

# Public Health Reports

Vol. 59 ● DECEMBER 15, 1944 ● No. 50

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## **PATHOLOGIC REACTION IN GUINEA PIGS TO THE HUMPHREYS' VIRUS STRAIN<sup>1, 2</sup>**

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This study was undertaken by Surgeon T. L. Perrin while in the Pathology Laboratory of the National Institute of Health, in cooperation with Associate Bacteriologist E. A. Steinhaus in the Rocky Mountain Laboratory. Both guinea pigs and mice were inoculated intraperitoneally with the Humphreys' virus, at that time thought to be a new virus, and killed after varying intervals by Dr. Steinhaus. He performed immediate autopsies and forwarded the tissues in 3.8 percent formaldehyde solution to Dr. Perrin at Bethesda. Paraffin sections of various organs were prepared and routinely stained with buffered azure eosin and iron hematoxylin-picric acid. Frozen sections of heart, liver, and kidney were regularly stained with oil red O for fats. The ferrocyanide reaction was done on all spleen sections.

Grossly, the principal findings in guinea pigs were enlargement and deepening of color of the spleen, small focal necroses in the liver, enlargement and hemorrhage of inguinal and sometimes axillary lymph nodes, and fluid contents in the gastrointestinal tract. Splenic enlargement was first noted 3 days after inoculation, on the second day of fever. It was never marked, being recorded usually as moderate up to one and one-half times normal, once two times normal. Small white focal lesions in the liver, up to fair-sized areas or necrosis, appeared first in 2 of 3 guinea pigs killed on the third febrile day, or 4 days after inoculation. They were noted in all 3 animals killed on the fourth febrile day, in none on the fifth, larger foci in all 3 on the sixth febrile day, in 2 of 3 killed on the seventh day from onset of fever (8 days after inoculation), and in both guinea pigs killed 9 days after

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<sup>2</sup> Manuscript was completed for Perrin and Steinhaus by Senior Surgeon R. D. Lillie.

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inoculation. Swelling of inguinal lymph nodes was first noted 2 days after inoculation, hemorrhage 5 days after inoculation. Enlargement was slight on the first to third febrile days and was noted only in 4 of 9 guinea pigs; on the fourth and fifth febrile days the inguinal nodes were more or less enlarged and regularly hemorrhagic in all 6 guinea pigs. In animals killed on the sixth day from onset of fever (7 days after inoculation), no inguinal adenopathy was noted, while hemorrhagic inguinal nodes were noted in 4, and axillaries as well in 2 of these, among the 6 guinea pigs killed 8 and 9 days after inoculation. In 11 of the 12 guinea pigs killed 6 to 9 days after inoculation, the gastrointestinal contents were noted as liquid. This condition was not noted in animals killed earlier or in animals inoculated with uninfected spleen tissue and killed after the same interval.

Histologic examination of all but 2 of the experimental animals and of most of the controls was completed by Dr. Perrin, and most of his results tabulated before he was detached for sea duty.

*Brain.*—Slight to moderate focal lymphocyte infiltration of the meninges was noted in 6 guinea pigs, of which 1 was killed on the second day and 1 was a control. Five of these and 1 other showed slight focal lymphocyte infiltration about vessels in the parenchyma, with focal cellular gliosis in 4 of the 7. One of these and 1 other control animal presented granulomata containing encephalitozoa, so that lesions of one sort or another were present in 8 of the 36 brains studied (2 of 9 controls, 6 of 27 inoculated animals). Chorioid plexus was specifically noted as uninvolved in all 36.

*Spinal cord and ganglia.*—The only lesion noted was a bilateral calcification of part of the gray substance in 1 control guinea pig. Ganglia were found in the cross sections of the spinal column in 25 guinea pigs, 8 controls, and 17 inoculated. These also showed no lesions.

*Spleen.*—Splenic follicles showed no particular alteration. Usually a few mitoses were present, and often there was a little phagocytosis of nuclear fragments by follicle phagocytes. Guinea pigs killed 3 or more days after inoculation presented moderate to fairly marked congestion of pulp and sinuses, and with this there was a considerable increase in numbers of polymorphonuclear leucocytes and much phagocytosis of nuclear fragments by swollen pulp and sinus reticulo-endothelial cells. The amount of yellowish-brown pigment also seemed increased in the same period, more in animals killed 5 to 9 days after inoculation, and then it was usually at least partly iron positive with acidulated potassium ferrocyanide. In later stages some peritrabecular and diffuse lymphoid cell infiltration was seen, but this was less than in control animals and megakaryocytes did not appear.

*Vertebral marrow.*—This was usually quite cellular. The cell picture was in general similar in experimental and control animals and focal lesions were absent during the first 3 days after inoculation. In animals killed 4 to 6 days after inoculation considerable numbers of pyknotic and fragmenting nuclei with cell necrosis and irregular cell depletion were seen. Adult polymorphonuclears continued present in usual numbers. Lesser similar changes were seen 7 and 8 days after inoculation in some animals, and thereafter the marrow appeared normal.

*Lymph nodes.*—Usually some mitoses and some phagocytic reticulum cells were present in the follicles in both cervical and mesenteric lymph nodes, in control as well as in experimental animals. Moderate to rather marked sinus dilatation was noted, more in mesenteric nodes, and was accompanied by more or less prominence of sinus endothelium. In mesenteric nodes the controls showed a similar status, but in cervical nodes sinus endothelium was more prominent in experimental than in control animals. More or less congestion was evident in mesenteric but not cervical nodes in animals killed 3 to 8 days after inoculation. Erythrophagia was rarely seen in cervical nodes, more often in mesenteric, and in these chiefly in animals killed 7 and 8 days after inoculation. Abscesses were seen in cervical nodes in 2 guinea pigs, 8 and 9 days after inoculation, but such lesions are not infrequent in guinea pigs.

*Submaxillary glands.*—These glands presented periductal and, less often, interstitial lymphocyte infiltration, perhaps more often in animals killed during the first 3 days of fever than thereafter, but also in control animals in equal grade though apparently less often. Intranuclear inclusions in duct cells of serous lobules were noted in 14 guinea pigs, of which 1 was a control animal.

*Pancreas.*—In 2 guinea pigs the pancreas presented focal lymphocyte infiltration and absence of secretion granules was noted in 1. These changes are probably not significant.

*Liver.*—Slight to moderate or even fairly pronounced congestion was noted in most of the inoculated animals. Slight portal lymphocyte infiltration was present in many, both controls and inoculated guinea pigs. The control animals usually showed only traces of fat in liver cells, or none, while in the experimental series, except for 2 guinea pigs killed 1 and 2 days after inoculation, there was a more or less severe, usually diffuse, loading of liver cells with fine and medium fat droplets. While occasional foci of coagulation necrosis were seen in the livers of 2 of the 10 control animals, and such may be found not infrequently in guinea pigs, the occurrence of liver necrosis in the experimental animals of this series is too great not to be significant. They were absent in 6 of 9 guinea pigs killed 1 to 3 days after inoculation and in 1

each killed 4 and 9 days after. The remaining 19—1 each 1, 2, 3, and 9 days after inoculation; 2, 4 days after; 3 each 5, 6, and 7 days after; and 4, 8 days after inoculation—all showed more or less numerous foci of coagulation necrosis. In the earlier examples polymorphonuclear and lymphocyte infiltration were often noted among coagulated cells, some, fibroblast proliferation was evident by the fourth day, and calcification and hyalinization of necrotic cells appeared on and after the fifth day. The proliferative reaction proceeded later to partial replacement of necrotic foci, and the fibroblasts were sometimes foamy and laden with fat droplets.

*Stomach.*—Occasional foci of cellular infiltration in various layers were observed in 3 control and 6 inoculated animals. One guinea pig (ninth day) showed focal hemorrhage and a small area of coagulation necrosis in antral mucosa. The significance of all of these changes is dubious.

*Intestine.*—Sections of colon or small intestine generally showed no lesions.

*Peritoneum.*—Omentum, mesentery, and broad ligament often presented patches of interstitial infiltration by lymphocytes, monocytes, and sometimes polymorphonuclear leucocytes. Infrequently mesothelial proliferation of slight grade was noted, and sometimes interstitial fibroblast proliferation. Such changes occurred both in inoculated and in control animals, and perhaps more often in those animals injected intraperitoneally 1 to 4 days previously than in those surviving 5 to 9 days. They may be related rather to the introduction of foreign material into the peritoneum than to the specific infection.

*Kidney.*—Congestion of slight to moderate grade was noted, most in animals killed 3 to 5 days after inoculation. Degenerative tubular changes were slight, chiefly manifest by the appearance of fat droplets in the epithelium of the cortical tubules, often in fair numbers, and tending to be patchy and irregular in distribution. It involved sometimes especially collecting tubules, sometimes deep convoluted. Intratubular exudate was more common in the later survivors; epithelial degeneration and necrosis of a few cells were seen in occasional animals throughout the course of the disease. Foci of medullary calcification were seen in 2 control and 2 inoculated animals.

*Adrenal.*—Congestion was noted between the third and eighth days; occasional patches of lymphocyte infiltration in the medulla were observed (6 guinea pigs). The cytoplasmic oxyphilia and partial cell separation observed in the reticular zone of the cortex in a number of guinea pigs occurred also in some of the controls, and this alteration may be artefact.

*Testicle.*—In the 13 males no significant changes were noted.

*Ovary.*—No lesions were noted, aside from thecal epithelial degeneration in 1 inoculated and 1 control animal.

*Uterus and cervix.*—In the 24 females no consistent lesions were noted.

*Urinary bladder.*—Focal lymphocyte infiltration of the mucosa was noted in 2, subepithelial edema, serosal thrombosis, and focal mucosal hemorrhage in 1 guinea pig each.

*Heart.*—Focal epicardial, interstitial, and endocardial lymphocyte infiltration and fibroblast proliferation in varying location and measure were observed in all animals, inoculated and controls, without appreciable significant differences. Fine fat droplet deposition in muscle fibers, slight to quite pronounced in grade, was seen in 14 of 26 inoculated and in none of 8 control animals. No frozen sections were made from 3 hearts.

