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SHADOWED REPLICAS OF TOOTH SURFACES [1]

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Present-day laboratory methods in dental histology and histopathology do not include adequate means for studying the topographical surface of the enamel, its microstructure *in situ*, and especially the minute characteristics of the surfaces of teeth under various conditions in the mouth. The preparation of metal-shadowed collodion replicas makes such investigation possible. This technique provides a means of attack on such important dental problems as: (*a*) The characteristics of normal tooth surfaces, (*b*) the initiation and gradual development of caries, (*c*) the manner in which chemical agents, such as acids and fluorides, hasten or retard tooth disintegration, and (*d*) the effects of dentifrices and abrasives on enamel surfaces.

This work was originally planned as a study of ultrafine structures which might be revealed with the electron microscope. It was soon apparent, however, that there was first much to be learned about the coarse surface details best investigated at lower magnifications. The present paper is a brief description of the technique used to make shadowed replicas of tooth surfaces for examination with the optical microscope, with reproductions of several typical structures thus revealed. Subsequent articles will be devoted to applications to specific problems in dentistry.

Most information about the surface structure of teeth has previously been obtained through the microscopic examination of cross and longitudinal ground sections. There have also been published a few photomicrographs (*1*) obtained with a reflection-type microscope and several electron micrographs (*2*), (*3*), (*4*) of polystyrene-silica (*5*), (*6*) replicas. Since ground sections must be prepared from extracted teeth and since polystyrene impressions must be taken under high pressure and at elevated temperatures, neither method is adaptable to the study of teeth *in situ*.

[1] From the Division of Physiology and Industrial Hygiene Research Laboratory, National Institute of Health.

Satisfactory collodion replicas of tooth surfaces can be made by the following procedure, which is essentially the same whether the replica is to be made from an extracted tooth or from one in the mouth. First the surface is cleaned or treated to the extent desired and then completely dried. A thin film of 2-percent collodion, prepared by diluting 4-percent collodion, U. S. P., with a mixture of equal parts of ether and amyl acetate, is applied to the dry surface with a ball-ended glass rod. After about 15 minutes' allowance for this film to set and dry, a drop of water is placed with a micro pipette at its most accessible edge. The wet edge is gently lifted with a thin knife blade until the film can be grasped with a small pair of pickup tweezers. The replica is then carefully stripped from the tooth. Tooth surfaces are curved, not flat over an appreciable area, and this enhances the natural tendency of these collodion films to curl up when drying. In order to obtain a sufficiently flat replica for subsequent photography the freshly stripped film is placed face up in a drop of water on a clean microscope slide and then spread and flattened with two small pointed manipulators. It has been found convenient to arrange several replicas in this fashion on the same slide. A cover glass is fixed in place over the flattened replicas with cellulose tape. Drying is then allowed to proceed for at least 8 hours at room temperature.

Thoroughly dried replicas are shadowed by oblique metal evaporation under a high vacuum, according to the procedures already described (*7*), (*8*). Silver, and occasionally aluminum, has been used in this work as evaporated metal. The angle of shadowing is such that shadows cast are twice as long as the heights of the details causing them. For shadowing, the protective cover glasses are removed, leaving the replicas undisturbed on their slides. After metal coating, cover glasses with liquid cement applied only to the edges are fixed in place over the finished replicas.

The nature of the information about tooth surfaces which is given by shadowed replicas is best illustrated through a series of typical photographs. To make these pictures, photomicrographic negatives of the mounted replicas were prepared, using achromats and either a 5× or a 10× eyepiece. Since it has been found easier to interpret shadowed micrographs printed as negatives, so that the "shadows" are dark and thus correspond to the normal visual experience when light is the illuminant, intermediate contact positives were made on lantern slides from the original negatives. The final negatives were projection prints from these lantern slide positives.

Figure 1 shows the type of replica commonly obtained from the undamaged enamel of a normal tooth, whether in the mouth or after extraction. The particular area reproduced here is from the labial surface of an extracted upper left lateral. Except for the numerous scratches running in various directions, and appearing as ridges in

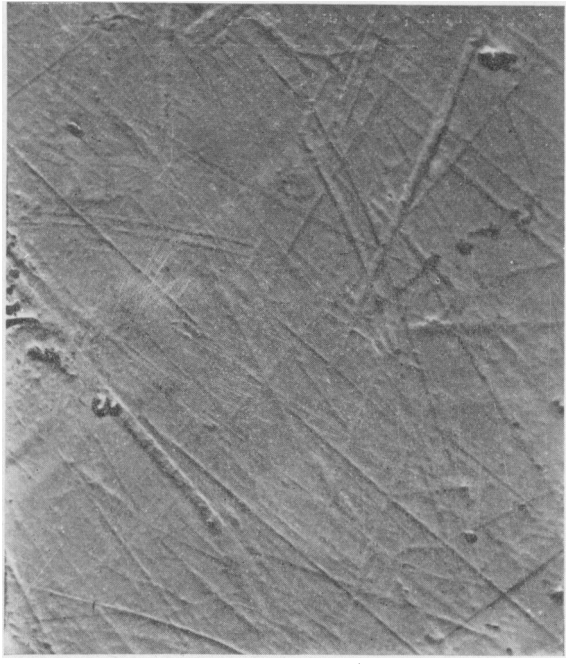

FIGURE 1.—Structureless enamel surface, 435×.

FIGURE 2.—Crack in enamel surface, 400×.

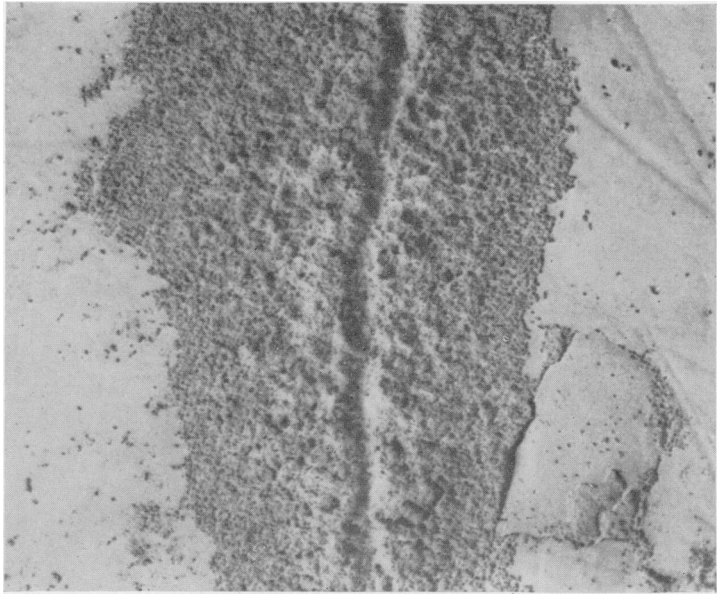

FIGURE 3.—Crack in enamel surface, 435×.

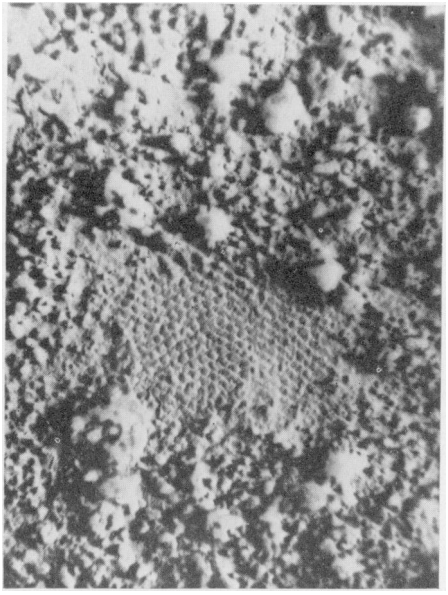

FIGURE 4.—Deep artificial etch, revealing underlying prismatic structure, 220×.

FIGURE 5.—Deep artificial etch, revealing underlying prismatic structure, 900×.

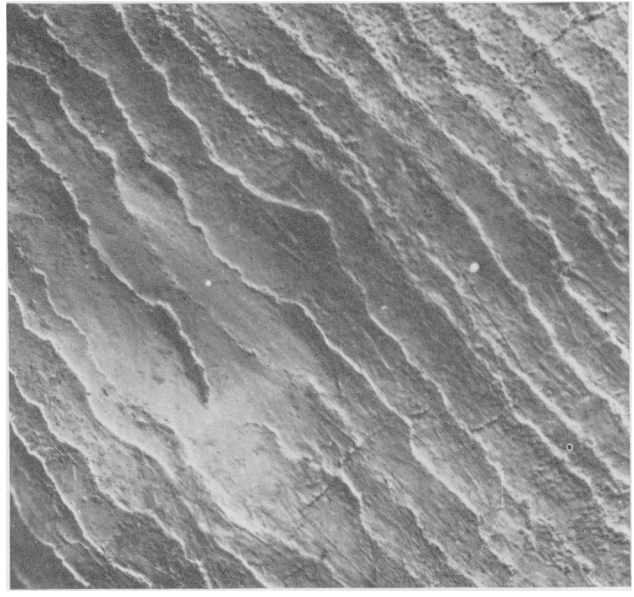

FIGURE 6.—Enamel surface showing perikymata, 105×.

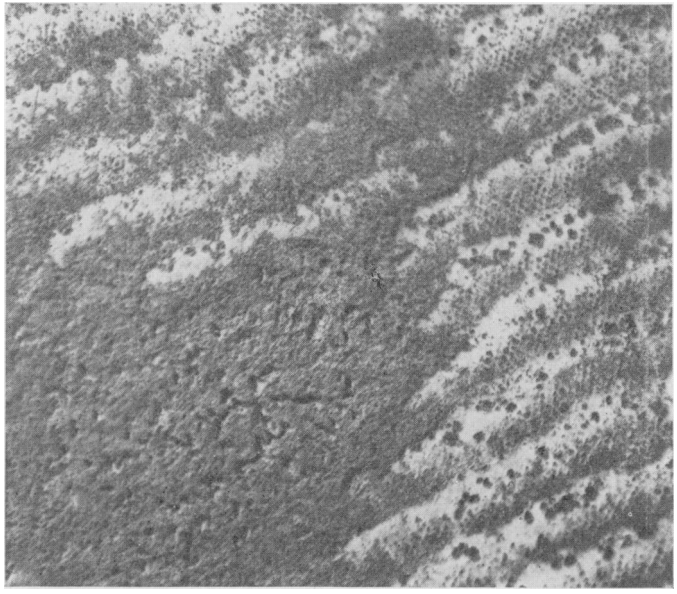

FIGURE 7.—White spot near contact point, 105×.

