: Charleston	0	11	0	7	5	3	0	2	1	0	20
Columbia	ŏ		Ŏ	Ó	8	ŏ	ŏ	ŏ	ō	ŏ	48
Greenville	0		0	0	4	1	0	0	0	0	9
Atlanta	5	28	8	1	8	4	0	8	0	1	90
Brunswick	0	18	0	0	0	<b>9</b>	0	0	8	0	6 36
Florida:	v	~	•	•	Ů	•	Ů	-	Ů	-	•••
Miami	2	4	03	1	3	1	0	12	0	8	32
Tampu.c	-	Ŭ	Ŭ	-	-	•	v	-	-	Ů	~
Kentucky:	0	4		2		1	0		0	2	
Lexington	2		0	25	2	Ô	ŏ	0	ŏ	õ	19
Louisville	3	3	0	406	9	29	0	6	0	10	59
Memphis	4		4	2	20	6	0	5	0	7	89
Nashville	0		2	2	10	3	0	1	0	8	58
Birmingham	1	17	5	11	3	4	0	8	0	0	73
Mobile	1		4	24	8	<u> </u>	0	1	8	0	25
Montgomory	v			-		Ŭ,	v		۲,	- 1	
Arkansas: Fort Smith											
Little Rock	1		0	19	1	0	0	1	0	0	3
Louisiana: New Orleans	22	10	7	7	26		0	10	0	0	162
Shreveport	ō		i j	12	10	2	ĭ	2	ŏ	ŏ	47
Texas:		2	2		10				6	1	74
Fort Worth	ŏ		2		9	ő	Ŏ	ō	ŏ	ō	54
Galveston	0		9	0	1	2	0 2	0	<b>9</b>	8	19
San Antonio	4		8	ĩ	11	ĩ	ŏ	δ	ō	ŏ	69
Montana [.]									1		
Billings	4		0	0	0	8	0	0	0	0	12
Great Falls	8		0	76	<b>0</b>	<b>0</b>	0	8	0	2	8
Missoula	ŏ		ŏ		î	ô	ŏ	ĭ	ŏ	i	n
Idaho: Boise	0		0	2	1		0	0	0	0	4
Colorado:	Ĭ				_		<u> </u>		Ĩ		
Denver	5	39	0	332	7	260		0	8 I	9	74
New Mexico:	, i						, i				
Albuquerque	0		1	5	2	2	0	ı,	0	12	15
Salt Lake City	0		1	16	2	82	0	1	0	43	35
Nevada: Reno	ó		0	0	1	2	0	0	0	0	4
	Ĩ		Ť	Ť	- [	-	Ĩ	-	-	-	-
Washington: Seattle	0			50		8	4		0	2	
Spokane	ŏ		0	113	5	ă	ō	1	ŏ	ō	49
Tacoma	0		0	8	4	8	n	0	0	0	24
Portland	0		0	58	5	11	0	2	0	1	98
Ualifornia: Los Angeles	17	80	3	27	17	75	1	17	ol	9	347
			ŏ	26	3	7	ô	2	ĭ	ŏ	28
Sacramento								~ '	A 1		10-

### 452

State and city	Mening	gococcus ingitis	Polio- mye-	State and city	Menin men	gococcus ingitis	Polio- mye-
	Cases	Deaths	Cases		Cases	Deaths	ntis cases
Massachusetts: Boston	1	1	0	District of Columbia: Washington	11	6	0
Connecticut: New Haven     1     1     1     Virginia: Lynchburg       New York:     1     0     0       New York:     13     3     1       Pennsylvania:     1     2     0       Pittsburgh     3     2     0       Pittsburgh     7     1     1       Alabama:     7     1     1	Lynchburg	1	0	0			
	1	Georgia: Atlanta Kentuoku:	1	0	0		
	Louisville	2	0	0			
	1	0	0				
Toledo	ō	1	ŏ	Louisiana:	-	v	Ŭ
ndiana:			•	New Orleans	3	0	0
Illinois:	-	v	U	Dallas	0	1	0
Chicago	14	10	0	Fort Worth	1	0	0
Milwaukee	0	1	0	Denver	0	0	1
Minnesota:				New Mexico:			-
Iowa:	1	1	U	Utah:	1	1	U
Des Moines	2	0	0	Salt Lake City	1	1	0
Missouri: Kansas City	1	0	0	Washington: Sep tle	0		1
St. LOUIS	4	2	0	Sp., Kane	0	1	0
Omaha	0	2	0	Los Angeles	0	0	7
Maryland: Baltimore	1	2	o				

### City reports for week ended Mar. 9, 1935-Continued

Denque.—Miami, 1 case. Epidemic encephalitis.—Cases: New York, 3; Pittsburgh, 1; Cleveland, 2. Pellagra.—Cases: Savannah, 3; Birmingham, 1; New Orleans, 1; Los Angeles, 1; San Francisco, 1.