*Lung.*—Peribronchial, periarterial, and interstitial lymphocyte infiltration with patchy septal thickening and focal alveolar exudates of varying character were absent in 1 inoculated and 1 control animal of the 36 from which lung sections were made, and among the animals with lesions it was not possible to distinguish controls from inoculated animals by quantity or character of the changes.

*Thyroid and parathyroid.*—No significant changes could be discerned in 15 thyroids from 11 inoculated and 4 control animals. There were no lesions found in the 9 parathyroids (5 inoculated, 4 controls).

*Thymus.*—Imbedded in the salivary gland there is usually a mass of thymic tissue with characteristic cortex and medulla. The latter contains concentric epithelial masses which often show some parakeratosis, sometimes also polymorphonuclear infiltration, karyorrhexis and central necrosis. These changes in the epithelial bodies are often seen in a variety of other conditions as well as in the control and inoculated animals of the present series.

Appearing in 1 of 3 animals 4 days after inoculation and in all inoculated animals thereafter, and in no control animals, was a patchy to diffuse degeneration of the thymic cortex. In this process there was pyknosis and karyorrhexis of thymic cortical small cells, perhaps in less extensive degenerations more pronounced at the inner border of the cortex. Sometimes, too, adjacent to small clear spaces in the cortex were closely packed collections of nuclear fragments grouped about a single, well-preserved, leptochromatic nucleus of reticulo-endothelial cell type, suggesting phagocytosis. Such phagocytes were scattered throughout the cortex, but seldom appeared in the medulla. In some animals the process resulted in diffuse karyorrhexis of the greater part of the cortex.

*Skeletal muscle.*—In one section from 1 guinea pig there were 2 areas of quite severe degeneration, atrophy and necrosis of muscle fibers with some nuclear multiplication, interstitial fibroblast prolifer-

ation, and definite fibrosis. As this was found in an animal inoculated 7 days previously, its relation to the infection under study is dubious. In other inoculated and control animals a few foci of slighter similar degeneration were noted.

#### DISCUSSION

Infection with the Humphreys' virus strain in guinea pigs is characterized by fatty degeneration and focal necrosis of the liver, some fatty degeneration of kidney tubules and heart muscle, and diffuse cellular necrosis in spleen pulp, bone marrow, and thymic cortical tissue. In liver and spleen, polymorphonuclear infiltration attended the earlier stages of necrosis. Calcification was prominent in later stages of the liver necrosis.

Since it has been suggested that Humphreys' virus is a strain of lymphocytic choriomeningitis, it may be pointed out that fatty changes and focal necrosis of the liver in monkeys with choriomeningitis have been reported by Lillie, and that similar changes in mice have been observed by him. The latter species also showed fatty degeneration in the kidneys. Lillie and Armstrong reported in a study done in 1936-7, but not published at that time, that there were frequent foci of necrosis and granulomatous reaction in guinea pigs. Calcification was not noted and fatty changes were less conspicuous than in the present series. However, it is to be noted that choriomeningitic mouse livers which are heavily loaded with fat droplets by the present supersaturated isopropanol technique, are often fat-negative by the Herxheimer method which was in use at that time.

The diffuse necrosis seen in this series in thymic cortical tissue, spleen pulp, and bone marrow, was absent in Lillie and Armstrong's guinea pigs as well as in monkeys and mice. However, the early polymorphonuclear and later pronounced reticulo-endothelial and lymphoid cell reaction in the guinea pig spleen pulp are comparable to the present series, though there was little necrosis.

The virtual absence of meningeal lesions and almost complete lack of chorioidal foci in the present series contrasts with their presence in intracerebrally inoculated mice and monkeys reported by Lillie, and, more significantly, as their guinea pigs were inoculated subcutaneously or intraperitoneally, with the relative frequency of meningeal and plexal lesions found by Lillie and Armstrong.

In this series cardiac and pulmonary focal lesions were relatively dubious and inconspicuous; in Lillie and Armstrong's series they seemed relatively much more conspicuous, as also in Lillie's report on monkeys.

Focal infiltration by lymphocytes was prominent in Lillie's monkeys in kidneys, epididymis, uterus, and tube. Lillie and Armstrong

reported similar infiltrations in guinea pigs in the kidney, bladder, and epididymis, together with severe testicular degeneration. Such infiltrations were relatively inconspicuous in the present series, and testicular degeneration was infrequent and inconspicuous.

These findings indicate a considerable difference in organ pathogenicity between Humphreys' virus and Armstrong's lymphocytic choriomeningitis strain. This would tend to dispute rather than support a thesis for the identity of the two virus strains, but the differences may be at least partly assignable to a virulence differential of similar virus strains rather than to distinct and unrelated viruses.

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## NOTES ON STATE LEGISLATIVE PROVISIONS FOR THE TEMPORARY LICENSING OF PHYSICIANS<sup>1</sup>

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This paper presents a brief analysis of State provisions for the temporary licensing of physicians, including new legislation enacted during 1943. The material is of current interest because of the part played by State licensure laws in restricting the interstate exchange of medical personnel and thus, in many instances, preventing the relocation of physicians to communities affected by wartime shortages of medical services. Furthermore, after the war licensure restrictions may impede the relocation of physicians discharged from the armed forces.

During the early part of 1942, various public and private agencies concerned with medical care sought to remove some of the legal restrictions imposed by State licensure laws and began to give special consideration to the possibility of temporary licensure for the period of the emergency. By October of that year, the Procurement and Assignment Service for Physicians, Dentists, and Veterinarians, in consultation with the Section on Federal-State Relations of the Department of Justice and other interested parties, had drafted a

<sup>1</sup> From the Division of Public Health Methods.

model bill for presentation to the State legislatures. The bill authorized, and provided for, the temporary admission of out-of-State physicians to practice within a State. Approval was given to the model law at a joint meeting of the Directing Board of the Procurement and Assignment Service and the Executive Committee of the Federation of State Medical Boards held in early December. It was agreed, however, that wherever possible existing provisions for reciprocity between States and for interstate endorsement should be utilized. The legislation proposed or enacted as a result of this activity is described below.

Even before Pearl Harbor there were 11 States (Arizona, Arkansas, Florida, Georgia, Indiana, Kansas, Louisiana, Mississippi, Montana, New Mexico, and South Carolina) whose medical practice acts contained provisions for temporarily licensing physicians. (See table 1.) In most of these States the license is valid only from the date of issuance until the next regular meeting of the State examining board, and individuals applying for such temporary permits or certificates must have the same qualifications as applicants for permanent licenses. Ten of the acts allow the holders of temporary licenses to practice anywhere within the State, but the Arizona law limits the area of practice to a community where the applicant's services are needed in an emergency.

There are certain provisions of the medical practice acts of four other States (Kentucky, New Hampshire, New Jersey, and West Virginia) which, if broadly interpreted, might be used as a basis for authorizing the admission of physicians into those States to practice for a limited period. The Kentucky law<sup>2</sup> provides that the State board of health may grant to qualified persons a limited certificate to practice general medicine in a county or counties of the Commonwealth where it appears to the board that physicians are needed. The certificates are valid for a period of 5 years, unless revoked sooner, and are renewable at the discretion of the board. By an amendment to the statutes enacted some 15 years ago, New Hampshire empowered the State board of examiners "on account of war or other threatened or existing national calamity" to suspend, in whole or in part, that section of the medical practice act which prescribes the qualifications to be possessed by applicants.<sup>3</sup> In New Jersey the prohibitory provisions of the licensure law do not apply to a lawfully qualified physician or surgeon of another State who, on written permission of the board of medical examiners, takes charge of the practice of a New Jersey licentiate during his absence from the State.<sup>4</sup> The West Virginia law provides that "whenever in the judgment of the public

<sup>1</sup> Carroll's Kentucky Statutes, Baldwin's 1936 Revision, ch. 63, sec. 2613a-2.

<sup>2</sup> Public Laws of New Hampshire, 1926, as amended, title XXI, ch. 204, sec. 10.

<sup>4</sup> Revised Statutes of New Jersey, 1937, as amended, title 45, ch. 9, art. 1, sec. 45:9-21.

TABLE 1.—State laws passed before the present emergency which provide for temporary licensing of physicians

State	Scope of law			Law citation
	Period of validity	Area of practice	Qualifications of applicants	
Arizona.....	Until next regular board meeting.....	Community where applicant's services needed in Statewide.....	Graduate of recognized medical college whose services are needed as an emergency in community.	Ariz. Code Ann., 1939, off. ed., ch. 67, sec. 67-1103.
Arkansas.....	No longer than 2 months before next regular stated meeting of board.	Statewide.....	Same as for applicant for permanent license.	Pope's Digest of Ark. Stats., 1937, as amended, ch. 130, sec. 10743.
Florida.....	Until next regular board meeting.....	do.....	do.....	Fla. Comp. Gen. Laws, 1927, as amended, div. 1, title II, ch. 17, sec. 3410.
Georgia.....	do.....	do.....	do.....	Ga. Code, 1933, as amended, ch. 84-9, sec. 84-912.
Indiana.....	do.....	do.....	do.....	Burn's Ind. Stats. Ann., 1933, title 63, ch. 13, sec. 63-1306.
Kansas.....	do.....	do.....	do.....	Kans. Gen. Stats., 1935, as amended, ch. 65, sec. 65-1093.
Louisiana.....	do.....	do.....	Pass examination.....	Dart's La. Gen. Stats., 1939, title 62, ch. 31, sec. 9948.
Mississippi.....	do.....	do.....	Same as for applicant for permanent license; not issuable to a partner-ship.	Miss. Code, 1930, as amended, ch. 148, sec. 5886.
Montana.....	do.....	do.....	Same as for applicant for permanent license.	Mont. Rev. Codes, 1935, ch. 267, sec. 3118.
New Mexico.....	Until next board meeting and until second examination passed upon.	do.....	Pass examination in all but 2 of designated subjects.	N. Mex. Stats., 1929, as amended, ch. 110, sec. 110-106.
South Carolina.....	Until next regular board meeting.....	do.....	Same as for applicant for permanent license.	So. Car. Code, 1932, title 30, art. 7, sec. 5153.

health council a condition exists in which medical service may be required, the council is authorized to grant permits for the practice of medicine to qualified physicians in prescribed areas, and such permits shall be subject to revocation when the agreement, under which they were issued, has been violated."<sup>5</sup>

Although 44 State legislatures convened in regular session during 1943, bills drafted along the lines of the model law approved at the December conference were introduced into the legislatures of only 7 of these States, to wit: Delaware, Kansas, Maine, Nevada, Pennsylvania, Vermont, and Washington. A bill of like nature was also introduced into the United States Congress for the District of Columbia for the second time in 2 consecutive years. In the States of Delaware, Maine, Nevada, Pennsylvania, and Washington, the bills were enacted into law (table 2).