FIGURE 8.—White spot below contact point, 255×.

FIGURE 9.—Heavily discolored opaque area, 130×.

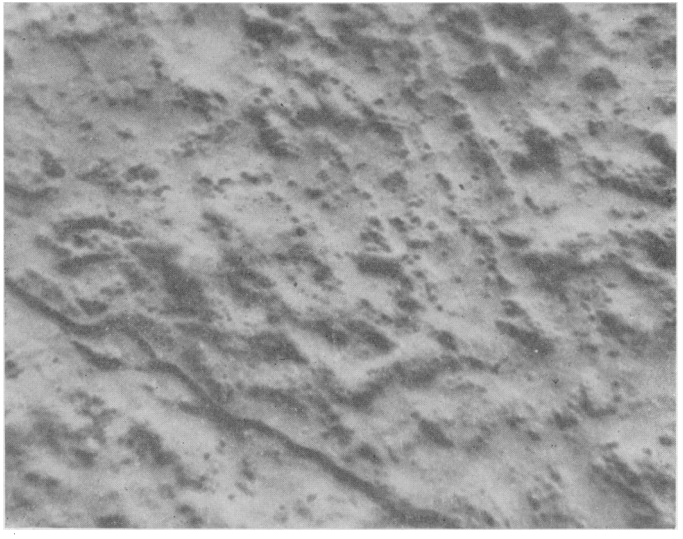

FIGURE 10.—Enamel rod pattern on surface having minute white areas, 1,500×.

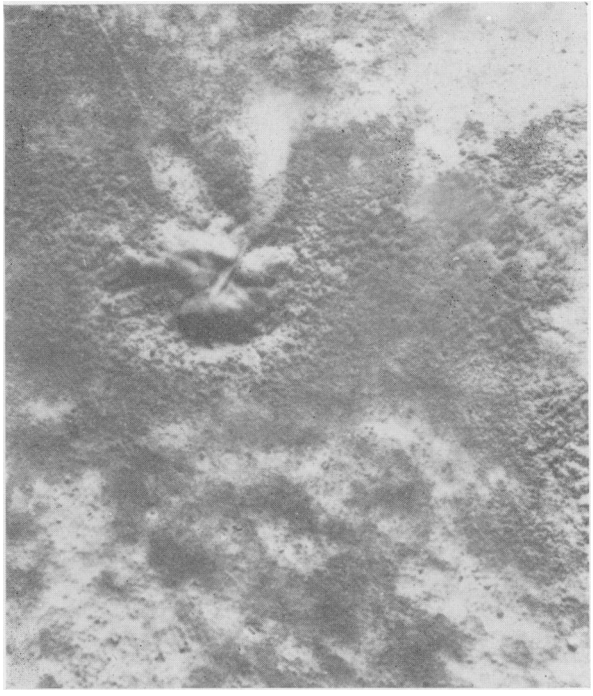

FIGURE 11.—Small pit in opaque-white surface, 150×.

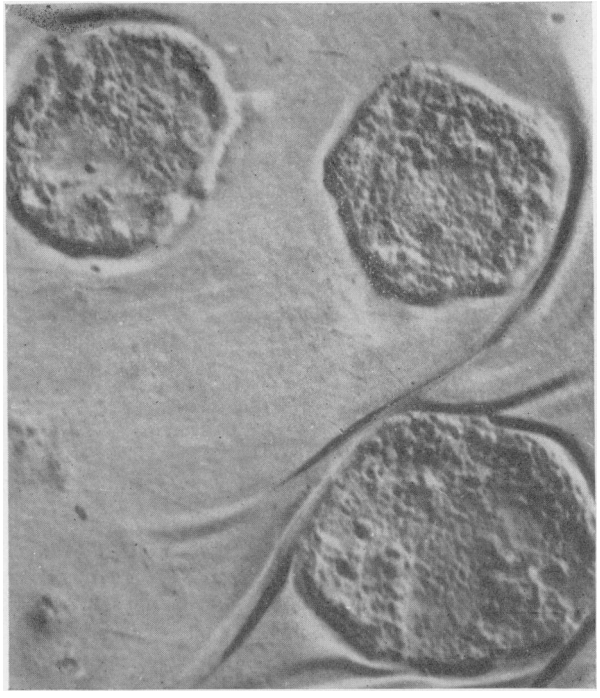

FIGURE 12.—Discrete pits in severely fluorosed enamel, 50×.

the replica, the surface is remarkably smooth with little or no indication of the prismatic structure of the underlying enamel.

A fine crack in the labial surface of an extracted upper right cuspid is reproduced in figure 2. The surface of this tooth was on the whole intact and featureless. The replica of figure 3 was taken from the labial surface of a badly cracked upper right central of one of the workers in the laboratory. The deep fissure, the fine detail in the rough areas on either side of it, and the structureless regions beyond are clearly evident.

Figures 4 and 5 are photomicrographs of replicas taken from surfaces of extracted teeth after they had been deeply etched for 2 minutes with concentrated hydrochloric acid to reveal the underlying prismatic structure of the enamel. Figure 4 shows this prismatic structure over a considerable area of the labial surface of an upper left cuspid. It is interesting to note that even though the entire crown of the tooth was immersed in the acid the decalcification was not uniform. The prismatic structure appears at a higher magnification and in greater detail in figure 5; this replica was taken from the buccal surface of a lower first molar. Succeeding photomicrographs exhibit a variety of stages between the smooth structureless surfaces of the first pictures and these well-defined prismatic patterns.

The replica of figure 6 was taken from the mesial surface of an upper right first bicuspid immediately below the contact point. Although there was no break in the surface detectable with an explorer, the tooth showed a white area originating at the gingival margin of the contact point. Most of the reproduced area is of normal structureless enamel, but the edge of the white spot appears in the extreme right portion of the picture, and it exhibits faintly the fine structure which is so apparent in the etched surfaces. The stratification of the entire surface, which apparently corresponds to the perikymata, is well defined in this picture and in many others.

A more seriously damaged region adjacent to a contact point is illustrated in figure 7. This region, from the distal (bordering on the buccal) surface of a lower right second bicuspid, was opaque white with a central brownish spot, and had no surface breaks detectable with an explorer. A high magnification of the replica from a small white spot occurring just below the contact point on the distal surface of an upper right second bicuspid is reproduced in figure 8.

When regions of heavy discoloration are associated with opacities on tooth surfaces they often yield replicas resembling figure 9, obtained from the distal surface of an upper left central. Although there may not be signs of deep pitting, the detail on these rough areas is readily disturbed by probing instruments, and it is often difficult to be sure whether they represent surface deposits or areas of disintegration of the superficial layers of enamel.

A photograph at high magnification of a surface which showed

minute areas of opacity is shown in figure 10. The ends of the enamel rods and the inter-rod material are clearly visible. This replica was taken from the labial surface of an upper left lateral.

The remaining two photographs show replicas taken from surfaces having visible breaks immediately perceptible with an explorer. Figure 11 is from the buccal surface of an upper right second molar. The entire surface was covered with dull, white opaque areas indicative of either hypocalcification or decalcification, together with numerous pits, several of the larger of which showed the recognized initial stages of caries. The photomicrograph includes one of the smaller of these pits surrounded by an opaque-white region. The surface of a severely fluorosed tooth is pictured in figure 12. This specimen came from a natural fluoride area where the communal water supply contains 3.9 p. p. m. of fluorine. The tooth, a lower left first molar, had a dull, opaque, chalky-white appearance; the buccal surface, represented in part by the replica, had nine discrete pits from 0.5 to 1.0 mm. in diameter. Three of these pits are shown in the photograph, which is not a photomicrograph but a direct enlargement of the replica made on the photoprinter.

SUMMARY

Metal-shadowed collodion replicas can be prepared which reveal the microstructure of the surfaces of teeth *in situ* as well as of extracted teeth. Typical micrographs are presented which show the appearance under the optical microscope of the surfaces of unbroken and of severely etched enamel, of areas of disintegration and probable incipient caries, and of pits caused by excessive amounts of fluorine in drinking water. This experimental technique thus offers a new means of approaching such important dental problems as the changes in tooth surfaces (associated with dental caries attack), and the alteration in structure resulting from the administration of different amounts of fluorine.

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THE PREPARATION OF ANTIGENS FROM YOLK SACS INFECTED WITH RICKETTSIAE [1]

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The preparation of antigens from the yolk sacs of eggs infected with the rickettsial agents has proved somewhat difficult. Use by Craigie (*1*) of diethyl ether as a lipoid solvent as well as a means of selectively removing tissue impurities was a definite advance in the preparation of rickettsial antigens from infected yolk sacs. The demonstration of a soluble antigen released from *Rickettsia prowazeki* when exposed to diethyl ether by Topping and Shear (*2*) added an active fraction that could be extracted from ether-processed yolk sacs. However, it has been found that no single procedure is applicable to all of the various rickettsial agents, therefore several modifications of the original techniques are necessary when working with different agents. For example, a soluble antigen is released by diethyl ether from both murine and epidemic typhus and from Rocky Mountain spotted fever but not from the rickettsiae of Q fever. The usual ether-extraction method fails to release a soluble antigen from both Q fever and tsutsugamushi rickettsiae, yet the method used for the preparation of Q fever antigens is not applicable to tsutsugamushi. It is the purpose of this paper to outline briefly three basic methods for the preparation of rickettsial antigens and to present the results of the three methods when applied to five of the rickettsiae.