### FOREIGN AND INSULAR

### MEXICO

Smallpox.—A report dated March 15, 1935, states that smallpox has been reported in Mexico, as follows: During the week ended January 26, 1935, 1 case was reported in the city of Juarez. In the city of Chihuahua, Chihuahua State, 3 cases of smallpox were reported during January 1935, 6 cases during February, and 11 cases during March. Deaths from smallpox were reported during January 1935, as follows: 1 at Saucillo, 2 at Guadalupe, 1 at Carichic, 2 at Batopilas, 1 at Cienega de Ortiz, and 3 at Neoqui. During the month of February 1935 a total of 17 deaths was reported as follows: 3 at Cienega de Ortiz, 5 at Neoqui, and 9 at Villadama. Intense vaccination is being carried on, the entire population of Oja Caliente, Chihuahua State, being vaccinated.

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LERA, PLAGUE, SMALLPOX, TYP)
<b>DLERA, PLAGUE, SMALLPOX, TYP</b>
IOLERA, PLAGUE, SMALLPOX, TYP)
HOLERA, PLAGUE, SMALLPOX, TYP)

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 table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

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

			ţ	t						Weel	t ended	1					
Place	Aug.	26 ⁻ Sept.	26pt. 36pt. 36pt. 36pt. 36pt. 36pt.	28- 28- Nov.		Dece	mber 19	34			lanuary	1935			Februar	y 1935	
	1001 (n=			1001 (1.	1	80	15	ฉ	29	5	12	19	<b>5</b> 8	2	6	16	ន
Ceylon: Colombo																12	5
Peliyagoda																3.o	
	58, 347 29, 409	53, 096 28, 643	19, 160 9, 524	16, 176 8, 550	2, 547	5, 640 2, 829	2, 974	1,962	1, 191	257	2, 005	043					
Bassein			2	133	32	<b>3</b> 3-	13	-01		610	610	5	010	-		610	~~~~
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Domosy Calenta Chittagong Madras Prasidanov	182 6.883	183 183 183 183	110	78 1.901	22 1 80 8	01w	46 3 3 2 452	38	49	53	30 1.553	30	61	8	151	2	179
Madras. C	3, 184 145	1, 095 290 290 290 200 200 200 200 200 200 200	526	895 895 895	469	3	1, 201 3 8 1	10.4	708 8 8 4	- ² 62	911 2 2	1, 114 9 4	91	÷.	2		
Porto Novo		8		1				ρ.			12		-	2	1	п	81
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	5	4		-	4	_			21		Mar. 9
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Indi			Indo		Siam	a 0	μų			-	

• . 11 INI 11 282 & DEBUILD BU TON TOTAL T ¹ Unoider has been reported in Siam as follows: For the week ended Mar. 2, 1935, 13 cases with Bangkok. Siam.

Ĩ	Sel	otem ber	1934	õ	tober 193	*	Nov	ember 1	934	Dec	ember 1	934	Januar	y 1935
F 1808	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	07-11	21-31	1-10	11-20
Indo-China (French) (see also table above): Cambodia ³							60 67							
Cochin-China ¹								69						

³ Reports incomplete.