Six of the proposed acts provided that a physician, in order to apply for a temporary permit, must be licensed to practice outside the State, and must be found qualified by the State examining board to practice within the State. In most of the bills the period during which temporary permits were to be valid was limited to 6 months after the present war emergency, and the State boards were authorized to impose special limitations on the practice of the holders of such permits. In only one State (Washington) and the District of Columbia were no restrictions proposed as to the area of practice; in the other six States the area of practice was to be confined to territorial limits determined by the State boards.

Legislation was introduced in 1943 in two other States (Colorado and New York) in an endeavor to effect a different solution to the problem of supplying health personnel to needy areas. It was proposed in Colorado (Senate bill 333) that the State board of health be authorized to declare emergency areas and to permit all full-time State, county, and municipal health officers to practice medicine for the period of the emergency, provided such officers had graduated from an approved medical school and had been licensed to practice in one of the several States. Charges were to be made for services of a private nature, the fees collected to be deposited in the general fund of the State or of a political subdivision, depending upon whether services were performed by a State or a local health officer. This bill died in the Senate. In New York the State War Emergency Act was amended by chapter 294 of the laws of 1943 (introduced as Assembly bill 335). This amendment authorized the Governor to designate certain regions as emergency health and sanitation areas if there were inadequacies of medical personnel or facilities therein. Under such conditions the State commissioner of health would be empowered to employ medical and health personnel to serve in the designated areas.

<sup>5</sup> West Virginia Code, 1943, sec. 2860.

TABLE 2.—*Scope and final disposition of State legislative proposals made in 1943 for temporarily licensing physicians during the war emergency*

State	Bill number	Scope				Final disposition
		Qualifications of applicants	Duration of license	Area of practice	Special limitations on practice	
Delaware.....	S. 38.....	Any physician licensed outside of State and found qualified by State Medical Council.	12 months; renewable at discretion of Council.	Within such limits as may be imposed by Council.	Such restrictions as may be imposed by Council.	Approved Mar. 4.
District of Columbia..	H. R. 1457..	Over 21, good moral character, sufficient professional training.	1 year; renewable; automatically terminates 6 months after end of war. Until present war emergency terminates.	State-wide.....	None.....	In Committee.
Kansas.....	H. 91.....	Licensed outside of State and found qualified by Board of Medical Registration to practice in the State.	Specified in temporary certificate.	Within such limits as may be imposed by Board.	Such restrictions as may be imposed by Board.	Killed in House.
Maine.....	H. 328.....	do	do	do	do	Effective Apr. 5.
Nevada.....	A. 141.....	Any doctor found qualified by State Board of Medical Examiners.	June 30, 1945	Within territorial limits determined by Board and specified in license; such limitations to be changed at discretion of Board.	None.....	Approved Mar. 20.
Pennsylvania.....	H. 235.....	Must prove to State Board of Medical Examination and License that possess license from another State and has satisfactory professional standing.	6 months after cessation of hostilities.	Communities where medical services needed as determined by Board with advice of State F. & A. S. and of State Med. Soc.	do	Approved Apr. 22.
Vermont.....	H. 49.....	Licensed outside of State and found qualified by State Board of Medical Registration to practice in the State.	Until Mar. 1, 1945, unless sooner revoked.	Within such limits as may be imposed by the Board.	Such restrictions as may be imposed by the Board.	Killed in Senate.
Washington.....	S. 218.....	Licensed and qualified to practice outside of State and applicant for license in State.	Until next regular examination given by State Board of Examiners.	State-wide.....	None.....	Approved Mar. 9.

New Jersey, on the other hand, amended its law during 1943<sup>4</sup> so as to limit the time during which an out-of-State physician might take temporary charge of the practice of a New Jersey doctor to a period of not less than 2 weeks nor more than 4 months. The amendment also imposed a fee of \$25 for a temporary license and authorized the board of medical examiners in its discretion to extend such license for further periods of 2 weeks to 4 months but not to exceed in the aggregate 1 year.

To summarize, 11 States had legislation before the present war emergency specifically empowering the State examining boards to grant temporary permits or certificates to practice medicine within the respective States; the provisions of the medical practice acts in 4 other States can be interpreted as permissive legislation for the admission of out-of-State physicians to practice for a limited period; and 6 States passed laws during 1943 which were designed to supply needed physicians to critical areas. By the end of 1943, only 16 States had statutory provisions for temporarily licensing physicians. Of these laws, 5, or less than one-third, were enacted as a direct consequence of the efforts of various groups to meet the urgent need for relocating health personnel to relieve certain medical care shortages precipitated by the war.

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## INFECTIOUS HEPATITIS: EXPERIMENTAL STUDY OF IMMUNITY<sup>1</sup>

By J. W. OLIPHANT, *Surgeon, United States Public Health Service*

In previous papers (1, 2) the experimental production of jaundice following inoculation of human subjects with homologous serum or with yellow fever vaccines containing human serum was described. Evidence was also presented showing that the icterogenic agent was present in the blood of patients at some period before the appearance of jaundice but not 2½ months after its disappearance. It was therefore desirable to obtain more information concerning the question of immunity resulting from the induced infection; also to determine whether recovery from this condition results in immunity to the causative agent of spontaneously occurring infectious hepatitis.

On March 31, 1944, immunity and serum protection tests were set up as follows:

GROUP 1. *Immunity test.*—Ten individuals who had had experimental jaundice 12 to 18 months before, following inoculation with yellow fever vaccine containing human serum or with icterogenic human serum alone, received 0.5 ml. each of lot 367 yellow fever vaccine. This vaccine was kindly supplied by the Rockefeller Foundation and was one of the highly icterogenic lots which had produced jaundice in the personnel of the United States Army in 1942 (3).

<sup>4</sup> Revised statutes of New Jersey, 1937, as amended, title 45, ch. 9, art. 1, sec. 45: 9-21.

<sup>1</sup> From the Division of Infectious Diseases, National Institute of Health.

**GROUP 2. Serum protection test.**—Equal quantities of serum obtained from each of two persons who had recovered 1 to 3 months previously from homologous serum jaundice were pooled. Lot 367 dried yellow fever vaccine was suspended in this serum, which had been diluted 1:2 in normal saline solution. The final dilution of the vaccine was that recommended on the package and the dose of diluted vaccine employed was 0.5 ml. subcutaneously. Ten persons were thus inoculated.

**GROUP 3.** Ten apparently normal persons were similarly inoculated with 0.5 ml. of lot 367 yellow fever vaccine alone, as a control to the above two groups.

Cases of jaundice occurring in the three groups above are shown in the following table:

	Inoculum	Number in group	Number cases of jaundice
Group 1 (recovered persons).	Lot 367 dried yellow fever vaccine, 0.5 ml. subcutaneously.	10	0
Group 2 (normal persons).	Lot 367 dried yellow fever vaccine resuspended in 50 percent "immune" serum, 0.5 ml. subcutaneously.	10	1
Group 3 (controls).....	Lot 367 dried yellow fever vaccine, 0.5 ml. subcutaneously.	10	3

**Cross immunity test.**—Serums obtained early in acute cases of spontaneous epidemic hepatitis which developed in Italy were obtained.

One of these specimens, No. 4-171,<sup>2</sup> which was employed as the inoculum appeared to be mildly icteric and was estimated to contain about 1 mg. bilirubin per 100 ml. On June 29, 1944, 10 persons who had had homologous serum jaundice 6 to 19 months previously and 11 apparently normal persons were each inoculated subcutaneously with 0.5 ml. of this serum plus phosphate-buffered normal saline solution, the final serum dilution being 1:6. In the group of 11 normal controls there resulted 4 cases of jaundice, with incubation periods ranging from 85 to 106 days. In the group of 10 recovered persons there have been no cases of jaundice to date, November 8, 1944.

#### DISCUSSION

It has been rather generally suspected for some time that "homologous serum jaundice" and infectious hepatitis have the same etiologic agent. Clinically and pathologically the conditions are indistinguishable. The available evidence indicates that the incubation period of spontaneous infectious hepatitis is about 30 days; that of homologous serum jaundice is usually much longer. Why this should be so is unexplained.

The present study indicates that recovery from homologous serum jaundice results in immunity to reinoculation with serum from acute

<sup>2</sup> Received through the courtesy of Dr. Thomas Francis, Jr., to whom it had been sent through the Preventive Medicine Service, Office of the Surgeon General, U. S. Army, by the Commanding Officer of the 15th Medical General Laboratory at the suggestion of Colonel William S. Stone, M. C., chief, Preventive Medicine Service, Office of the Chief Surgeon, North African theater of operations.

cases of infectious hepatitis or with icterogenic yellow fever vaccine, and that the immunity persists for at least 12 to 18 months. Pooled serums from 2 patients, drawn 1 to 3 months following recovery from homologous serum jaundice, when mixed with icterogenic serum failed to protect 1 of 10 individuals inoculated with this mixture.

#### SUMMARY

Ten persons who had had jaundice 12 to 18 months before, following inoculation with icterogenic human serum or yellow fever vaccine containing human serum, did not develop jaundice upon reinoculation with icterogenic yellow fever vaccine. Among 10 normal similarly inoculated controls 3 developed jaundice.