MATERIALS

Yolk sacs showing good growth of rickettsiae when suitably stained and examined microscopically were pooled in 500-cc. centrifuge bottles and stored at −45° C. When the accumulated yolk sacs in the pools totaled 100 gm. or more they were thawed and transferred to a Waring Blendor. They were ground without the addition of any liquid with precautions against heating of the blender cup. The homogeneous mass was then divided by weight into suitable containers for further processing.

The Breinl strain of epidemic typhus, the Wilmington strain of murine typhus, the Bitter Root strain of Rocky Mountain spotted fever, the Karp train of tsutsugamushi disease, and an Australian strain of Q fever were used throughout the studies. Homologous antiserums were used in the complement-fixation tests (*3*) for the measurement of the antigenicity of the various fractions. The serums were from guinea pigs which had been infected with guinea pig-passage virus and had never received yolk-sac material.

[1] From the Division of Infectious Diseases, National Institute of Health.

METHODS

Three methods of preparing antigens from infected yolk sacs have been developed. Although they all use diethyl ether in processing the crude material they operate in different ways, and the results differ with the various strains of rickettsiae. The steps taken in the three methods are briefly outlined in the accompanying flow chart (fig. 1). It will be seen that the homogeneous mass which results from thorough grinding in a blender can either be made into a 10-percent emulsion with saline (which may or may not contain formalin), or it may be defatted immediately. If a 10-percent emulsion is made it may be processed in two ways as outlined under methods 1 and 2.

Method 1.—After an adjustment in pH, the emulsion is shaken directly with 1½ volumes of diethyl ether (*4*). The emulsion soon breaks into three distinct phases—a clear yellow ether at the top; an interphase of extraneous material containing some rickettsiae; and the aqueous phase which, with some of the strains, contains most of the rickettsiae plus the soluble antigen released from the rickettsiae by exposure to the ether. If it is desired to separate the rickettsiae from the soluble antigen, this can be done by centrifugation of the aqueous phase.

Method 2.—A preliminary centrifugation is employed to sediment the rickettsiae before diethyl ether is used (*5*). This method allows for the early discard of much of the pigment and soluble proteins of the yolk sacs as well as for concentration of the rickettsiae. The sedimented rickettsiae may be resuspended in any desired volume of saline; one-tenth the original volume for resuspension is used routinely. Again, after shaking with ether, three distinct phases appear; sometimes this separation occurs rather slowly. Another centrifugation may be utilized to separate the rickettsiae of the aqueous phase from any soluble antigen that may have been released by the ether.

Method 3.[2]—Diethyl ether is used in a manner different from the two previous methods described. The ground yolk sacs are placed in 500-cc. centrifuge bottles, and 10 volumes of cold ether is added. The mixture is thoroughly shaken in the cold (4° C.) for 30 minutes to 1 hour. The ether becomes very yellow and on standing a few moments a reddish mass of tissue falls to the bottom of the bottle. The ether is decanted as completely as possible and the tissue washed with cold ether until no yellow color is visible in the ether. Usually once or twice is sufficient. Approximately 1 cc. of sterile distilled water is added for each gram of yolk sac,and the mixture is thoroughly shaken. The ether in solution is removed under a partial vacuum and the tissue suspension allowed to stand overnight in the refrigerator. The next morning it is centrifuged at about 3,000 r. p. m. for

[2] Method 3 is a modification of a method previously described in a paper entitled "A method for the preparation of tsutsugamushi (scrub typhus) antigen from infected yolk sacs." *By* Norman H. Topping and Charles C. Shepard. Pub. Health Rep. (In press.)

DIETHYL ETHER TREATMENT OF YOLK-SAC MATERIAL

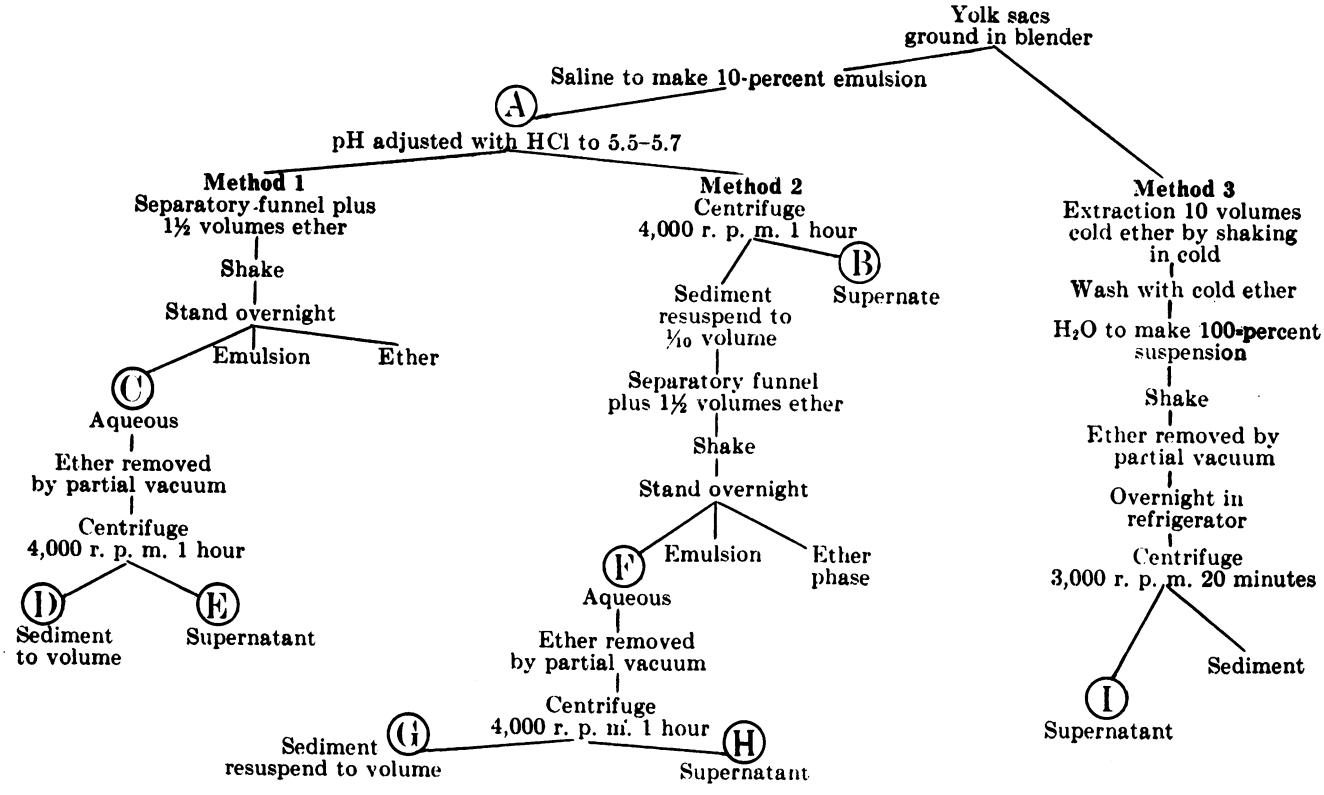

FIGURE 1.--Flow chart: Diethyl ether treatment of yolk-sac material.

20 to 30 minutes. There is a large amount of reddish-brown sediment which occasionally is not too well packed and may be somewhat difficult to separate from the clear red supernatant. With *Rickettsia orientalis* the supernatant is a satisfactory antigen although the sediment contains considerable antigenic material, some of which may be removed by washing with distilled water.

RESULTS

The results of using these three methods with the five rickettsial agents are summarized in table 1. From this it can be clearly seen that any of the three methods of ether extraction releases a soluble antigen from *R. prowazeki*, *Rickettsia mooseri*, and to a much lesser degree from *Rickettsia rickettsii*. The increased antigenicity with these three rickettsiae is almost entirely accounted for in the supernatants after centrifugation. It must be kept in mind however that antigens prepared by method 2 and method 3 are concentrated tenfold when compared to antigens prepared by method 1.

TABLE 1.—*Results of complement fixation with diethyl ether-treated yolk-sac material: End point titers* [1]

Rickettsiae	Crude 10-percent emulsion		Method 1			Method 2			Method 3
			10-percent saline emulsion			Sediment (tenfold concentration)			Cold-ether extraction
	Whole	Supernatant	Aqueous	Sediment	Supernatant	Aqueous	Sediment	Supernatant	
	Flow-chart designation								
	A	B	C	D	E	F	G	H	I
R. prowazeki	1:32	1:16	1:512	1:4	1:256	[2] >1:2048	1:256	1:2048	[2] >1:2048
R. mooseri	1:64	1:8	1:256	1:8	1:256	1:2048	1:256	1:2048	[2] >1:2048
R. rickettsii	1:2	1:1	1:4	0	1:4	1:32	1:4	1:32	1:32
R. burneti	1:8	0	1:4	1:4	0	1:32	1:32	0	1:4
R. orientalis	1:8	1:4	1:4	0	1:2	1:2	0	1:1	1:128

[1] Only 3+ and 4+ reactions.
[2] No end point at given titer.

With *Rickettsia burneti*, however, there was no increase in antigenicity when infected yolk sacs were extracted with ether; in fact it appears that some may be lost. Here there was no antigen demonstrated in the supernatants after centrifugation, the only active fractions being those containing the rickettsial bodies. In method 3 with *R. burneti*, even though there should have been a tenfold final concentration of any soluble antigen, the titer was lower than that of the original material.

R. orientalis differs from the others in that with either method 1 or 2 there is no release of soluble antigen by ether extraction. Here large numbers of rickettsiae go into the interphase, causing a reduction

in titer from the starting material. This is clearly shown in the results obtained with *R. orientalis* in method 2, where, even with a tenfold concentration, the titers are lower than those of the original material. By method 3, however, a satisfactory antigen can be prepared from yolk sacs infected with *R. orientalis*.