					PLAG	UEI											
			li [C II	dicates c	ases; D,	deaths	P, pre	sent]									
	July	Aug.	Sept.	Oct.						Wee	s ended	1					
Place	29- Aug.	Sept.	30- Oct. 27,	Nov.		Dece	mber 1	34			January	1935			Februa	y 1935	
	25, 1934	29, 1934	1934	24, 1934	-	80	15	22	29	5	12	19	8	5	6	16	ន
Argentina (see also table below): Santiago de Estero Province -Frias Azores. (See table below.)	0					-	•										
Belgian Congo				14			20			-	5	-					
Ceara State						2	61										
British East Africa (see also table balow): Kenya Uganda	20°	52E	68 -	501	- 83	~ <u>~</u>	19	8	8	11	1	ន	ង	3	16		
Canary Islands: Las Palmas.		8	8	0 2	5	2	9	3	9 -	-	3	87	8	٦ 1	1		
Plague-infected rats China (see also table below): A mov 3		-		5N 679	-										7		
Kangping. ³ Manchuria 4	° 00								*								
Dutch East Indies: Cherlbon Java-Batavia	00		2														1.
West Java	D 1, 721	2,201	1,684	1,668	478	202	517	189									
Ecuador: Celica Punoala and Tiven (meer)						3		3								116	
Egypt: Alexandria-Plague-infected rats	A.	<u>р</u> ,	P.	<u></u> Р,°		A		Α,		<b>P</b> 4		A		<b>A</b>			
Asyut. Beni-Suef Giros				*													
Hawali Territory: Hawali Island—Hamakua district— Kalopa—Plazua-infected rats	)			~									•	•			
Paauhau	οA		<u> </u>														

March 29, 1935

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

Plague-infected rats			-													
Pohakea – Plague-infected rats			-													
Maui IslandMakawao district Kahului 6 (9 miles from) Plague.				_												
infected rats			2													
Paia-Plague-infected rats						_										
India	D 3,032	6, 640 3, 981	5, 642 3, 114	2, 107 2, 424	1, 059	964 587	817 521 55	222 223	1, 300	1, 212 649	1,071					
Bassein. Plague-infected rats	»« د	- ~	- 10	~ <u>`</u>												
Bombay Presidency.	1,46	2, 929	2, 759	2,003	372	300	220	25 21	232	8	251	291	360			
Bombay		2 1 2 1	1, 040	P01 '1	R	0/1	5	12	138	100	148	152				
Plague-infected rats		2														
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Moulmein			3	3	3		<u>.</u>		3	5	3					
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			21	8.8	2 00	1	010		> <		1	-1-	-	99	35	85
Rangoon		~		3	,	2	•		>	4	>	•	 0	25	3	1
Plague-infected rats		,			-				•							
Indo-China (see also table below):																
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Phom. Panh			•			-				-					-	
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Madagascar. (See table below.)																
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Siam: Brochie Merrie Merrie																
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South-West Africa.											·			<u>.</u>		
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Moulmein	c	-														
	D	1											_			
¹ Including plague in the United States al	nd its posse	ssions.	:			i										

⁴ Jurnug the week ended Mar. 2, 1935, 1 fatal imported case of plague was reported at Amoy. China. ³ A report dated Jan. 29, 1935, states that up to Jan. 23, 70 cases of plague with 78 deaths were reported near Kangping, China: the reports also states that up to Jan. 21, 50 deaths from plague were reported in 6 villages of the Fe Wang Fu District, northwest of Kangping. ⁴ A report dated Oct. 30, 1934, states that to Pe Wang Fu District, northwest of Kangping. ⁵ Subangshan 21, Tungingo 41, Kirni Province-Changing 27, Chienan 28, Fuyu 32, Hainking City 1, Nungan 168. ⁵ Up to Jan. 5, 1835, 44 cases of plague were reported at Manabutua, China, as follows: Fengtien Province-Liaoyuan 30, ⁵ Up to Jan. 5, 1835, 44 cases of plague were reported at Manabutua, China.

6 Imported. 7 For 2 weeks.

During the week ended Mar. 9, 1835, 1 plague-infected rat was reported 10 miles from Kahului, Makawao district, Maui Island, Hawaii Territory. • From January to Oct. 31, 1834, 33 cases of plague were reported in Ovamboland, South-West Africa.

¹⁰ For 4 weeks.

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

PLAGUE-Continued

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

Place	Aug- ust 1934	Septem- ber 1934	October 1984	Novem- ber 1934	Decem- ber 1934	January 1935	Place	Aug- ust 1034	Septem- ber 1934	October 1934	Novem- ber 1934	Decem- ber 1934	Janu- ary 1935
Argentina (see also table Arcentina (see also table Acores Acores Britah East Africa (see also table abrev): Uganda. China: Kwangchowan China: Kwangchowan Connoile Contina: China Cambodia Contin-China Contin-China	•••: 88888 88	20 07 01 80			2		Madagascar (central region) C Peru Peru Senegal. Dakar ¹¹	831 274 ° 288	8°°8-1-101 2	21.0 ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °	410 12 22 23 44 33 44 33	387 364 364 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 364 1 366 1 3 366 1 3 366 1 3 366 1 3 366 1 3 3 366 1 3 3 3 3	1 38 12
	ľ												