Among 10 normal individuals inoculated with icterogenic yellow fever vaccine suspended in 50-percent convalescent serum from homologous serum jaundice patients 1 subsequently developed jaundice, while among 10 controls given vaccine alone there were 3 cases of jaundice.

Serum obtained from a case of spontaneous jaundice in Italy produced typical "homologous serum jaundice" in 4 of 11 normal persons. In 10 controls who had had inoculation jaundice, no jaundice was induced by the same serum.

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## ANNOUNCEMENT OF ANNUAL MEETING OF AMERICAN PUBLIC HEALTH ASSOCIATION

The Executive Board of the American Public Health Association has announced that the third wartime conference and seventy-fourth annual meeting, and meetings of related organizations, will be held in Chicago, Ill., the week of September 17, 1945, with headquarters in the Hotel Stevens.

At its annual meetings this professional society of public health workers brings together the health officials of the Western Hemisphere for discussion of local, national, and international health problems. The Chicago program will cover subjects of interest to health officers, public health nurses, laboratory workers, nutritionists, vital statisticians, engineers, child and maternal health specialists,

health educators, public health dentists, epidemiologists, industrial hygienists, and others working in the broad field of health protection and promotion.

The related organizations will include the American School Health Association, the conference of State and municipal public health engineers, of public health nursing directors, of professors of preventive medicine, of State and provincial public health laboratory directors, of State directors of public health education, and of industrial health consultants.

The Illinois committee in charge of local arrangements will be headed by Dr. Herman N. Bundesen, president, Chicago board of health, and Dr. Roland R. Cross, State director of public health, Springfield, Ill., cochairmen.

The headquarters office of the American Public Health Association is located at 1790 Broadway, New York 19, N. Y. Reginald M. Atwater, M. D., is executive secretary.

### DEATHS DURING WEEK ENDED NOVEMBER 18, 1944

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

	Week ended November 18, 1944	Correspond- ing week, 1943
<b>Data for 93 large cities of the United States:</b>		
Total deaths.....	9, 143	9, 040
Average for 3 prior years.....	8, 930	.....
Total deaths, first 46 weeks of year.....	412, 943	420, 065
Deaths, under 1 year of age.....	611	632
Average for 3 prior years.....	590	.....
Deaths under 1 year of age, first 46 weeks of year.....	28, 533	30, 347
<b>Data from industrial insurance companies:</b>		
Policies in force.....	66, 898, 575	66, 046, 335
Number of death claims.....	14, 054	11, 418
Death claims per 1,000 policies in force, annual rate.....	11. 0	9. 0
Death claims per 1,000 policies, first 46 weeks of year, annual rate.....	10. 0	9. 7

# PREVALENCE OF DISEASE

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

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## UNITED STATES

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### REPORTS FROM STATES FOR WEEK ENDED NOVEMBER 25, 1944

#### Summary

Following last week's sharp increase in the reported number of cases of meningococcus meningitis (204 cases), the incidence declined to 141 cases for the current week, as compared with 195 for the corresponding week last year, and a 5-year (1939-43) median of 35. For some reason this disease usually shows considerable weekly fluctuations. Only 3 States reported more than 8 cases—New York (28), Ohio (16), and Pennsylvania (11). The cumulative total to date is 15,126, as compared with 16,256 for the same period in 1943. The weekly figures for the current year, while constantly above the expectancy, have been continuously below those for the corresponding weeks of last year since early in March. Since the week ended September 9, which was the week of lowest incidence this year (110 cases), 1,645 cases have been reported, as compared with 2,234 for the same period last year and a 5-year median of 341 for the same period.

A total of 221 cases of poliomyelitis was reported, as compared with 288 last week and a 5-year median of 150. The total number of cases reported to date is 18,711, as compared with 11,993 for the corresponding period last year and a 5-year median of 8,693 for the same period.

Weekly figures for influenza, measles, smallpox, typhoid fever, and whooping cough are below the respective figures for last week, the corresponding week last year, and the 5-year medians. Figures for diphtheria and scarlet fever, while below those for last week, are above figures for both the medians and the corresponding week last year. A cumulative total of 23,866 cases of scarlet fever has been reported since the week ended August 26, the lowest weekly incidence of the year, as compared with 26,430 for the same period last year and a 5-year median of 23,395.

Deaths registered in 93 large cities of the United States during the week totaled 8,477, as compared with 9,143 last week and a 3-year (1941-43) average of 8,648. The cumulative total is 421,420, as compared with 428,828 for the corresponding period last year.

*Telegraphic morbidity reports from State health officers for the week ended November 25, 1944, and comparison with corresponding week of 1943, 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 1939-43	Week ended—		Median 1939-43	Week ended—		Median 1939-43	Week ended—		Median 1939-43
	Nov. 25, 1944	Nov. 27, 1943		Nov. 25, 1944	Nov. 27, 1943		Nov. 25, 1944	Nov. 27, 1943		Nov. 25, 1944	Nov. 27, 1943	
<b>NEW ENGLAND</b>												
Maine.....	2	4	1		31		2	70	64	0	0	0
New Hampshire.....	0	0	0				0	5	5	1	3	0
Vermont.....	0	1	0				3	23	23	0	0	0
Massachusetts.....	7	6	4				77	158	197	9	11	3
Rhode Island.....	0	0	1	23			0	38	3	2	1	0
Connecticut.....	1	3	0	1	1	1	15	3	60	0	6	1
<b>MIDDLE ATLANTIC</b>												
New York.....	14	15	14	11	13	17	69	321	257	28	24	7
New Jersey.....	4	2	2	2	7	7	9	269	27	4	6	2
Pennsylvania.....	10	11	12		1		32	204	332	11	16	3
<b>EAST NORTH CENTRAL</b>												
Ohio.....	11	8	17	5	12	12	17	1,434	34	16	10	1
Indiana.....	14	9	13	4	3	7	9	111	17	4	0	0
Illinois.....	4	9	19	1	6	6	17	40	35	8	10	4
Michigan <sup>2</sup> .....	17	12	12		1	1	18	364	183	7	8	2
Wisconsin.....	0	3	3	10	19	19	15	328	157	3	5	0
<b>WEST NORTH CENTRAL</b>												
Minnesota.....	14	17	1		270	1	5	352	59	4	5	0
Iowa.....	5	1	6	1		1	8	23	23	0	0	0
Missouri.....	10	6	9	1	149	3	2	5	7	0	8	1
North Dakota.....	8	6	5		5	1	2	222	1	0	0	0
South Dakota.....	0	2	2				2	9	2	0	0	0
Nebraska.....	2	9	5		3		11	14	5	0	2	0
Kansas.....	2	7	6	1	5	3	3	7	20	1	1	0
<b>SOUTH ATLANTIC</b>												
Delaware.....	0	0	1				2	11	2	2	1	0
Maryland <sup>2</sup> .....	4	11	10	6	6	5	0	16	16	1	12	1
District of Columbia.....	0	2	1	1	4	1	3	4	3	2	0	0
Virginia.....	12	13	41	139	259	157	3	372	48	1	6	2
West Virginia.....	2	3	10	1	5	13	5	20	14	2	3	1
North Carolina.....	20	24	35	2	7	5	4	55	55	1	0	1
South Carolina.....	4	4	15	415	331	331	8	27	4	2	2	0
Georgia.....	19	12	21	28	30	30	3	25	5	4	0	0
Florida.....	13	8	8	2	7	2	2	17	8	1	2	0
<b>EAST SOUTH CENTRAL</b>												
Kentucky.....	10	6	10	2	1	3	1	32	32	2	2	1
Tennessee.....	15	11	16	13	56	31	13	24	18	8	6	1
Alabama.....	23	21	21	18	54	54	1	62	10	2	1	1
Mississippi <sup>2</sup> .....	12	11	11							0	4	1
<b>WEST SOUTH CENTRAL</b>												
Arkansas.....	9	4	17	44	89	62	8	23	7	0	0	1
Louisiana.....	21	9	8	4	1	6	1	1	1	0	2	1
Oklahoma.....	17	8	11	64	74	47	6	3	2	0	1	0
Texas.....	66	37	43	837	807	539	26	27	27	5	7	2
<b>MOUNTAIN</b>												
Montana.....	8	0	-2	1	6	6	1	97	16	0	0	0
Idaho.....	0	0	0	1			4	8	8	0	0	0
Wyoming.....	0	0	0	18	2	2	7	12	4	0	0	0
Colorado.....	4	3	6	9	12	12	7	80	26	1	1	1
New Mexico.....	5	2	2	2	4	1	0	1	3	1	1	0
Arizona.....	0	5	4	70	155	105	4	5	6	0	0	0
Utah <sup>2</sup> .....	0	0	0			7	7	2	25	0	2	1
Nevada.....	0	0	0				0	0	0	0	0	0
<b>PACIFIC</b>												
Washington.....	5	6	3	4	1	1	13	15	15	1	1	0
Oregon.....	7	2	1	9	11	18	18	43	25	0	5	0
California.....	34	42	25	21	27	36	138	70	70	7	20	1
Total.....	435	375	399	1,761	2,465	1,999	601	5,052	2,648	141	195	35
47 weeks.....	12,141	12,296	13,930	354,112	98,408	162,712	598,363	596,993	483,286	15,126	16,256	1,827

<sup>1</sup> New York City only.

<sup>2</sup> Period ended earlier than Saturday.