DISCUSSION

Fundamental differences in the antigenic constitution of the various rickettsial agents can probably be demonstrated by the methods of ether extraction described. A relatively large amount of soluble antigen can be released by any one of the three methods from *R. prowazeki* and *R. mooseri*. A lesser amount can be released from *R. rickettsii*. No soluble antigen however can be demonstrated after ether extraction of *R. burneti*. These four rickettsiae, however, all remain in the aqueous phase, but *R. orientalis* is attracted to the interphase and leaves the aqueous phase. Further, since methods 1 and 2 fail to release a soluble antigen from *R. orientalis* and the rickettsiae are attracted to the emulsion, neither method is satisfactory for antigen preparation.

Distilled water is used in method 3 to take advantage of the fact that approximately 75 to 80 percent of the protein in egg yolk is vitellin which is a globulin-like protein insoluble in water (*6*). The remaining 20 to 25 percent of protein in egg yolk is mainly livetin which behaves as a pseudoglobulin, soluble in water, and is not removed in the processing as described under method 3. When antigens are prepared according to method 1 (similar to production methods for typhus vaccine) it has been noted frequently that after standing for some time an insoluble sediment appears. This is probably due to the vitellin in saline solution slowly splitting off lecithin and thereby becoming insoluble.

The soluble antigen released by ether from three of the rickettsiae (except that derived from *R. orientalis* processed by method 3) behaves somewhat as a pseudoglobulin. It is soluble in distilled water, physiologic saline, 8 percent cold ethanol, and 20 percent ammonium sulfate. It is precipitated by 40 to 45 percent ammonium sulfate and 25 percent cold ethanol. These differences in solubility allow for further purification and concentration if desired. It has recently been observed that ether used in a similar manner releases a soluble antigen from certain of the gram-negative bacteria (*7*).

Although it has been reported that slight denaturation occurs with ether extraction of *R. prowazeki* (*8*), this has not been of sufficient magnitude to interfere with these antigens in the immunization of animals or man. There have been several reports indicating that ether processing improves the immunogenic properties of epidemic typhus vaccine (*9*). Fractions C, D, and E (see flow chart, fig. 1)

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have all been shown to be effective antigens for immunization of animals (*10*). Fraction H has been shown to produce complement fixing and neutralizing antibodies as well as resistance to challenge with passage virus of epidemic typhus in guinea pigs (*11*). Groups of mice immunized with fractions C through I prepared from yolk sacs infected with murine typhus, when challenged intraperitoneally with the toxic substance from murine-infected yolk sacs, have all shown varying degrees of resistance to the immediate toxic effect as well as to the infection.

With antigens prepared from yolk sacs infected with tsutsugamushi, however, no definite evidence of immunity in mice, when vaccinated subcutaneously and challenged intraperitoneally, has as yet been established. Since the infected yolk-sac material killed with formalin does not immunize either, it is not known whether processing with ether is deleterious to the antigen or whether other factors are operating to prevent demonstrable immunization.

SUMMARY

Three methods for the preparation of antigen from yolk sacs of hen's eggs infected with rickettsiae have been developed. All three methods utilize some of the properties of diethyl ether in the purification of the antigen. No single method is satisfactory for all the five species of rickettsiae studied. The results of antigen titrations against homologous antiserums are presented and discussed.

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THE TROPICAL DISEASE EDUCATION PROGRAM OF THE UNITED STATES PUBLIC HEALTH SERVICE [1]

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At the general meeting in 1944, the American Society of Tropical Medicine adopted the recommendations of its Committee on War and Post-War Problems.[2] This committee was concerned with what the society might do to aid in solving medical problems arising from the return of our military forces who had been in intimate contact with diseases of the tropics in many parts of the world. The diseases considered most likely to constitute a major problem are: (1) Malaria, (2) amebiasis, (3) filariasis, (4) hookworm, (5) leishmaniasis, (6) schistosomiasis, and (7) echinococcosis.

The recommendations specifically requested the Surgeon General of the United States Public Health Service to consider:

(*a*) The organization of several teaching teams to visit State and other laboratories for the instruction of personnel in techniques of the laboratory diagnosis of the common tropical diseases.

(*b*) The dissemination of appropriate articles on the diagnosis and treatment of tropical diseases through its district directors to the practicing physician by means of State and local public health and medical publications.

(*c*) The formation of a library of teaching films on tropical diseases to be loaned to medical societies and other appropriate organizations.

A progress report on the development of this program was given by Dr. R. E. Dyer, Director, National Institute of Health.[3]

Early in November of 1944 the Public Health Service established a small office in Washington under the direction of Dr. L. L. Williams, Jr., who was assigned a parasitologist to assist him in developing the Tropical Disease Education program.

In order to meet urgent needs in the development of an international health program, Dr. Williams was transferred to the State Department early in 1945. On February 21, 1945, the Tropical Disease Education program was transferred to Atlanta, where it was incor-

[1] From the Bureau of State Services, Office of Malaria Control in War Areas, Atlanta, Ga. (Presented at the meeting of the American Society of Tropical Medicine, Cincinnati, Ohio, Nov. 14, 1945.)

[2] War and Post-War Tropical Medicine: Recommendations of the Committee on War and Post-War Problems of the American Society of Tropical Medicine. Tropical Medicine News, 1: 8-11 (October 1944).

[3] The President's message. Tropical Medicine News, 2: 3-4 (June 1945).

porated into the activities of the Training and Education Division of the Office of Malaria Control in War Areas.

The objectives of this program fall generally into two categories: (1) To increase the adequacy of diagnostic facilities in State health department and other laboratories, and (2) to acquaint the practicing medical and public health profession with facts related to the recognition and management of the diseases concerned, and to stimulate them to use the laboratory facilities available for the diagnosis of these diseases. In the development of the program in the Atlanta office, emphasis has been placed on the first of these objectives.

Plans were made to recruit and train ex-servicemen as technicians, who would then be assigned to State health department laboratories. These men were to serve both as diagnostic technicians in the laboratory and to train other technicians throughout the State in the laboratory diagnosis of tropical diseases. It became obvious that the plan to recruit and train veterans was not feasible at that time. Competent personnel was not available, and courses adapted to the specific needs of these veterans were not being offered by universities.

The plan was abandoned in favor of a program offering intensive training in the diagnosis of parasitic diseases to technicians already employed by State and local health department laboratories. At the meeting of the State and Territorial Health Officers in Washington, D. C., on April 10, it was stated that facilities would be developed in the Atlanta office for training technicians in the laboratory diagnosis of parasitic diseases. The first formal course was scheduled to begin on October 1, 1945. Eligible for admission to this course, with travel and per diem allowance, were: (1) Qualified personnel now employed by the Public Health Service, (2) all qualified personnel from State and local health departments and nonprofit institutions or agencies within the State who are certified by the State health officer and cleared with the district director.

The major portion of the effort on the part of those responsible for the development of the program has been expended in procuring space, equipment, materials, and personnel, to offer a first-class course in the diagnosis of parasitic diseases. Early in July Dr. Marion M. Brooke joined the staff of the Training and Education Division to direct the development of this course and other parasitological activities. In August 1945 Surgeon S. E. Miller of the Public Health Service was transferred to Atlanta to direct the Diagnostic and Training Laboratory, of which the training course for technicians is one activity.

On October 1, the initial 6 weeks' course was opened with 24 students from 19 States attending. The first 2 weeks of the course were devoted to the microscopical diagnosis of malaria. The following 4 weeks offered intensive training in the diagnosis of hemoflagellates and filarial worms, techniques of fecal examination, diagnosis of

intestinal protozoa, and the diagnosis of intestinal helminths. Instruction in the diagnosis of malaria was given by Miss Aimee Wilcox of the National Institute of Health Malaria Investigations Laboratory. The remainder of the course was presented by members of the staff of the Diagnostic and Training Laboratory. Due to the excellent cooperation and interest of a number of institutions, a constant source of fresh, living material was available to the students for laboratory study. Thus the students had an opportunity to work with the types of specimens encountered in diagnostic laboratories. The first group of students completed the course November 9. A number of these students have already planned to offer similar training to other technicians in the laboratory where they are employed. Efforts will now be made, through the district directors and State health departments, to inform practicing physicians in those States where technicians have been trained, that a diagnostic service in tropical diseases is available.

This course will be repeated every 3 months as long as such training is desired by State and local health departments. In the near future the course will be made flexible enough to provide short periods of training for those interested only in certain parasitic diseases.

Only a small fraction of public health workers will be able to attend formal courses at any one time. However, the majority of laboratory workers would profit by certain continuing training experiences. In line with this principle, there has been established an extension service of the Diagnostic and Training Laboratory. So far the service has been limited to the sending of stained malaria smears to the various State health departments. A number of local or district health department laboratories have been added to the list and there have been requests from numerous private laboratories to be included in this service. Once a month, two malaria smears, with keys to their correct identification, are mailed to the laboratory directors. These slides are useful in checking the accuracy of the technicians and also are of value to those laboratories where such specimens are rare. The laboratories are permitted to retain the slides as a part of their permanent collection of reference and teaching materials.

The present mailing list includes 105 laboratories in 43 States. The service has been developed through the Public Health Service district offices and in turn through State health departments. The present policy is to include on the mailing list any laboratories recommended by a State health officer. At an early date this extension service will be expanded to include specimens of other parasitic diseases. Comments from the directors of laboratories and from State health officers have indicated that this type of service meets a real need.

The preparation of parasitic specimens for study purposes is not limited to the extension service, but specimens are furnished also to various technical and professional training centers. In the develop-

ment of the specimen-preparation service, the Atlanta office has worked in close cooperation with the Distribution Center for Parasitological Material which has been operating for several years at the Army Medical Center. Early in the year a technician was employed by this office and assigned full time to the Distribution Center. Positive malaria slides of the three common species of *Plasmodium* were furnished to the Center by the Malaria Control in War Areas office and the Malaria Research Laboratory at Columbia, S. C., for redistribution.