11 Reports incomplete.

SMALLPOX

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

	July	Ane		Oet					·		Week e	pepu	ŀ				
Place	Aug.	26- Bept.	27, 1984	Nov.		D ecen	nber 191	×		-	January	1935			Februar	y 1985	
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Sergipe State				Α.	Ī	Ī				Ī	Î	Ħ	Ħ		Ī	Ħ	

British East Africa:	-	-	-	•		-	-	-		•						
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Dahomey. (See table below.)										- 11 .			8			1
Dutch East Indies: Balei							_									
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¹ For 2 weeks.								•				•	- ,	-	•	1

. rou a wees. 'A report dated Mar. 7, 1835, states that from Jan. 31, 1835, 20 cases of smallpor were reported at Welitara, Ceylon.

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

SMALLPOX-Continued

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

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March 29, 1935

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Vyasaland. (See table below.) Palestine	0				-								6		4		
Persia Teheran	 	3	2	40		-				ន	11	21					
] ² eru. (S <del>ee</del> table below.)		-	-	-								-					
Poland Portugal (see also table below):			- (														
Disput Operatorio Portuguese East Africa. (See table below.)		1	•	N 1			-		-				İ				
1 For 2 weeks.		0 1001		orllam-													

A report dated Mar. 7, 1936, states that from Jan. 31, 1936, 20 cases of smallpox were reported at Welitara, Ceylon.
 A report states that from February to Sept. 10, 1934, 233 cases of smallpox, with 70 desths, had been reported in Sanoyes, Liberia. All sanitary measures have been taken.
 A report dated Dec. 28, 1934, states that about 48 cases of smallpox, with 70 desths, had been reported in Sanoyes, Liberia. All sanitary measures have been taken.
 A report dated Dec. 28, 1934, states that about 48 cases of smallpox, with 70 desths, had been reported at Allande, Marico.
 A report dated Aug. 27, 1934, states that smallpox has appeared in the suburbe of Maxtellan, Sinalos, Marico; the report also states that 104 deaths from smallpox have occurred in Teitipsc, Oaxaea, Mesico.

<b>FEVER</b> —Continued
AND YELLOW
FEVER,
TYPHUS
SMALLPOX,
PLAGUE,
CHOLERA,

# SMALLPOX-Continued

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

	1			ţ							Week e	nded					
Place	20- 20- 20- 20- 20- 20- 20- 20- 20- 20-	Sept.	30-Oct. 27, 1934	28- 28- Nov.		])ecei	mber 19	34			Januar	1935			Februsi	y 1935	
				1001 114	1	80	15	ន	8	s	13	19	8	8	e	16	8
Salvador Siam Annerob	30	32	5 <b>4</b>	130			121	178		80	~	12	-				
Sierra Leone	80 47	38 <b>8</b>	33	8- 18- 18-	7	- 128	15	- -	13	180		12			3	90	
Sudan (Anglo-Egyptian)	4	1	•				-		11	3	5	20	1	5	2	1	1
Beirut. Damaseus. Provinces. C	32	78	51	33 116 116	89	30 30		4.00	11		6 20	6		9 M	1		
Turkey. (See table below.) Turkey. (See table below.) Union of South Africa. Cuion of Soviet Socialist Republice. (See table Delow.)	<u>р</u>	А,									cu						
On vessels: 8.8. Esthippa at Rangoon from Madras 8.8. Rohne at Penang from Madras 8.8. Esthypura at Rangoon from Madras 8.8. Kroang-Si at Jibuti. 8.8. Vareta at Basra	_		1 Case	Sept. 24 Sept. 24 Nov. 28 Dec. 8	1934 1934 1934 1934 1934	0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	88861s 88861s 88. 7at 88. Aor 88. Aor 88. Aor 88. Aor 88. 7at	Continu ma st H angi st i ang st E ngolia st huta Ma nua Ma	ed. Sydney Sydney fingapor Suez fr ru at St ru at St	ng from V of from V om Au n Fran	ancouv Osaka stralia cisco	-	-	- e.	rresent. 1 case. 1 case. 1 case. 1 case. 1 case.	Jan. Jan. Feb. Mar.	19, 1935 24, 1935 24, 1935 14, 1935 14, 1935 14, 1935