Telegraphic morbidity reports from State health officers for the week ended November 25, 1944, and comparison with corresponding week of 1943, and 5-year median—  
Continued

Division and State	Polio-myelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever <sup>1</sup>		
	Week ended—		Median 1939-43	Week ended—		Median 1939-43	Week ended—		Median 1939-43	Week ended—		Median 1939-43
	Nov. 25, 1944	Nov. 27, 1943		Nov. 25, 1944	Nov. 27, 1943		Nov. 25, 1944	Nov. 27, 1943		Nov. 25, 1944	Nov. 27, 1943	
<b>NEW ENGLAND</b>												
Maine.....	3	0	0	31	30	17	0	0	0	0	0	0
New Hampshire.....	0	2	0	13	5	5	0	0	0	1	0	0
Vermont.....	1	1	0	6	14	7	0	0	0	0	0	0
Massachusetts.....	4	4	1	223	158	158	0	0	0	0	1	1
Rhode Island.....	0	0	0	5	7	5	0	0	0	1	0	0
Connecticut.....	3	8	1	24	51	29	0	0	0	0	2	2
<b>MIDDLE ATLANTIC</b>												
New York.....	71	11	11	223	257	216	0	0	0	2	9	6
New Jersey.....	3	1	1	29	63	72	0	0	0	1	0	2
Pennsylvania.....	14	3	4	191	158	187	0	0	0	1	11	9
<b>EAST NORTH CENTRAL</b>												
Ohio.....	10	1	2	252	237	213	0	0	0	1	3	3
Indiana.....	6	0	2	83	55	72	1	0	1	0	1	1
Illinois.....	2	10	5	174	168	168	0	10	2	4	2	3
Michigan <sup>2</sup> .....	7	3	3	173	147	115	0	0	1	1	0	2
Wisconsin.....	0	4	4	81	139	139	0	0	0	1	3	0
<b>WEST NORTH CENTRAL</b>												
Minnesota.....	4	0	8	59	6	63	0	0	1	0	0	0
Iowa.....	1	2	2	52	59	59	0	0	0	0	0	0
Missouri.....	2	1	3	43	58	58	0	0	0	0	0	2
North Dakota.....	0	1	1	12	13	11	0	0	0	0	0	0
South Dakota.....	0	0	0	5	23	29	0	0	0	0	0	0
Nebraska.....	2	1	2	50	27	16	0	0	0	0	0	0
Kansas.....	1	4	2	82	92	89	0	1	0	1	0	3
<b>SOUTH ATLANTIC</b>												
Delaware.....	0	0	0	1	3	7	0	0	0	0	0	0
Maryland <sup>2</sup> .....	6	0	0	66	55	36	0	0	0	1	0	2
District of Columbia.....	0	0	0	21	21	14	0	0	0	0	1	0
Virginia.....	14	1	2	50	57	61	0	0	0	3	2	6
West Virginia.....	3	0	0	71	65	65	0	0	0	2	1	1
North Carolina.....	5	0	2	98	96	95	0	0	0	0	0	1
South Carolina.....	2	0	0	2	9	10	0	0	0	0	1	1
Georgia.....	0	0	0	44	18	37	0	0	0	0	0	5
Florida.....	3	0	0	11	9	7	0	0	0	1	2	2
<b>EAST SOUTH CENTRAL</b>												
Kentucky.....	9	2	2	34	69	79	3	0	0	0	6	4
Tennessee.....	3	2	3	84	64	98	0	0	0	3	4	3
Alabama.....	0	0	1	18	20	35	0	0	0	1	0	1
Mississippi <sup>2</sup> .....	0	2	1	23	9	17	0	0	0	0	0	2
<b>WEST SOUTH CENTRAL</b>												
Arkansas.....	2	0	0	37	1	15	0	0	0	2	1	7
Louisiana.....	0	1	0	15	7	7	0	0	0	6	5	5
Oklahoma.....	1	8	1	31	75	23	0	0	0	0	2	2
Texas.....	7	9	3	93	75	68	0	0	0	8	7	6
<b>MOUNTAIN</b>												
Montana.....	1	3	1	22	32	28	0	0	1	4	1	0
Idaho.....	0	0	1	25	27	6	1	0	0	0	0	0
Wyoming.....	0	0	0	7	2	4	0	0	0	0	0	0
Colorado.....	1	1	1	71	37	29	0	0	0	1	1	1
New Mexico.....	1	1	0	15	4	6	0	0	0	1	0	1
Arizona.....	1	0	0	11	5	5	0	0	0	0	1	1
Utah <sup>2</sup> .....	1	7	1	18	93	12	0	0	0	0	1	1
Nevada.....	0	0	0	4	0	0	0	0	0	0	0	0
<b>PACIFIC</b>												
Washington.....	5	10	1	54	66	21	0	0	0	5	0	1
Oregon.....	10	17	3	51	43	25	0	0	0	0	2	2
California.....	12	29	13	239	201	160	0	0	0	2	0	5
<b>Total.....</b>	<b>221</b>	<b>150</b>	<b>150</b>	<b>3,027</b>	<b>2,930</b>	<b>2,642</b>	<b>5</b>	<b>11</b>	<b>14</b>	<b>54</b>	<b>70</b>	<b>126</b>
47 weeks.....	18,711	11,993	8,693	172,105	124,926	124,926	3.9	687	1,279	5,101	5,155	7,956

<sup>1</sup> Period ended earlier than Saturday.

<sup>2</sup> Including paratyphoid fever reported separately as follows: New Hampshire, 1; Rhode Island, 1; Texas, 2.

Telegraphic morbidity reports from State health officers for the week ended November 25, 1944, and comparison with corresponding week of 1943, and 5-year median—  
Continued

Division and State	Whooping cough			Week ended November 25, 1944								
	Week ended—		Median 1939-43	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularaemia	Typhus fever
	Nov. 25, 1944	Nov. 1943			Amebic	Bacillary	Unspecified					
<b>NEW ENGLAND</b>												
Maine	23	3	29	0	0	0	0	0	0	0	0	0
New Hampshire	0	2	6	0	0	0	0	0	0	0	0	0
Vermont	39	31	31	0	0	0	0	0	0	0	0	0
Massachusetts	133	95	134	0	0	7	0	1	0	0	0	0
Rhode Island	1	26	22	0	0	2	0	1	0	0	0	0
Connecticut	70	23	73	0	0	1	0	0	0	0	0	0
<b>MIDDLE ATLANTIC</b>												
New York	202	284	439	0	0	15	0	1	0	0	0	0
New Jersey	64	90	147	0	4	0	0	0	0	0	0	0
Pennsylvania	101	127	279	0	0	0	0	0	0	0	0	0
<b>EAST NORTH CENTRAL</b>												
Ohio	114	133	211	0	0	0	0	0	0	0	0	0
Indiana	6	18	26	0	0	0	2	0	0	0	0	0
Illinois	42	132	132	0	2	8	0	1	0	0	2	0
Michigan <sup>2</sup>	69	222	279	0	0	9	0	0	0	0	0	0
Wisconsin	79	172	172	0	0	0	0	0	0	0	0	0
<b>WEST NORTH CENTRAL</b>												
Minnesota	48	41	56	0	3	2	0	0	0	0	0	0
Iowa	4	28	20	0	0	0	0	0	0	0	0	0
Missouri	19	16	20	0	0	0	1	0	0	0	0	0
North Dakota	12	5	6	0	0	0	1	0	0	0	0	0
South Dakota	4	8	3	0	0	0	0	0	0	0	0	0
Nebraska	5	27	8	0	0	0	0	0	0	0	0	0
Kansas	32	39	48	0	0	1	0	1	0	0	0	0
<b>SOUTH ATLANTIC</b>												
Delaware	3	11	14	0	0	0	0	0	0	0	0	0
Maryland <sup>2</sup>	70	53	53	0	0	0	1	0	0	0	1	0
District of Columbia	4	3	10	0	0	0	0	0	0	0	0	0
Virginia	42	109	51	0	1	0	69	0	0	1	0	0
West Virginia	4	17	17	0	1	0	0	0	0	0	0	0
North Carolina	44	190	102	0	0	0	0	0	0	1	0	5
South Carolina	26	50	31	0	0	6	0	0	0	0	0	1
Georgia	4	4	15	0	0	0	0	0	0	0	0	45
Florida	24	4	6	0	3	0	0	0	0	0	0	14
<b>EAST SOUTH CENTRAL</b>												
Kentucky	16	91	67	0	0	0	0	0	0	0	2	0
Tennessee	33	25	26	0	0	0	3	1	0	0	0	3
Alabama	21	11	17	0	0	0	0	0	0	0	0	19
Mississippi <sup>2</sup>				0	0	0	0	0	0	0	0	1
<b>WEST SOUTH CENTRAL</b>												
Arkansas	10	8	8	0	0	8	0	0	0	0	0	0
Louisiana	0	7	4	0	0	1	0	0	1	0	0	8
Oklahoma	8	2	7	0	0	6	0	0	0	0	0	0
Texas	125	89	89	0	2	576	36	1	0	0	1	39
<b>MOUNTAIN</b>												
Montana	15	16	16	0	0	0	0	0	0	0	0	0
Idaho	3	3	2	0	0	0	0	0	0	0	0	0
Wyoming	0	1	5	0	0	0	0	0	0	0	0	0
Colorado	31	33	17	1	0	0	0	0	0	0	0	0
New Mexico	0	4	4	0	0	7	6	1	0	0	0	0
Arizona	3	23	10	0	0	0	15	0	0	0	0	0
Utah <sup>2</sup>	2	14	20	0	0	0	0	0	0	0	0	0
Nevada	0	1	0	0	0	0	0	0	0	0	0	0
<b>PACIFIC</b>												
Washington	18	32	32	0	0	0	0	0	0	0	0	0
Oregon	2	15	15	0	0	0	0	0	0	0	0	0
California	92	117	152	0	1	7	0	1	1	0	0	1
<b>Total</b>	<b>1,667</b>	<b>2,455</b>	<b>3,243</b>	<b>1</b>	<b>17</b>	<b>656</b>	<b>134</b>	<b>9</b>	<b>2</b>	<b>2</b>	<b>6</b>	<b>136</b>
Same week 1943	2,455			1	49	526	16	10	0	3	10	134
Same week 1942	3,243			1	27	166	41	10	0	1	19	63
47 Weeks 1944	86,588			39	1,685	22,341	8,301	598	31	453	506	4,805
47 Weeks 1943	166,704			62	1,946	15,802	7,007	633	27	433	724	4,064
47 Weeks 1942	162,372		162,372	73	1,117	11,531	6,179	532	43	451	789	2,656

<sup>2</sup> Period ended earlier than Saturday.<sup>3</sup> 5-year median 1939-43.