To further assist State and local health department laboratories in the diagnosis of parasitic diseases, the Diagnostic and Training Laboratory in Atlanta is now offering consultative diagnostic service. As personnel becomes available it is planned to offer field investigation services whenever outbreaks of tropical diseases occur. A limited service of this type was provided during an outbreak of amebic dysentery in an Alabama institution. Assistance was given by the National Institute of Health and the Atlanta office.

In considering the best approaches to the second major objective, that of acquainting the practicing medical and public health profession with facts related to the recognition and management of the diseases concerned, it was felt that a tropical disease information service would best meet the need. The policy at present is to concentrate on furnishing services to those groups already engaged in professional education. Emphasis has been placed on the development of visual materials which would be useful in teaching tropical medicine in medical schools and in conducting programs on tropical diseases before medical societies and other groups. On July 1, 1945, Senior Assistant Surgeon David S. Ruhe was assigned to develop this phase of work.

A film strip on schistosomiasis has already been completed and a number of other units are now in preparation. To insure the technical accuracy of these units it is our policy to call upon specialists in the various fields to review and approve their content.

In order to have access to clinical cases and laboratory material, the Atlanta office has entered into a cooperative arrangement with Moore General Hospital at Asheville, N. C. The staff at Moore General Hospital, where the Army is concentrating its tropical disease cases, has been most helpful in making available materials for photographing.

With the release of physicians from the armed forces, a large number of well-qualified medical men, with a background of experience in the diagnosis and treatment of tropical diseases, will be scattered over the United States. It is our plan to enlist the aid of these qualified individuals in conducting programs on tropical medicine before their own medical societies. Lantern slides, film strips, refer-

ence digests and other materials will be made available to them for that purpose at the earliest possible date.

The establishment of a library for audio-visual materials is still in a formative stage. A number of other plans to increase the knowledge of, and interest in, tropical diseases are being developed, but the announcement of various services will be delayed until they can actually be offered. The United States Public Health Service will continue to make every effort to meet existing needs by offering appropriate services with the advice and guidance of health departments and professional workers and will join with them in furnishing leadership in meeting any threat, actual or potential, to the health of the Nation from tropical diseases.

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

March 24–April 20, 1946

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State for each week are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4 weeks ended April 20, 1946, the number reported for the corresponding period in 1945, and the median number for the years 1941–45.

DISEASES ABOVE MEDIAN PREVALENCE

Diphtheria.—The incidence of diphtheria continued at a relatively high level, the number of cases (1,274) reported for the 4 weeks ended April 20 being 25 percent above the incidence for the corresponding 4 weeks in 1945 and 40 percent above the 1941–45 median. The number of cases was higher than the median expectancy in each section of the country, but the greatest excesses were reported from the Middle Atlantic and Mountain sections. For the country as a whole the current incidence was the highest reported for this period since 1939 when 1,322 cases were reported for the corresponding 4-week period.

Measles.—The number of reported cases of measles rose from 117,342 during the preceding 4 weeks to 152,615 during the current 4 weeks. For the country as a whole the current incidence was the highest since 1939 when approximately 219,000 cases were reported for the corresponding 4-week period. The New England, West North Central, and East South Central sections reported a relatively low incidence; in the South Atlantic section the number of cases was only

slightly above normal, but in other sections the incidence ranged from 1.3 times the median in the East North Central section to 2.4 times the median in the Middle Atlantic section.

Poliomyelitis.—The number of cases of poliomyelitis dropped from 142 during the preceding 4 weeks to 111 during the 4 weeks ended April 20. The number was less than 90 percent of the 1945 incidence but it was 1.4 times the 1941–45 median. The incidence was relatively high in all sections except the West North Central and East South Central sections. In the Mountain and Pacific sections the numbers of cases were about 3 times the median and in the Middle Atlantic and West South Central sections the incidence was about 2 times the median; smaller increases were reported from the other sections.

DISEASES BELOW MEDIAN PREVALENCE

Meningococcus meningitis.—The cases of this disease dropped from 756 during the 4 weeks ended March 23 to 440 during the 4 weeks ended April 20. The number of cases was less than 70 percent of the 1945 incidence (794 cases) which figure also represents the 1941–45 median for this period. While the current incidence compares very favorably with the 1941–45 median, which contained 3 years in which this disease was unusually prevalent, the number of cases was more than twice the median (approximately 250 cases) for more normal years (1938–42).

Scarlet fever.—The incidence of this disease was also relatively low, the 15,894 cases reported for the 4 weeks ended April 20 being about 75 percent of the 1945 incidence for the corresponding period and 90 percent of the 1941–45 median. Of the 9 geographic sections only 3, the Middle Atlantic, South Atlantic, and Pacific sections, reported an increase over the normal seasonal expectancy. With the exception of the year 1942 when 14,686 cases were reported for the corresponding 4 weeks, the current incidence was the lowest in the 18 years for which these data are available.

Smallpox.—Of the total of 60 cases of smallpox reported for the 4 weeks ended April 20, 38 occurred in the State of Washington. Up to April 20 there were 38 cases reported in the Seattle-King County area; the number of cases, however, dropped from 19 (the highest weekly figure) during the first week of the current period to 4 during the last week. To the same date, 12 cases were reported from California. The outbreak of this disease followed exposure to a case in a soldier returned from the Orient. In all sections except the Pacific the incidence either approximated the 1941–45 median figures or fell below them.

Typhoid and paratyphoid fever.—The number of cases (241) of these diseases was slightly higher than during the corresponding period in 1945, but it was lower than the 1941–45 median (255 cases). The

Number of reported cases of 9 communicable diseases in the United States during the 4-week period March 24–April 20, 1946, the number for the corresponding period in 1945, and the median number of cases reported for the corresponding period, 1941–45

Division	Current period	1945	5-year median	Current period	1945	5-year median	Current period	1945	5-year median
	Diphtheria			Influenza [1]			Measles [2]		
United States	1,274	1,008	903	7,219	7,352	11,488	152,615	16,857	104,80[illegible]
New England	37	32	29	19	147	27	7,487	1,100	8,71
Middle Atlantic	262	129	132	17	30	71	49,711	1,647	20,955
East North Central	205	166	166	276	180	429	35,074	1,528	26,395
West North Central	103	70	70	30	46	189	7,441	686	8,226
South Atlantic	191	131	131	1,975	1,825	3,370	11,886	1,368	11,745
East South Central	90	85	83	375	278	917	3,182	407	3,443
West South Central	177	169	169	3,831	4,277	4,277	11,676	2,730	8,672
Mountain	84	50	50	495	450	681	8,097	1,192	4,643
Pacific	125	176	84	201	119	362	18,061	6,199	7,945
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	550	794	794	111	128	80	15,894	20,892	17,096
New England	28	39	45	3	2	2	1,287	2,211	2,211
Middle Atlantic	140	155	155	19	30	10	6,009	5,679	5,470
East North Central	112	152	152	10	15	7	3,948	5,160	5,160
West North Central	42	72	72	4	5	5	1,194	1,705	1,576
South Atlantic	68	122	122	17	14	10	1,340	1,958	1,120
East South Central	51	68	68	5	30	9	344	509	620
West South Central	48	73	73	21	24	10	314	617	492
Mountain	9	10	10	11	1	4	397	907	855
Pacific	52	103	103	21	7	7	1,061	2,146	841
	Smallpox			Typhoid and paratyphoid fever			Whooping cough [2]		
United States	60	54	96	241	230	255	7,216	10,035	14,201
New England	0	0	0	9	7	12	901	1,124	1,217
Middle Atlantic	0	0	0	23	37	40	1,627	1,997	3,018
East North Central	7	21	21	30	26	27	1,476	1,468	2,902
West North Central	3	12	12	14	5	8	214	243	531
South Atlantic	0	2	3	31	59	63	1,016	1,610	1,610
East South Central	2	3	4	26	25	23	285	297	666
West South Central	4	5	19	73	52	50	848	1,160	1,160
Mountain	2	5	2	15	13	13	378	474	577
Pacific	42	6	6	20	6	17	471	1,662	1,706

[1] Mississippi and New York excluded; New York City included.
[2] Mississippi excluded.

greatest excess over the median was reported from the West South Central section; the Middle and South Atlantic Coast sections reported appreciable declines from the normal seasonal incidence, and in all other sections the incidence was about normal.

Whooping cough.—There were 7,216 cases of whooping cough reported during the current 4-week period. The number was about 70 percent of the number reported for the corresponding period in 1945 and slightly more than 50 percent of the 1941–45 median. The incidence was relatively low in all sections of the country.

MORTALITY, ALL CAUSES

For the 4 weeks ended April 20 there were 36,708 deaths from all causes reported to the Bureau of the Census by 93 large cities. The preceding 3-year average was 37,708 deaths; the number of deaths was below the average during each week of the current period.

INCIDENCE OF HOSPITALIZATION, MARCH 1946

Through the cooperation of the Hospital Service Plan Commission of the American Hospital Association, data on hospital admissions among members of Blue Cross Hospital Service Plans are presented monthly. These plans provide prepaid hospital service. The data cover hospital service plans scattered throughout the country mostly in large cities.

Item	March	
	1945	1946
1. Number of plans supplying data	82	81
2. Number of persons eligible for hospital care	17,046,176	20,585,082
3. Number of persons admitted for hospital care	144,576	180,554
4. Incidence per 1,000 persons, annual rate during current month (daily rate×365)	99.8	103.2
5. Incidence per 1,000 persons, annual rate for the 12 months ended March 31, 1946	103.0	107.8
6. Number of plans reporting on hospital days	25	30
7. Days of hospital care per case discharged during month [1]	8.32	9.17

[1] Days include entire stay of patient in hospital whether at full pay or at a discount.