S. S. Ethiopa at Rangoon from Madras	1 CBS6	Sent. 3	1934	S. S. Taima at Hong Kong	Prese
S. S. Ussuri Maru at Kobe from Dairen.	1 case.	Sept. 24	1934	S. S. Aoranoi at Sydney from Vancouver	3
S. S. Rohna at Penang from Madras.	1 case	Oct.	1934	S. S. Hosano at Singapore from Osaka	5
8. S. Erinpura at Rangoon from Madras.	1 Case	Oct. 8	11334	S. S. Mongolia at Suez from Australia.	5
S. S. Kwang-Si at Jibuti	1 case	Nov. 24	1934	S. S. Tatsuta Maru at San Francisco.	5
S. S. Varela at Basra	1 case	Dec. 8	1934	S. S. Tatsuta Maru at San Francisco.	8
¹ For 2 weeks.					
³ Imported.					
¹ For 3 weeks.					

March 29, 1935

Janu- ry 1935	9 
Decem- ber 1934 a	5 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Novem- ber 1934	2288.7 288.7 288.7
October 1934	104 106 104 104 2
Septem- ber 1934	12 29 88 12 88 16 88
August 1934	100 100 60 60 60 80 4 4 4
Place	Lithuania
Janu- ary 1935	31
Decem- ber 1934	280 27 15 280 29 280 29
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October No 1934 be	88 23 ° 23
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August Septem October No 1934 ber 1934 1934 be	66 83 33 100 100 100 100 100 100 100 100 100

### TYPHUS FEVER

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Place	July 20- Aug. 26, 1934	Aug.26- Sept. 29, 1934	Sept.30- Oct. 27, 1934	Ž	quiða	ar 1934			Decen	iber 19	3		Ja	Duary	935		ebrus	ury 193	6
					10	17	*			15		8		5		8			9
Algeria: Algiers Department	1:			3	-	-				5			00						
Bone	1-		r 61				61				0	•	•	• -	 	10 00			9   <b>1</b>
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Bolitan. (See table below.) British East Africa: Uganda	ş 1	3	Ŋ	• 9	•	-	; m		- 19		 N	1					+		1
Bulgaria	1 160	90	2.0.			20			; • • • •	~	-	61			80	61		<u>   </u> r	
Concepcion.	7, 100	2 <b>1</b>	- T O T		Ħ					<u>; ;</u> 3.0		$\frac{1}{1}$	$\frac{1}{1}$				$\frac{1}{1}$		
Santiago.	185	430			$\frac{1}{1}$				35	8				$\frac{1}{1}$					
Valparaiso	21	57	11	10	•		00	97	2	- 97		1			- 9			-	
¹ Imported.										•			•	-	-		-	l	

FEVERContinued	
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PLAGUE,	
CHOLERA,	

TYPHUS FEVER-Continued

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

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Place	July 29- Aug. 26, 1934	Aug.26- Sept. 29, 1934	-Sept.30 Oct. 27 1934		Voveml	ber 1934			Decen	lber 19	34		Jar	uary 19	35	_	ebruar	y 1935	.
				e	9	17	24			15	22	8	-	2	8		•	¥	_
China: Hankow Shankhai									5	-		1							11
Tientsin C Chosen. (See table below.) Colombia														: :					: :
Czechoslovakia. (See table below.) Egypt: AlexandriaC	1								-										6
Beheira Beni-Suef	31	-								~	-	80	<b>ce</b> 0	-			<b>4</b>	50	
Cairo Dakahiiya Damietta	2									-						•	8		• i i
Falyum	8-	~	<u> </u>				9			$\frac{1}{1}$	6					8	88	=	11
Minufiya Minya						-	=  -	-	6	6	=		-	5			-	-	
Port Said	6000						8		1-10	N 0	- 2	-07		3-	g		• •	- s	
Estonia. Greece (see also table below); Salonika						°  1	1 -	«			-		•						-
Linden Baghdad Baghdad Mosul liwa Lish Free State: Waterford County-Lismore. C Italy: Laghorn. C Italy: Laghorn. C	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							· · · · · · · · · · · · · · · · · · ·	-	•		•							
Japan: Aomori Prefecture Kobe																			