**NOTIFIABLE DISEASES, THIRD QUARTER 1944**

The figures in the following table are the totals of the monthly morbidity reports received from the State health authorities for July, August, and September 1944. These reports are preliminary and the figures are therefore more or less incomplete. In most instances they include cases reported in both civilian and military populations. The comparisons made are with similar preliminary reports; but owing to population shifts and the presence of large military populations in certain States, the figures for some States are not comparable with those for prior years, especially for certain diseases. Each State health officer has been requested to include in the monthly report for his State all diseases that are required by law or regulation to be reported in the State. The lists of diseases required to be reported are not the same for each State. Only 12 of the common communicable diseases are notifiable in all the States. In some instances cases are reported, in some States, of diseases that are not required by law or regulation to be reported, and the figures are included although manifestly incomplete. There are also variations among the States in the degree of completeness of reporting of cases of the reportable diseases. As compared with the deaths, incomplete case reports are obvious for such diseases as malaria, pellagra, pneumonia, and tuberculosis, while in many States other diseases, such as puerperal septicaemia and Vincent's infection, are not reportable.

In spite of these known deficiencies, however, these monthly reports, which are published quarterly and annually in consolidated form, have proved of value in presenting early information regarding the reported incidence of a large group of diseases and in indicating a trend by providing a comparison with similar preliminary figures for prior years. To some extent they also give a picture of the geographic prevalence of certain diseases, as the States are arranged by geographic location.

Leaders are used in the table to indicate that no case of the disease was reported.

*Consolidated monthly State morbidity reports for July, August, and September 1944*

Division and State	An-thrax	Chick- enpox	*Con- junc-tiv- itis	*Diph- theria	Dysen- tery, ame- bae	Dysen- tery, bac- tilary	Dysen- tery, un- de- fined	En- cep- hal- itis, in- fec- tious	Ger- man mea- sles	Hook- worm dis- ease	Influ- enza	Ma- lar- ia	*Mea- sles	*Men- ingit- is, men- ingo- coc- cus	Mumps	Op- thal- mia neo- nato- rum	Pella- gra	Pne- umonia, all forms
<b>NEW ENGLAND</b>																		
Maine.....	1	182		6				1	26		11	1	228	11	18			90
New Hampshire.....		19							2				61	6	64			2
Vermont.....		149		1					33				52	1	93			7
Massachusetts.....	1	961	81	34	81	7	4	4	147		84	151	1,195	78	931	38		223
Rhode Island.....		73		8				6	6		5	16	278	14	25			25
Connecticut.....		212	2	6		18		2	50	4				41	141	1		207
<b>MIDDLE ATLANTIC</b>																		
New York.....	3	1,467		61	32	437		15			18	1,159	1,663	238	484	11		1,822
New Jersey.....	1	781		18	1	4		8	143		22	298	615	101	749			349
Pennsylvania.....	2	980	1	85	2	2		3			12		911	186	1,313	7		409
<b>EAST NORTH CENTRAL</b>																		
Ohio.....		575		67	4	3		3	14		37	52	227	78	154	130		450
Indiana.....		66		73	3	2		2	6		44	103	82	32	71	2		63
Illinois.....		482	0	46	16	20		21	4		32	14	318	109	421	118		888
Michigan.....		886	4	74	0	91		3	66		7	60	768	94	566	7		201
Wisconsin.....		1,140		21	3			1	169		105	8	1,481	44	1,062			818



Consolidated monthly State morbidity reports for July, August, and September 1944—Continued

Division and State	*Polio- myelitis	Rabies in animals	Rabies in man	Rocky Mountain spotted fever	*Scarlet fever	Septic sore throat	*Small-pox	Tetanus	Treponema	Trichinosis	*Tuberculosis, all forms	Tuberculosis, respiratory	Tularemia	*Typhoid and typhoid fever	Paratyphoid fever	Typhus fever	*Undulant fever	Vincent's infection	*Whooping cough
NEW ENGLAND																			
Maine.....	12				149	2	1				159	142		8	1	2	10	13	173
New Hampshire.....	56				43						62			1					18
Vermont.....	29				12						6			8				6	346
Massachusetts.....	291			1	687	12	1			4	747	702		62	51	1	12		831
Rhode Island.....	8				31						149	142		7	2		3		174
Connecticut.....	130				119	13				1	327	317		17	4		14		568
MIDDLE ATLANTIC																			
New York.....	4,619	61	1	10	906	111		14		11	3,602	3,357		111	27	4	64		1,982
New Jersey.....	3,377			7	210	12		3		24	858			20	1	2	15		824
Pennsylvania.....	1,137		1	5	814			2	1	1	1,324			78		1	25		1,092
EAST NORTH CENTRAL																			
Ohio.....	831	50		1	1,038	6		3	4	1	2,028	1,951		88	6	3	24		2,008
Indiana.....	267			10	298	6		2	8		900	870		44	2		25		99
Illinois.....	366	100		10	566	90		10	48		1,982	1,835		44	5		105		1,207
Michigan.....	736	17			564	98		6		3	1,603			56	12		23		1,171
Wisconsin.....	181				515	13		1			789			7			77		1,635
WEST NORTH CENTRAL																			
Minnesota.....	382				266	9		3			732	236		4	12	2	107		448
Iowa.....	124	20	5	2	188	1		1			236			32			111		98
Missouri.....	88	17		5	169	6		4	110		695			60			11		327
North Dakota.....	36				36			1	4		77	71		4					214
South Dakota.....	3				42	1		1	14		73	16		6			13		207
Nebraska.....	50				56			1			44								141
Kansas.....	85	2	1		233	7		3			183	171		32	1		46		445
SOUTH ATLANTIC																			
Delaware.....	88	1		2	16						45	45		2			1		20
Maryland.....	356	18		19	244	12		1			934	903		27	4		16		1,088
District of Columbia.....	185	28			66						519	481		7	1		1		26
Virginia.....	590				262	294					864	864		50	2	6	7		617
West Virginia.....	148		1	12	424	4		1			457			70	3		2		293
North Carolina.....	622	35		35	339	15		4			545	536		1	72		115		2,014
South Carolina.....	46	32		8	55	112		5			176			5	73		79		1,078
Georgia.....	70			8	133	36		4			479	478		102	23		482		1,190
Florida.....	62	1			49	76		6			288	284		55	14		260		214
EAST SOUTH CENTRAL																			
Kentucky.....	591			7	150	12		1			1,095	1,049		4	103		22		887
Tennessee.....	89		7	19	220	25		2	11		1,228			66	4		34		427
Alabama.....	74	29		8	160			1			727			170	114		460		279
Mississippi.....	89			7	83			18		26	526			10			63		3,100

State/Territory	17	30	66	174	10	3	164	694	416	34	90	14	5	18	260
Arkansas.....	80	20	48	35	16	3	421	1055	7	96	6	143	23	15	36
Louisiana.....	29	1	42	20	1	42	711	220	3	3	53	3	157	3	97
Oklahoma.....	103	165	356	291	1	55	1,982	1,982	14	205	15	735	157	2,569	
MOUNTAIN															
Montana.....	29	1	99	10	1	1	106	35	2	3	3	3	8	304	
Idaho.....	3	1	82	1	1	1	1055	1055	10	10	10	10	44	44	
Wyoming.....	4	6	32	1	8	8	13	12	16	2	2	2	2	2	
Colorado.....	40	141	141	7	8	8	220	468	1	20	3	3	1	305	
New Mexico.....	11	5	46	5	8	8	483	483	25	25	25	25	1	30	
Arizona.....	23	62	62	3	90	90	223	443	12	12	12	1	13	249	
Utah.....	11	5	112	3	44	44	43	43	12	5	5	1	7	482	
Nevada.....	6	1	6	101	2	2	28	28	3	1	1	1	1	17	
PACIFIC															
Washington.....	95	1	337	16	2	3	485	467	17	4	9	4	9	26	
Oregon.....	157	1	181	13	2	3	196	196	21	3	16	3	16	42	
California.....	174	215	1,190	1,190	23	23	2,477	2,331	69	14	69	14	192	1,025	
Total.....	13,630	817	287,112	1,574	58	145	599	32,577	18,776	165	2,282	353	2,416	1,301	544
Third quarter, 1943.....	8,186	490	234,120	927	62	151	757	24,998	17,688	208	2,503	320	1,770	1,187	905
Median, 1938-43.....	5,766	559	208,115	1,209	93	151	866	52,980	15,265	257	3,986	1,261	1,000	430	46,158
Alaska.....	3	1	1	2	3	3	77	74	74	2	2	1	50	3	21
Hawaii Territory.....	1	1	9	9	2	2	201	184	14	11	11	2	2	77	92
Panama Canal Zone.....							9	9	9						

\*Diseases marked with an asterisk (\*) are reportable by law or regulation in all the States, including the District of Columbia. Typhoid fever is reportable in all the States; paratyphoid fever in all except 6 States. Syphilis is reportable in all the States and the District of Columbia but is not included in the table.

† For reports for first and second quarters of 1944, see pages 816 and 1150 of the PUBLIC HEALTH REPORTS of June 23 and September 1, 1944, respectively.

‡ Includes cases of suppurative and keratoconjunctivitis and of pink eye.

§ Includes 82 cases with infection outside of New York State.

¶ 140 recurrent and out-of-State cases were also reported.

‡ 4-year (1940-43) average.

† Off-shipment.

§ Includes the cities of Colon and Panama.

¶ In the Canal Zone only.

‡ Includes 30 cases delayed reports.

§ Actinomycosis: Connecticut 1, Pennsylvania 1, Illinois 1, Michigan 2, Minnesota 3, South Dakota 1, Montana 1.

¶ Botulism: Nevada 2, Washington 3, California 2.

‡ Occidiodiomyosis: Kansas 1, Arizona 6, California 6.