DEATHS DURING WEEK ENDED APR. 20, 1946

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

	Week ended Apr. 20, 1946	Corresponding week, 1945
Data for 92 large cities of the United States:		
Total deaths	9,003	9,040
Average for 3 prior years	9,201	
Total deaths, first 16 weeks of year	158,475	152,334
Deaths under 1 year of age	621	633
Average for 3 prior years	620	
Deaths under 1 year of age, first 16 weeks of year	9,595	10,044
Data from industrial insurance companies:		
Policies in force	67,197,093	67,223,663
Number of death claims	11,184	14,389
Death claims per 1,000 policies in force, annual rate	8.7	11.2
Death claims per 1,000 policies, first 16 weeks of year, annual rate	11.0	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

REPORTS FROM STATES FOR WEEK ENDED APRIL 27, 1946

Summary

Of the total of 8 cases of smallpox reported for the week, 2 occurred in Washington. The total for the year to date for the entire country is 167, as compared with 175 for the same period last year and a 5-year (1941–45) median of 377. (See p. 721.)

A total of 40,072 cases of measles was reported, as compared with 37,960 last week and 26,526 for the 5-year median. Increases occurred in the New England, Middle Atlantic, South Atlantic, West South Central, and Pacific areas. An aggregate of 21,374 cases occurred in the Middle Atlantic and East North Central areas, practically the same as last week, increases in New Jersey and Illinois being offset by decreases in Pennsylvania and Wisconsin. The cumulative total is 379,228, as compared with 428,804 for the corresponding period in 1944 and a 5-year median of 314,834.

Of the total of 313 cases of diphtheria (as compared with 296 last week and a 5-year median of 211), a larger number than reported for any corresponding week since 1939, Texas reported 31, New York and California 25 each, Maryland 22, and Pennsylvania, Indiana, and Minnesota 16 each. The total to date is 6,177, as compared with a corresponding 5-year median for the period of 4,826. The next largest number reported for a corresponding period in the past 6 years, 5,970 cases, was reported in 1940.

Of the total of 47 cases of poliomyelitis, as compared with 29 last week and 18 for the 5-year median, Florida reported 14, California 8, and New York 6.

A total of 126 cases of meningococcus meningitis was reported, as compared with 112 last week and a 5-year median of 202. States reporting more than 5 cases each are New York (17), Pennsylvania (11), Michigan (6), Alabama (8), Virginia and Texas (7 each), and California (10). The cumulative figure is 3,075, as compared with 4,009 for the corresponding period last year.

Deaths recorded during the week in 93 large cities of the United States totaled 9,448, as compared with 9,082 last week, 9,105 and 9,322 for the corresponding weeks, respectively, of 1945 and 1944, and a 3-year (1943–45) average of 9,504. The cumulative number is 169,248, as compared with 162,732 for the same period last year.

Telegraphic morbidity reports from State health officers for the week ended Apr. 27, 1946, and comparison with corresponding week of 1945 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none was reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45
	Apr. 27, 1946	Apr. 28, 1945		Apr. 27, 1946	Apr. 28, 1945		Apr. 27, 1946	Apr. 28, 1945		Apr. 27, 1946	Apr. 28, 1945	
NEW ENGLAND												
Maine	0	0	0	----	----	1	170	1	84	0	2	3
New Hampshire	0	0	0	----	1	----	31	60	49	2	1	1
Vermont	0	0	0	----	----	----	9	11	109	0	0	0
Massachusetts	4	5	3	----	----	----	2,449	215	1,190	3	6	6
Rhode Island	1	1	1	----	33	----	10	----	4	2	1	1
Connecticut	0	2	1	1	3	----	428	128	447	2	2	2
MIDDLE ATLANTIC												
New York	25	14	14	(1)	[1] 2	[1] 7	5,285	62	1,836	17	19	19
New Jersey	7	1	4	8	5	5	4,531	46	1,505	3	6	6
Pennsylvania	16	3	9	2	1	1	3,829	343	1,297	11	13	13
E. NORTH CENTRAL												
Ohio	13	4	4	6	3	12	730	47	568	4	9	9
Indiana	16	3	5	3	1	5	632	54	198	5	4	4
Illinois	8	4	17	1	1	7	1,213	141	918	5	11	11
Michigan [2]	8	5	5	----	1	1	1,696	169	1,078	6	7	7
Wisconsin	0	2	2	43	54	54	3,458	70	1,703	1	3	3
W. NORTH CENTRAL												
Minnesota	16	4	3	----	----	1	53	10	322	3	1	1
Iowa	6	2	2	----	----	1	268	59	213	0	4	1
Missouri	3	1	1	1	3	3	212	20	308	4	7	7
North Dakota	3	0	1	----	----	4	5	15	45	0	0	0
South Dakota	3	3	0	----	----	----	29	16	20	0	0	0
Nebraska	1	4	3	3	3	3	671	92	255	0	1	1
Kansas	4	2	3	2	----	2	402	64	616	3	4	4
SOUTH ATLANTIC												
Delaware	0	0	0	----	----	----	48	4	15	0	0	1
Maryland [2]	22	14	6	2	3	4	664	25	409	3	4	6
District of Columbia	1	0	0	----	----	----	427	8	132	2	2	4
Virginia	14	11	5	142	70	162	711	66	381	7	7	10
West Virginia	8	3	2	3	2	13	132	45	133	2	2	2
North Carolina	9	5	5	----	----	7	485	33	686	2	4	4
South Carolina	2	8	4	239	258	291	455	53	150	0	2	2
Georgia	2	4	3	5	8	29	262	22	211	0	1	1
Florida	5	6	5	----	1	14	311	28	289	2	11	2
E. SOUTH CENTRAL												
Kentucky	5	4	4	----	----	3	135	28	169	5	5	5
Tennessee	4	3	3	15	30	30	227	70	232	1	6	6
Alabama	3	14	9	11	13	45	143	19	263	8	8	6
Mississippi [2]	6	4	5	----	----	----	----	----	----	0	3	3
W. SOUTH CENTRAL												
Arkansas	3	3	3	44	40	44	149	61	152	2	4	1
Louisiana	6	5	5	47	22	3	287	57	67	0	0	1
Oklahoma	3	3	3	17	17	46	227	33	184	0	1	2
Texas	31	29	28	508	654	711	2,240	654	1,541	7	15	15
MOUNTAIN												
Montana	0	1	2	----	15	15	48	14	115	0	1	1
Idaho	4	0	0	5	1	1	178	52	33	1	2	0
Wyoming	0	0	0	----	----	----	43	14	67	0	0	0
Colorado	6	3	11	10	11	22	1,289	15	308	0	2	2
New Mexico	0	2	2	7	6	5	51	13	72	0	1	0
Arizona	8	0	0	38	85	85	234	27	110	0	0	0
Utah [2]	2	0	0	2	11	5	389	270	154	0	0	0
Nevada	0	0	0	----	217	----	----	2	2	0	0	0
PACIFIC												
Washington	8	2	2	----	----	----	771	241	256	3	3	3
Oregon	2	0	3	6	9	17	398	76	190	0	1	1
California	25	22	18	28	10	80	3,657	1,360	1,360	10	16	16
Total	313	206	211	1,199	1,594	1,741	40,072	4,913	26,526	126	202	202
17 weeks	6,177	4,927	4,826	181,831	57,670	71,036	379,228	49,965	314,834	3,075	4,009	4,009

[1] New York City only.
[2] Period ended earlier than Saturday.

Telegraphic morbidity reports from State health officers for the week ended Apr. 27, 1946, and comparison with corresponding week of 1945 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever [3]		
	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45	Week ended—		Median 1941–45
	Apr. 27, 1946	Apr. 28, 1945		Apr. 27, 1946	Apr. 28, 1945		Apr. 27, 1946	Apr. 28, 1945		Apr. 27, 1946	Apr. 28, 1945	
NEW ENGLAND												
Maine	0	0	0	36	48	23	0	0	0	1	0	0
New Hampshire	0	0	0	16	5	7	0	0	0	0	0	0
Vermont	0	0	0	6	20	10	0	0	0	0	0	0
Massachusetts	2	0	0	183	315	326	0	0	0	1	5	2
Rhode Island	0	0	0	12	27	19	0	0	0	0	0	0
Connecticut	0	0	0	73	83	83	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	6	6	0	705	580	577	0	0	0	1	5	5
New Jersey	0	0	0	170	140	173	0	0	0	3	0	0
Pennsylvania	1	0	0	364	502	502	0	0	0	5	6	3
EAST NORTH CENTRAL												
Ohio	0	1	0	425	397	317	0	0	0	3	4	1
Indiana	0	0	0	100	95	118	1	0	1	3	1	1
Illinois	2	0	0	212	277	277	0	0	1	0	0	1
Michigan [3]	0	1	0	157	251	250	0	1	0	0	1	1
Wisconsin	0	0	0	121	178	178	0	0	1	0	1	0
WEST NORTH CENTRAL												
Minnesota	0	1	0	55	91	72	0	0	0	1	1	1
Iowa	1	0	0	45	59	50	2	0	1	[4] 0	0	1
Missouri	0	0	0	44	82	87	0	0	0	0	0	1
North Dakota	0	1	0	11	35	9	0	0	0	2	0	0
South Dakota	0	0	0	5	17	17	0	0	0	0	0	0
Nebraska	0	0	0	23	113	32	1	0	0	0	0	0
Kansas	0	0	0	38	106	75	0	0	0	1	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	7	7	18	0	0	0	0	0	0
Maryland [2]	0	0	0	51	146	146	0	0	0	2	0	2
District of Columbia	0	0	0	26	23	20	0	0	0	1	0	0
Virginia	0	0	1	135	81	57	0	0	0	0	0	3
West Virginia	0	0	0	28	68	44	0	0	0	0	1	2
North Carolina	1	0	0	45	51	26	0	0	0	1	2	2
South Carolina	0	0	0	8	13	2	0	0	0	2	2	1
Georgia	0	0	0	4	20	18	0	0	0	3	5	5
Florida	14	4	0	5	16	9	0	0	0	3	6	2
EAST SOUTH CENTRAL												
Kentucky	0	0	0	31	71	71	0	0	0	0	10	4
Tennessee	0	1	1	22	45	45	0	0	0	2	3	3
Alabama	0	0	1	48	25	17	0	0	0	0	0	1
Mississippi [3]	0	0	0	5	7	7	0	0	0	1	4	3
WEST SOUTH CENTRAL												
Arkansas	0	0	0	15	6	7	0	0	0	2	0	1
Louisiana	1	0	0	10	15	9	1	1	1	3	7	7
Oklahoma	1	0	0	5	12	12	0	0	0	1	2	0
Texas	4	6	3	41	100	62	0	0	1	13	17	6
MOUNTAIN												
Montana	1	0	0	10	22	22	0	0	0	2	1	0
Idaho	0	0	0	5	37	37	0	0	0	0	2	0
Wyoming	0	0	0	21	5	12	0	0	0	1	0	0
Colorado	3	0	0	39	45	44	0	0	0	1	0	1
New Mexico	0	0	0	10	12	7	1	0	0	0	1	0
Arizona	1	0	0	11	55	12	0	0	0	0	1	0
Utah [2]	0	0	0	31	23	19	0	0	0	0	0	0
Nevada	0	0	0	-------	0	0	0	1	0	0	0	0
PACIFIC												
Washington	1	2	1	12	115	44	2	0	0	1	0	0
Oregon	0	0	0	28	32	16	0	0	0	0	0	0
California	8	4	3	170	426	145	0	[4] 0	0	[4] 5	3	3
Total	47	27	18	3,624	4,899	4,104	8	3	15	65	91	87
17 weeks	651	580	401	59,920	93,945	67,902	167	[4] 175	377	[4] 845	995	1,223