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Narasaki				1														:
via. (See table below.) nuania		0	2	6	3	-		1	90	4		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	7		6		4	9
kico: Guadalajara Mexico, D. F Saltillo.		000	34	-80	14			3	18	7							_	:::
San Luis Potosi. Torreon rocco. Setine. Haifa		A00000		31	0110 + 4		- 2	2	6 6	6		5 5	ŝ					
sia. Teheran u. (See table below.) and			<b>6</b> 1 7	10 23	19 18 5	2 4 0 2 1 1 2 1 2	36	4 27 5 29 27	0 5 5 m	-52 38 1 38	33 10	3 <del>3</del> 37	38	21 60 60	10 10 10 10 10	4 8 8	00 0100	:: 12 %
tugal (see also table below): Oporto. Tarouca (near) mania. (See table below.)									67									::::
aus settlements: sungapore lia: Beirut Ms-Jordan												-					<u> </u>	::°
Provinces. Frovinces. revy. (See table below.) tion of South Africa. (See table) tion of South Africa. Jow.) solavia. (See table below.)	below.) s. (Be	e table	- 7	8	-8	1.0	14	2 10 %		<b>x0</b>		6	8		8	101		52
Place	Au- gust 1934	Septem ber 1934	- October 1934	Novem- ber 1934	Decem- ber 1934	January 1935		Id	80 B		Au- gust 1934	Septer ber 193		pe Z	vem- r 1934	Decem- ber 1934	Jan- uary 1935	1
livia	28 88 224	33 31 31 16 33 16	\$% 000000000000000000000000000000000000	දී <del>1</del> පහ සිහා සි	123213 8512 7 8517 8 8517 8 855555555555555555555555555555555555	33	Turkej Union Calon Calon Valon Yugosi	of South of South pe Provin tal ange Free ansvaal ablics	Africa: toe State riet Soo		22 15 11, 297 12, 272 12 12, 272 12, 2	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 0000	16 32 32 32 32 32 32 32 32 32 32 32 32 32	3064433 20 394433 20 3964433 20	32 163 296 296 296		8 8

¹ Imported.

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

## YELLOW FEVER

[C indicate: cases; D, deaths; P, present]

		1	į							A	eek en	- pe						
Place	26-Aug. 25, 1934	Aug.26- Sept. 29, 1934	Sept. 30-Oct 27, 1934		Vovem	ber 1934			Decei	nber 1	34		Jai	uary 1	935		ebruar	y 1935
				ŝ	10	17	24	1	80	15	8	30		1		6 6	<b>a</b>	16
Brazii: Ceara State: Iguatu Mato Grosso State: Coronal Ponce. ¹	1																	
Colombia: Intendencia of MetaRestrepo D French Equatorial Africa: Middle Congo Poin- famoire. ³							ŝ						-					5
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Bathurst											5		-					
Gold Coast: Aperadi								_						5	-			
D Kokobee							-		Ī					-				
Oda. Wenchi						1			Ī								+++++++++++++++++++++++++++++++++++++++	
Avory Coast: Abidian											_						_	
Agooville. Banguoanou		-					Ì	Î							$\frac{1}{1}$	$\frac{1}{1}$		
Bingervine. Dobo-Diolasso • Dobro			(3) 1							$\frac{1}{1}$				•	+		$\frac{1}{1}$	
Diekekro										-								
Gagnos. Ouagadougou. 4 Tireillaur										<u>.</u>		<u> </u>				<u> </u>		<u> </u>
Toumodi									15			-						
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Sierre Leone: Hill Station (near Freetown) U		-			<u> </u>							-			-	
	_	_		-	_	-	-	-	-	-	-	-				1

During the month of October 1934, 1 case of yellow fever was reported at Coronel Ponce, Mato Grosso State, Brazil.
 During the week ended Mar. 16, 1935, 2 cases of yellow fever were reported at Pointenoire, Middle Congo, French Equatorial Africa.
 During the week ended Feb. 23, 1935, 1 case of yellow fever was reported at Bobo-Diolasso, Ivory Coast, and 1 case of yellow fever was reported at Bobo-Diolasso, Ivory Coast, and 1 case of yellow fever at Ouagadougou, Ivory Coast.
 During the week ended Mar. 2, 1935, 1 case of yellow fever was reported at Bobo-Diolasso, Ivory Coast, and 1 case of yellow fever at Ouagadougou, Ivory Coast.

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