§ Dengue: South Carolina 2, Mississippi 2, Arkansas 1, Texas 12, Hawaii Territory 57.

¶ Diarrhea and enteritis: New Jersey 13 (diarrhea only), Ohio 633, Indiana 2 (diarrhea only), Michigan 14 (diarrhea only), Minnesota 7 (enteritis only), Maryland 66 (diarrhea only), South Carolina 2,481 (diarrhea only), Florida 6 (diarrhea only), New Mexico 73, Washington 64, California 8 (diarrhea only).

‡ Dog bite: Illinois 3,540 (all animals), Michigan 2,464, Arkansas 194.

§ Food poisoning: Ohio 1, Indiana 3, Illinois 6, Louisiana 2, New Mexico 3, Washington 2, California 76.

Granuloma (unspecified): Ohio 10.

Granuloma inguinale: Missouri 8, Florida 49, Tennessee 8, Mississippi 228, Louisiana 25, Washington 10.

Impetigo contagiosa: Indiana 2, Illinois 32, Michigan 215, North Dakota 8, Kansas 30, Maryland 6, Montana 3, Wyoming 3, Oregon 62, Hawaii Territory 45.

Jaundice: Indiana 1, Illinois 10, Florida 8, Idaho 3, Arizona 2, Utah 6, Washington 10, California 97.

Lead poisoning: Minnesota 6.

Leprosy: New York 1, Ohio 1, Florida 1, Louisiana 3, Colorado 1, Nevada 1, California 2, Hawaii Territory 7, Panama Canal Zone 1.

‡ Lymphogranuloma venereum: Missouri 24, Florida 60, Tennessee 20, Louisiana 43, Arizona 15, Utah 2.

‡ Pleura (human): Hawaii Territory 1.

‡ Pleurisy: Maryland 1.

‡ Puerperal septicaemia: Ohio 1, Mississippi 68, New Mexico 3.

‡ Rat-bite fever: Maine 2, Tennessee 1.

‡ Rheumatic fever: Texas 6, Arizona 2, Nevada 2, California 3.

‡ Rheumatoid fever: Rhode Island 8, Indiana 3, Illinois 98, Michigan 44, North Dakota 5, Maryland 80, Georgia 3, Louisiana 1, Utah 36, Washington 28, California 284.

‡ Ringworm: Michigan 143, Washington 99.

‡ Scabies: Michigan 67, North Dakota 1, Kansas 9, Montana 15, Idaho 3, Wyoming 4, Oregon 54.

‡ Sliciosis: Montana 3.

‡ Well's disease: Massachusetts 2, Michigan 4, Hawaii Territory 4.



## City reports for week ended November 18, 1944—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomycelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
<b>WEST NORTH CENTRAL</b>												
<b>Minnesota:</b>												
Duluth.....	0	0	0	0	1	0	3	2	4	0	0	1
Minneapolis.....	6	0	0	1	3	0	6	1	9	0	0	5
St. Paul.....	0	0	0	0	1	2	12	1	11	0	0	13
<b>Missouri:</b>												
Kansas City.....	1	0	0	0	0	1	6	1	13	0	0	2
St. Louis.....	5	0	1	0	0	4	18	4	11	0	0	9
<b>Nebraska:</b>												
Omaha.....	0	0	0	0	7	0	2	1	17	0	0	0
<b>Kansas:</b>												
Topeka.....	0	0	0	0	0	0	0	0	3	0	0	4
Wichita.....	0	0	0	0	0	0	5	0	6	0	0	0
<b>SOUTH ATLANTIC</b>												
<b>Delaware:</b>												
Wilmington.....	0	0	0	0	0	0	1	1	2	0	0	0
<b>Maryland:</b>												
Baltimore.....	8	0	4	2	1	2	5	0	48	0	1	77
Cumberland.....	0	0	0	0	0	0	0	0	0	0	0	0
Frederick.....	0	0	0	0	0	0	0	0	0	0	0	0
<b>District of Columbia:</b>												
Washington.....	0	0	3	0	2	1	10	1	17	0	0	7
<b>Virginia:</b>												
Lynchburg.....	0	0	0	0	0	0	0	0	2	0	0	0
Richmond.....	0	0	2	0	0	1	3	0	16	0	0	1
Roanoke.....	0	0	0	0	0	0	2	0	2	0	0	0
<b>West Virginia:</b>												
Charleston.....	0	0	0	0	0	0	0	0	7	0	0	0
Wheeling.....	0	0	0	0	2	1	0	1	4	0	0	2
<b>North Carolina:</b>												
Raleigh.....	0	0	0	0	0	1	0	0	1	0	0	1
Wilmington.....	2	0	0	0	0	0	1	0	6	0	0	1
Winston-Salem.....	0	0	0	0	1	0	1	0	4	0	0	0
<b>South Carolina:</b>												
Charleston.....	0	0	2	0	0	0	1	0	2	0	0	0
<b>Georgia:</b>												
Atlanta.....	0	0	5	0	0	1	3	0	6	0	0	1
Brunswick.....	0	0	0	0	0	0	0	0	0	0	0	0
Savannah.....	0	0	4	0	0	0	1	0	1	0	0	0
<b>Florida:</b>												
Tampa.....	1	0	0	0	0	0	2	1	0	0	1	0
<b>EAST SOUTH CENTRAL</b>												
<b>Tennessee:</b>												
Memphis.....	1	0	0	0	12	0	4	0	11	0	1	7
Nashville.....	0	0	0	0	0	0	5	0	2	0	0	0
<b>Alabama:</b>												
Birmingham.....	1	0	0	1	0	0	4	0	5	0	0	0
Mobile.....	3	0	0	1	0	1	3	1	1	0	0	0
<b>WEST SOUTH CENTRAL</b>												
<b>Arkansas:</b>												
Little Rock.....	0	0	0	0	0	1	1	0	4	0	0	2
<b>Louisiana:</b>												
New Orleans.....	3	0	3	2	2	2	11	0	5	0	0	0
Shreveport.....	3	0	0	0	0	0	5	0	1	0	0	0
<b>Texas:</b>												
Dallas.....	9	0	1	1	1	3	2	0	9	0	0	2
Galveston.....	0	0	0	0	0	0	0	0	0	0	0	0
Houston.....	3	0	0	0	0	1	5	0	4	0	0	0
San Antonio.....	5	0	0	0	1	0	8	0	0	0	0	0

City reports for week ended November 18, 1944—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Pollomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
<b>MOUNTAIN</b>												
Montana:												
Billings.....	0	0	0	0	0	0	0	0	0	0	0	1
Helena.....	0	0	0	0	0	0	0	0	1	0	0	3
Missoula.....	0	0	0	0	2	0	0	0	1	0	0	0
Idaho:												
Boise.....	0	0	0	0	0	0	0	0	0	0	0	0
Colorado:												
Denver.....	4	0	1	2	2	1	2	1	7	0	0	6
Pueblo.....	0	0	0	0	0	0	2	0	1	0	0	0
Utah:												
Salt Lake City.....	0	0	0	0	1	0	1	0	7	0	0	4
<b>PACIFIC</b>												
Washington:												
Seattle.....	0	0	0	1	9	0	4	0	8	0	0	1
Spokane.....	0	0	0	0	0	1	3	0	6	0	1	0
Tacoma.....	1	0	0	0	1	0	0	0	1	0	1	0
California:												
Los Angeles.....	6	0	8	1	7	5	7	2	34	0	0	2
Sacramento.....	0	0	2	2	2	0	0	9	0	0	0	4
San Francisco.....	2	0	3	0	13	4	6	1	12	0	0	4
Total.....	102	2	48	20	220	88	382	91	852	0	11	520
Corresponding week, 1943.....	96		91	23	1,076		399		839	0	14	702
Average, 1939-43.....	95		124	127	1,689		367		729	1	23	995

1 3-year average, 1941-43.

2 5-year median, 1939-43.

- Dysentery, amebic.*—Cases: New York, 2; Chicago, 1; Charleston, S. C., 1; Tampa, 1; Los Angeles, 1.  
*Dysentery, bacillary.*—Cases: Providence, 1; New Haven, 1; Buffalo, 1; New York, 53; Chicago, 1; Detroit 4; Charleston, S. C., 7; Nashville, 1; Mobile, 1; Los Angeles, 6.  
*Dysentery, unspecified.*—Cases: Memphis, 1.  
*Leprosy.*—Cases: New Orleans, 1.  
*Typhus fever, endemic.*—Cases: Wilmington, N. C., 1; Atlanta, 9; Savannah, 1; Tampa, 2; Birmingham, 1; Mobile, 7; Little Rock, 1; New Orleans, 1; Galveston, 1; Houston, 8; San Antonio, 4.