[2] Period ended earlier than Saturday.

[3] Including paratyphoid fever reported separately as follows: Massachusetts, 1; Georgia, 2; Louisiana 1; Texas, 2; Colorado, 1: California 1.

[4] Delayed reports: Iowa, typhoid fever, 21 cases; California, smallpox, 1 case; Camp Beale (Marysville).

Telegraphic morbidity reports from State health officers for the week ended Apr. 27, 1946, and comparison with corresponding week of 1945 and 5-year median—Con.

Division and State	Whooping cough			Week ended Apr. 27, 1946							
	Week ended—		Median 1941–45	Dysentery			Encephalitis, infectious	Rocky Mt. spotted fever	Tularemia	Typhus fever, endemic	Undulant fever
	Apr. 27, 1946	Apr. 28, 1945		Amebic	Bacillary	Unspecified					
NEW ENGLAND											
Maine	25	32	19								1
New Hampshire											
Vermont	25	25	23								1
Massachusetts	*122	129	140		4						3
Rhode Island	7	18	20								2
Connecticut	46	65	65								
MIDDLE ATLANTIC											
New York	149	238	238	1	8		2				6
New Jersey	165	153	153			2	1				1
Pennsylvania	126	205	243								2
EAST NORTH CENTRAL											
Ohio	69	201	190								
Indiana	40	17	39	1							1
Illinois	111	22	72	5	2						14
Michigan [2]	90	72	150		4						
Wisconsin	104	60	119				1		1		8
WEST NORTH CENTRAL											
Minnesota	18	9	40	2			1				5
Iowa	29	5	20	1							2
Missouri	16	19	19						1		
North Dakota		5	3								2
South Dakota		6	6								
Nebraska		12	18				12				
Kansas	18	25	41								2
SOUTH ATLANTIC											
Delaware	1	2	1								
Maryland [2]	14	65	65				1				3
District of Columbia	7	6	22								
Virginia	32	47	62			53		1	1	2	1
West Virginia	29	17	17								1
North Carolina	55	160	160	1						1	
South Carolina	38	92	81	4	17				3	4	
Georgia	9	14	28							3	6
Florida	5	15	23	5						2	1
EAST SOUTH CENTRAL											
Kentucky	8	28	43			2	2				
Tennessee	27	24	42		1	1		1	3	1	
Alabama	13	22	22							3	1
Mississippi [2]										2	5
WEST SOUTH CENTRAL											
Arkansas	7	15	38	1				1	2	1	1
Louisiana	7	14	8	2						2	
Oklahoma	4	8	36								
Texas	229	391	339	10	379	38				23	15
MOUNTAIN											
Montana	3	16	14					2			
Idaho	12	8	2								
Wyoming	1		3					1			
Colorado	53	15	25				1	1			10
New Mexico	5	14	26		1	1					
Arizona	14	35	24			35					
Utah [2]	31	33	47								1
Nevada											
PACIFIC											
Washington	47	29	45								1
Oregon	12	19	28								1
California	90	425	375	2	4					1	5
Total	1,913	2,832	3,889	35	420	132	21	7	11	45	102
Same week, 1945	2,832			40	361	101	4	8	10	61	96
Average, 1943–45	2,902			33	284	87	13	[3] 9	11	[3] 33	
17 weeks: 1946	30,962			643	4,939	1,739	152	21	315	782	1,351
1945	42,080			482	7,463	1,976	114	16	285	821	1,466
Average, 1943–45	47,017		[3]65,384	480	4,806	1,296	164	[3] 24	247	[3]350	

[2] Period ended earlier than Saturday.
[3] 5-year median, 1941–45.

Leprosy: Texas 1; California 1.

* Delayed report: Massachusetts, week ended Apr. 13, whooping cough, 111 cases (instead of 0).

WEEKLY REPORTS FROM CITIES

City reports for week ended Apr. 20, 1946

This table lists the reports from 87 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0		0		0	1	0	3	0	0	4
New Hampshire:												
Concord	0	0		0		0	1	0	3	0	0	
Vermont:												
Barre	0	0		0	1	0	0	0	1	0	0	
Massachusetts:												
Boston	0	0		1	422	1	1	0	34	0	0	8
Fall River	0	0		0	121	0	2	0	0	0	0	2
Springfield	0	0		0	40	0	1	0	11	0	0	
Worcester	0	0		0	290	0	7	0	5	0	0	20
Rhode Island:												
Providence	1	0		0	7	0	2	0	6	0	0	34
Connecticut:												
Bridgeport	0	0		0	1	0	0	0	5	0	0	1
Hartford	0	0		0	2	0	0	0	5	0	0	17
New Haven	0	0		1	59	0	1	0	1	0	0	6
MIDDLE ATLANTIC												
New York:												
Buffalo	3	0		0	188	2	7	0	9	0	0	7
New York	17	2		0	1,447	7	62	1	530	0	2	25
Rochester	0	0		0	766	1	3	0	20	0	0	
Syracuse	0	0		0	39	0	1	0	11	0	0	1
New Jersey:												
Camden	2	0		0	46	1	3	0	3	0	0	4
Newark	0	0		0	1,021	0	5	0	18	0	0	17
Trenton	0	0		0	19	0	1	0	5	0	0	
Pennsylvania:												
Philadelphia	2	0		0	495	4	18	0	50	0	0	9
Pittsburgh	3	0	2	2	12	4	4	0	35	0	1	5
Reading	0	0		1	106	0	3	0	8	0	0	6
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	2	0		0	92	2	10	0	10	0	0	5
Cleveland	0	0	3	2	116	3	5	0	44	0	0	14
Columbus	3	0		0	5	0	3	0	11	0	0	
Indiana:												
Fort Wayne	0	0		0		1	4	0	0	0	0	
Indianapolis	0	0		1	240	0	4	0	18	0	0	15
Terre Haute	0	0		0	5	0	0	0	0	0	1	
Illinois:												
Chicago	0	0	1	0	418	1	32	0	90	0	0	26
Springfield	0	0		0	6	0	2	0	4	0	0	1
Michigan:												
Detroit	1	0		0	629	2	16	0	62	0	0	36
Flint	0	0		0	1	0	2	0	8	0	0	1
Grand Rapids	0	0		0	145	1	1	0	5	0	0	1
Wisconsin:												
Kenosha	0	0		0	27	0	0	0	0	0	0	
Milwaukee	0	0		0	3,012	1	2	0	22	0	0	31
Racine	1	0		0	19	0	0	0	4	0	0	
Superior	0	0		0		0	0	0	1	0	0	1
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0		0	9	0	0	0	1	0	0	3
Minneapolis	2	0		0	8	1	3	0	6	0	0	
Missouri:												
Kansas City	0	0		0	38	0	9	0	12	0	0	
St. Joseph	0	0		0	3	0	0	0	0	0	0	
St. Louis	2	1		0	90	0	7	0	20	0	0	