Rates (annual basis) per 100,000 population, by geographic groups, for the 87 cities in the preceding table (estimated population, 1943, 34,272,300)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza		Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Pollomyelitis 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.....	5.2	0.0	0.0	0.0	217	15.7	60.1	23.5	259	0.0	2.6	227
Middle Atlantic.....	6.9	0.4	2.3	1.9	17	14.3	53.2	22.2	93	0.0	1.9	69
East North Central.....	12.8	0.6	2.4	1.2	18	10.9	54.1	9.1	141	0.0	0.6	75
West North Central.....	24.7	0.0	2.1	2.1	25	14.4	107.2	20.6	153	0.0	0.0	70
South Atlantic.....	18.0	0.0	32.7	3.3	10	11.4	49.0	6.5	193	0.0	3.3	147
East South Central.....	29.5	0.0	0.0	11.8	71	5.9	94.4	5.9	112	0.0	5.9	41
West South Central.....	66.0	0.0	11.5	8.6	11	20.1	91.8	0.0	66	0.0	0.0	11
Mountain.....	33.3	0.0	8.3	16.6	42	8.3	41.6	8.3	141	0.0	0.0	116
Pacific.....	14.2	0.0	20.6	6.3	51	15.8	31.6	4.7	111	0.0	3.2	17
Total.....	15.6	0.3	7.3	3.1	34	13.4	58.3	13.9	130	0.0	1.7	79

## FOREIGN REPORTS

### CANADA

*Provinces—Communicable diseases—Week ended November 4, 1944.*—During the week ended November 4, 1944, 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.....		30		157	139	49	30	31	42	478
Diphtheria.....		9	8	48	6	4	8	1		84
Dysentery, bacillary.....				4					1	5
German measles.....		1		10	23		5		7	46
Influenza.....				29	2				4	35
Measles.....			3	116	30	27	5	8	36	225
Meningitis, meningococcus.....				1						1
Mumps.....				165	19	4	2	14	43	247
Poliomyelitis.....					9	1				10
Scarlet fever.....		8	9	137	137	25	11	23	39	389
Tuberculosis (all forms).....			3	76	56	9		4	31	179
Typhoid and paratyphoid fever.....			2	8	1				2	13
Undulant fever.....				1						1
Veneral diseases:										
Gonorrhoea.....		35	8	128	113	39	21	39	74	457
Syphilis.....		10	6	167	93	14	6	10	28	334
Whooping cough.....		24	10	139	43	16	9	21	57	319

### CUBA

*Habana—Communicable diseases—4 weeks ended November 11, 1944.*—During the 4 weeks ended November 11, 1944, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria.....	23	3	Poliomyelitis.....	1	1
Leprosy.....	1		Tuberculosis.....	4	1
Malaria.....	7	1	Typhoid fever.....	36	2

### SWEDEN

*Notifiable diseases—June–August 1944.*—For the months of June, July, and August 1944, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	June	July	August	Disease	June	July	August
Cerebrospinal meningitis.....	14	5	9	Poliomyelitis.....	50	86	257
Diphtheria.....	144	189	161	Scarlet fever.....	2,655	1,725	1,888
Dysentery.....	80	66	188	Syphilis.....	95	100	107
Encephalitis, epidemic.....	2			Typhoid fever.....	7	5	10
Gonorrhoea.....	1,453	1,806	2,189	Undulant fever.....	5	1	5
Hepatitis, epidemic.....	345	321	450	Weil's disease.....	2	5	9
Paratyphoid fever.....	20	13	10				

## REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER 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 the current year. 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.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

### Plague

*Ecuador—Loja Province.*—During the month of October 1944, 4 cases of plague with 1 death were reported in Loja Province, Ecuador.

*French West Africa.*—For the period November 1–10, 1944, 38 cases of plague with 17 deaths were reported in all of French West Africa, of which 17 cases were reported in Dakar.

*Palestine.*—Plague has been reported in Palestine as follows: Week ended October 28, 1944, 5 cases; week ended November 4, 1944, 6 cases.

*Peru.*—During the month of October 1944, plague was reported in Peru as follows: Ancash Department, 3 cases, 2 deaths; Lima Department, 2 cases, 2 deaths.

*Senegal.*—Plague has been reported in Senegal as follows: Rufisque, week ended November 4, 1944, 6 cases, 2 deaths; Thies, October 21–30, 1944, 1 fatal case.

*Tunisia.*—Plague has been reported in Tunisia as follows: October 11–20, 1944, 7 cases; October 21–31, 1944, 2 cases.

### Smallpox

*Belgian Congo.*—Smallpox has been reported in Belgian Congo as follows: Week ended October 21, 1944, 156 cases; week ended October 28, 1944, 210 cases.

### Typhus Fever

*Chile.*—For the period September 10 to October 7, 1944, 51 cases of typhus fever with 5 deaths were reported in Chile. Provinces reporting the highest incidence of the disease are: Santiago, 18 cases, 4 deaths; Concepcion, 10 cases, 1 death; Valparaiso, 7 cases; Antofagasta, 5 cases.

*Ecuador.*—For the month of October 1944, 108 cases of typhus fever with 14 deaths were reported in Ecuador. These figures include 80 cases of typhus fever with 8 deaths reported in Quito and 12 cases with 1 death reported in Tulcan.

*Irish Free State—Galway County—Loughrea.*—For the week ended November 4, 1944, 1 case of typhus fever was reported in Loughrea, Galway County, Irish Free State.

*Peru.*—For the month of September 1944, 90 cases of typhus fever were reported in Peru, including 58 cases reported in Junin Department, 9 cases in Apurimac Department, 8 cases in Puno Department and 6 cases in Arequipa Department.

*Tunisia.*—Typhus fever has been reported in Tunisia as follows: October 11–20, 1944, 35 cases; October 21–31, 1944, 30 cases.

*Yugoslavia.*—For the period September 8–14, 1944, 161 cases of typhus fever were reported in Yugoslavia, including 83 cases reported in Croatia, 68 cases in Bihac, and 10 cases in Brod.

#### Yellow Fever

*Colombia.*—Yellow fever has been reported in Colombia as follows: Amazonas Department, Caucaya, August 24, 1944, 1 death; Boyaca Department—Vasquez Territory, June 6, 1944, 1 death; Maripi, September 2, 1944, 1 death; Intendencia of Meta, Cumaral, July 1, 1 case (recovered).

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### COURT DECISION ON PUBLIC HEALTH

*Industrial sewage—contract between city and corporation for disposal of.*—(South Dakota Supreme Court; *Erickson v. City of Sioux Falls et al.*, 14 N. W. 2d 89; decided April 7, 1944.) The plaintiff, a citizen and resident taxpayer of the city of Sioux Falls, brought an action against the city, its governing board of commissioners, and a corporation owning and operating a packing plant in the city. The plaintiff sought to have declared invalid a contract between the city's governing board and the corporation relating to the disposition of the industrial sewage from the packing plant through the city sewage system and disposal plant and to procure an injunction restraining the further use of the said sewage system and plant for the disposal of the company's industrial sewage. In 1926 the city and the packing company first entered into a contract for the handling through the city sewage disposal system of the sewage originating in the packing plant. This contract had no time limit and either party could cancel it at will. The parties operated under it until March 1940 when it was amended. As amended, the contract provided, among other things, for certain treatment of the industrial sewage by the packing company before entering the city sewer system and for specified expenditures by such company in connection with the city system, such expenditures having relation to improvements, rehabilitation, replacements, equipment, and operation. It was also agreed that the company could send into the city sewer system all of its sewage for a period of 15 years. The judgment of the trial court was for the defendants and the plaintiff appealed to the Supreme Court of South Dakota. The conclusions of the latter court may be summarized as follows:

(a) The validity of the contract was involved in the litigation, and under a State statute a resident citizen and taxpayer was authorized to test in court any ordinance, resolution, or contract executed by the municipal authorities in any case where the validity of such action was challenged.

(b) The city could exercise its discretion and the courts would not interfere with its action unless it appeared to be unreasonable or arbitrary, where the statute empowered the city to regulate the use of sewers and neither defined the limits of that power nor prescribed the manner of its exercise.

(c) The courts will interfere to keep municipal authorities within the law and will interpose to prevent any action which is ultra vires because of some lack of antecedent legislative authority.

(d) A municipal corporation is a creature of the State constitution and statutes and possesses only such powers as these laws give it, together with only those incidental or implied powers as are necessary to enable it to perform designated and authorized functions.

(e) A city, as such, has no inherent powers and none of the attributes of sovereignty.

(f) The law's policy is to require of municipal corporations a reasonably strict observance of their powers.

(g) A city can only grant to a person or firm within its limits a license or permit to make proper connection and empty sewage into the system for such treatment and disposal as the city may from time to time provide, and it is not within the city's power to guarantee that it will successfully operate a sewage disposal plant or an adequate system. If the system or plant had to be closed for repairs or failed to receive or adequately purify the sewage, the city could not be held liable for resulting damages to any person whose sewage was thereby inadequately treated or excluded. Therefore, a city could not, by contract, assume any such liability or bind itself to receive and dispose of all the sewage which patrons might attempt to empty into its sewage system.

(h) The supervision and regulation of sewers is a police function of the city; hence the city, in granting permission for the use of the sewers in the first instance and for their continuing use, must retain control at all times, and any attempt by way of contract to deprive the city of that control is void.

(i) The city's police power cannot be bargained away by contract but must be available at all times for use to meet such public needs as may arise.

(j) Any license or permit to connect with the city sewers must necessarily at all times be contingent upon the ability of the sewage system and disposal plant to digest and dispose of the sewage involved.

(k) No one has any vested rights in the use of the sewers and the city cannot grant a vested right.

(l) If the system or plant will not handle sewage from a particular source because of its nature or quantity or if such sewage is of such character as to prevent the disposal plant from functioning, it is within the city's power to require the discontinuance of the sewer connection and it may be the duty of the city to do so.

(m) A permit or license by a city to make a sewer connection means only that the licensee may empty his sewage into the system so long as the system will take care of it and the city authorities permit. In its discretion, with which the courts will not interfere unless the action is clearly unreasonable and arbitrary, the city governing board may grant and revoke licenses or permits as may be warranted by the capacity and ability of the sewers and disposal plant and as the public interests may require.

(n) The amended contract in the instant case, by which the city authorities undertook to grant to the packing company the right to empty all of its sewage without limitation as to character or volume into the city system for 15 years, purported to grant far more than is embraced in the license or permit which the city was authorized to grant.

(o) The mere fact that one has expended considerable money to make the sewer connection gives him no vested right to retain the connection.

(p) The packing company acquired no rights in dealing with the city as it had in the past, beyond the city's authority to contract.

(q) The city could accept as voluntary contributions the money it had received from the packing company, but any such past payments, or future payments, neither impose liability upon the city nor conferred vested rights or supervisory control upon the company.

(r) The amended contract between the city and the packing company was wholly unauthorized and void.

(s) It did not follow as a necessary consequence that injunction had to issue to restrain further use of the city's sewers by the defendant company. The issuance of the requested injunction was properly denied because (1) the injunction could be promptly nullified by the issuance of a new permit, and (2) a discontinuance of the sewage outlet through the disposal plant, if continued in force, might either jeopardize the public health or greatly injure the public interests.