City reports for week ended Apr. 20, 1946—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	1	1	------	1	39	0	1	0	2	0	0	------
Kansas:												
Topeka	0	0	---	0	7	0	0	0	20	0	0	7
Wichita	0	0	1	0	73	1	4	0	4	0	0	1
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	---	0	42	0	2	0	4	0	0	------
Maryland:												
Baltimore	21	0	------	1	361	2	7	0	32	0	0	6
Cumberland	0	0	----	0	-------	0	0	0	3	0	0	------
Frederick	0	0	---	0	-------	0	0	0	0	0	0	------
District of Columbia:												
Washington	3	0	------	0	269	1	6	0	38	0	5	3
Virginia:												
Lynchburg	0	0	-----	0	20	0	1	0	3	0	0	------
Richmond	0	0	------	1	18	1	1	0	11	0	0	3
Roanoke	0	0	----	0	7	0	0	0	5	0	0	------
West Virginia:												
Charleston	2	0	------	0	-------	0	0	0	1	0	0	------
Wheeling	2	0	---	0	2	0	0	0	0	0	0	24
North Carolina:												
Raleigh	0	0	------	0	31	0	1	0	0	0	0	------
Wilmington	0	0	----	0	10	0	1	0	0	0	0	------
Winston-Salem	0	0	----	0	32	0	3	0	1	0	0	9
South Carolina:												
Charleston	0	0	2	0	27	0	0	0	2	0	0	1
Georgia:												
Atlanta	0	0	------	0	24	0	3	0	1	0	0	------
Brunswick	0	0	------	0	2	0	0	0	0	0	0	------
Savannah	0	0	1	0	2	0	0	0	2	0	0	------
Florida:												
Tampa	3	0	------	0	39	0	0	1	3	0	0	1
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	1	2	53	0	5	0	1	0	1	8
Nashville	0	0	----	1	4	0	0	0	0	0	0	1
Alabama:												
Birmingham	0	0	------	1	23	0	1	0	0	0	0	2
Mobile	1	0	------	0	1	0	0	0	2	0	0	------
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	2	0	------	0	17	0	0	0	1	0	0	2
Louisiana:												
New Orleans	7	0	6	0	21	4	3	2	8	0	3	3
Shreveport	1	0	------	0	-------	0	5	0	0	0	2	------
Texas:												
Dallas	0	0	------	0	48	0	4	0	3	0	0	1
Galveston	0	0	------	0	3	0	1	0	1	0	0	------
Houston	3	0	------	0	11	0	0	0	0	0	3	------
San Antonio	1	0	------	0	22	0	3	0	0	0	0	1
MOUNTAIN												
Montana:												
Billings	0	0	------	0	-------	0	0	0	0	0	0	------
Great Falls	0	0	------	0	2	0	0	0	1	0	0	------
Helena	0	0	------	0	2	0	0	0	0	0	0	------
Missoula	0	0	------	0	-------	0	0	0	0	0	0	------
Idaho:												
Boise	0	0	---	0	-------	0	0	0	1	0	0	------
Colorado:												
Denver	1	0	1	0	821	1	3	0	9	0	0	17
Pueblo	0	0	------	0	40	0	0	0	1	0	1	1
Utah:												
Salt Lake City	0	0	------	0	114	0	2	0	5	0	0	7

City reports for week ending Apr. 20, 1946—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
PACIFIC												
Washington:												
Seattle	1	0	------	0	80	0	3	0	4	4	0	6
Spokane	0	0	------	0	97	0	2	0	5	0	1	3
Tacoma	0	0	------	0	11	0	0	0	1	0	0	5
California:												
Los Angeles	0	0	7	0	419	2	6	1	29	0	1	10
Sacramento	1	1	------	0	185	0	2	0	5	0	0	2
San Francisco	0	0	3	0	170	2	8	0	21	0	1	1
Total	89	5	28	15	13,094	46	301	5	1,311	4	22	425
Corresponding week, 1945	59	------	35	13	1,214	------	366	------	1,545	1	16	672
Average, 1940–45	61	------	99	[1] 29	[2] 6,736	------	[1] 410	------	1,645	0	12	903

[1] 3-year average, 1943–45.
[2] 5-year median, 1941–45.

Anthrax.—Cases: New York 1.
Dysentery, amebic.—Cases: Chicago 1; St. Louis 1; Los Angeles 2.
Dysentery, bacillary.—Cases: Chicago 1; Detroit 1; Baltimore 1; Los Angeles 2.
Dysentery, unspecified.—Cases: San Antonio 13.
Typhus fever, endemic.—Cases: Birmingham 1; New Orleans 4; Houston 1; Los Angeles 2.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1943, 33,978,600)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
			Case rates	Death rates								
New England	2.6	0.0	0.0	5.2	2,465	2.6	41.8	0.0	193	0.0	0.0	240
Middle Atlantic	12.5	0.9	0.9	1.4	1,916	8.8	49.5	0.5	319	0.0	1.4	34
East North Central	4.3	0.0	2.5	1.8	2,904	6.8	49.9	0.0	172	0.0	0.6	81
West North Central	11.3	4.5	2.3	2.3	602	4.5	54.1	0.0	146	0.0	0.0	25
South Atlantic	50.7	0.0	4.9	3.3	1,448	6.5	40.9	1.6	173	0.0	8.2	77
East South Central	5.9	0.0	5.9	23.6	478	0.0	35.4	0.0	18	0.0	5.9	65
West South Central	40.2	0.0	17.2	0.0	350	11.5	45.9	5.7	37	0.0	23.0	20
Mountain	7.9	0.0	7.9	0.0	7,776	7.9	39.7	0.0	135	0.0	7.9	199
Pacific	3.2	1.6	15.8	0.0	1,521	6.3	33.2	1.6	103	6.3	4.7	43
Total	13.7	0.8	4.3	2.3	2,015	7.1	43.3	0.8	202	0.6	3.4	65

PLAGUE INFECTION IN SANTA BARBARA COUNTY, CALIF.

Under date of April 23, plague infection was reported proved, on April 18, in tissue from 1 ground squirrel, *Citellus beecheyi*, shot 1 mile south of Buellton, Santa Barbara County, Calif.

SMALLPOX IN SAN FRANCISCO, CALIF., AND SEATTLE, WASH.

As of April 30 no case of smallpox of local origin had been reported in San Francisco since March 27, the date of onset of the last reported local case. To April 30, 9 cases had been reported in San Francisco, 3 with origin outside the United States and 6 with origin within the city. In addition to these cases, 1 case had been reported in San Diego, with origin in the city, and 3 other cases in the State with origin

outside the United States, making a total for the State of 13 cases—7 in civilians and 6 in the military.

During the 9-day period ended April 29, a change of diagnosis in 2 cases from suspected to definite smallpox and 2 new cases brought the total cases in the Seattle-King County area to 53 (including 1 case of hemorrhagic type from Everett, with onset on April 14), and 1 death on April 29 brought the total deaths from smallpox to 13. Onset of last case was on April 22. In addition to these cases, 1 case each had been reported in Longview, Friday Harbor, and Waterville, apparently not associated with the Seattle cases.

TERRITORIES AND POSSESSIONS

Virgin Islands of the United States

Notifiable diseases—January–March 1946.—During the months of January, February, and March 1946, cases of certain notifiable diseases were reported in the Virgin Islands of the United States as follows:

Disease	January	February	March
Chickenpox	1	3	
Diphtheria			1
Dysentery, amebic			1
Filariasis	2	1	
Gonorrhea	23	28	16
Hookworm disease	11	9	7
Measles		1	
Pneumonia			1
Schistosomiasis	1	1	4
Syphilis	12	8	7
Tuberculosis (pulmonary)			3
Typhus fever (murine)		1	

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended March 30, 1946.—During the week ended March 30, 1946, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		13		99	247	21	23	20	13	436
Diphtheria		7	4	20	9	9	1			50
Dysentery, bacillary				1						1
Encephalitis, infectious								1		1
German measles				36	192	2	1	5	1	237
Influenza		10			11	1			16	38
Measles		123	8	800	1,299	18	30	40	12	2,330
Meningitis, meningococcus					2		1	1		4
Mumps		1	1	83	256	70	20	45	34	510
Poliomyelitis					1					1
Scarlet fever		14	8	88	70	12	15	14	2	223
Tuberculosis (all forms)		3	8	193	63	15	12	15	31	340
Typhoid and paratyphoid fever				9	4	1				14
Undulant fever					2			1		3
Venereal diseases:										
Gonorrhea	1	21	17	64	162	48	51	42	115	521
Syphilis	4	14	2	131	139	15	12	4	30	351
Whooping cough		2		57	43	6		9		117

CUBA

Provinces—Notifiable diseases—4 weeks ended March 23, 1946.—During the 4 weeks ended March 23, 1946, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana [1]	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1		5	7	2	12	27
Chickenpox	1	14		1	1		17
Diphtheria	4	16	5		1	1	27
Hookworm disease		30		2			32
Leprosy		1	13			2	16
Malaria	17	2		2	8	250	279
Measles		1			1	2	4
Poliomyelitis		1			1	1	3
Tuberculosis	23	59	24	33	15	97	251
Typhoid fever	12	69	11	60	17	33	202
Whooping cough			3				3

[1] Includes the city of Habana.

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOWFEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual incidence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during recent months. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

Cholera

China—Canton.—For the period March 21–31, 1946, 27 cases of cholera with 7 deaths were reported in Canton, China.

India—Calcutta.—For the week ended April 6, 1946, 79 cases of cholera with 43 deaths were reported in Calcutta, India.

Plague

China.—Plague has been reported in Fukien Province, China, as follows: Foochow, March 1–31, 1946, 96 cases, 56 deaths; Pucheng, March 5, 1 case; Yungtai, March 22, 1 case; Lienkong, March 25, 1 case; Nanan, March 1–28, 30 cases; Amoy, April 3, 2 cases. During the period March 1–20, 1946, 11 cases of plague with 1 death were reported in the suburbs of Tengchung, Yunnan Province, China.

Egypt—Alexandria.—For the week ended April 20, 1946, 4 cases of plague were reported in Alexandria, Egypt.

Manchuria—Mukden.—For the period February 25 to March 25, 1946, a total of 39 cases of pneumonic plague with 36 deaths were reported in Mukden, Manchuria. These figures include 19 deaths previously reported.

Smallpox

Morocco (French).—Smallpox has been reported in French Morocco as follows: March 21–31, 1946, 105 cases; April 1–10, 1946, 96 cases.

Sudan (French).—For the period March 21–31, 1946, 105 cases of smallpox were reported in French Sudan.

Typhus Fever

Greece.—During the week ended April 20, 1946, 100 cases of typhus fever with 16 deaths were reported in the Department of Xanthi and 1 case was reported in the Department of Zante, Greece.

Morocco (French).—Typhus fever has been reported in French Morocco as follows: March 21–31, 1946, 282 cases, no specific locations being given. For the period April 1–10, 1946, 284 cases of typhus fever were reported in French Morocco including cases reported by regions as follows: Agadir and frontier districts, 5; Casablanca, 61; Fez, 76; Marrakech, 40; Meknes, 59; Oujda, 1; Rabat, 42.

Tunisia.—For the period April 1–10, 1946, 36 cases of typhus fever were reported in Tunisia, including 3 cases in Tunis and 1 case in Sousse.

Turkey.—For the week ended April 20, 1946, 60 cases of typhus fever were reported in Turkey, including 3 cases in Balikesir, 1 case in Icel, and 1 case in Samsun.

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