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PREVALENCE OF SMALLPOX IN THE UNITED STATES

At this season of the year an increase in the prevalence of smallpox is usual, but this year the reports indicate somewhat more cases of this disease in November than were reported in 1925 or 1926.

The health officers of 41 States reported 452 cases of smallpox for the week ended November 19, 1927; 593 cases for the following week, and 559 cases for the week ended December 3, 1927.

Data from 43 States are available for the week ended December 3, 1927, and the corresponding weeks of 1925 and 1926. These States reported 444 cases for the week in 1925, 595 cases in 1926, and 570 cases for the week in 1927.

PREVALENCE OF POLIOMYELITIS IN THE UNITED STATES

Poliomyelitis is more prevalent this month than it usually is in December. During the week ended December 3, 1927, 42 States reported 172 cases of poliomyelitis. For the corresponding week of 1926 these States reported 34 cases, and in 1925 they reported 37 cases for the week. These figures do not include Ohio, as weekly reports for that State are not available for 1925 and 1926. Ohio reported 22 cases for the week in 1927.

For the week ended November 19, 1927, 42 States (including Ohio) reported 297 cases of poliomyelitis. The following week these States reported 195 cases, and for the week ended December 3, 1927, they reported 193 cases.

Reports for the week ended December 10, 1927, will be found on page 3086 of this issue of the Public Health Reports.

TETANUS FOLLOWING VACCINATION AGAINST SMALLPOX, AND ITS PREVENTION

With Special Reference to the Use of Vaccination Shields and Dressings

By CHARLES ARMSTRONG, *Surgeon, United States Public Health Service*

For a number of years the United States Public Health Service has been deeply interested in post-vaccination tetanus. Studies directed toward determining the origin of the contaminating tetanus

SUMMARY

1. Epidemiological evidence is presented which indicates that post-vaccination tetanus, when it develops, tends to follow severe primary vaccinations performed with large insertions and dressed with some type of shield or covering strapped to the site.

2. Shields and dressings are shown markedly to predispose to the development of post-vaccination tetanus in monkeys and rabbits vaccinated with virus artificially contaminated with *B. tetani*.

3. A proper vaccination is defined as one in which the insertion is not over one-eighth inch in its greatest diameter, made by some method which does not remove or destroy the epidermis. Such insertions treated openly, i. e., without the use of shields or dressings strapped to the site, have never, in so far as we are aware, been followed by post-vaccination tetanus. It seems probable that the adoption of these simple procedures of technique on the part of vaccinators, coupled with a proper warning to the vaccinated individual, or his parents or guardian, concerning the dangers of home-applied shields and dressings, would eliminate tetanus as a complication of vaccination.

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A REPORT ON THE DISPOSAL OF ZYKLON-B RESIDUE FOLLOWING THE FUMIGATION OF THE HOLDS OF VESSELS

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CLEARING TESTS IN SHIP FUMIGATION

In the method of ship fumigation with Zyklon–B at present employed at the New York quarantine station, the practice is to remove all the residue and throw it overboard before clearing the vessel. A series of tests was undertaken to determine whether it would be prac-

tical and safe to leave the residue in the holds following fumigation, which would permit of a better distribution and avoid the necessity of placing the fumigant within a restricted space, as on a piece of canvas.

Careful clearing tests were made on a series of 10 vessels undergoing routine fumigation with Zyklon–B at the port of New York in which the residue was well scattered over the holds of the vessels and allowed to remain as scattered.

The following table shows the results of these tests:

TABLE No. 1.—*Results of clearing tests in holds*

Ship No. and class	Hold No.	Capacity, in cubic feet	Ounces of HCN used	Clearing time, minutes	Weather condition	Local condition
1. Cargo vessel	1	90,669	180	170	Clear; slight breeze	Difficult; vessel located between high docks.
	2	143,392	280	40		
	3	31,255	60	150		
	4	111,149	220	160		
	5	72,372	120	120		
2. Cargo vessel	1	69,130	140	60	Clean and warm; very slight breeze.	Ventilation poor; holds sheltered by superstructure and docks.
	2	111,135	220	140		
	3	80,360	160	80		
	4	50,645	100	90		
3. Cargo vessel	1	27,191	60	40	Cloudy; slight mist, fair breeze.	Very good; holds small and exposed to breeze.
	2	47,157	100	50		
	3	31,816	60	60		
	4	33,131	80	70		
4. Cargo vessel	1	54,100	120	45	Clear; good breeze	Excellent; holds exposed to breeze.
	2	58,400	120	35		
	3	83,500	160	25		
5. Cargo vessel	1	98,126	200	60	Cloudy; air damp, good breeze.	Good; vessel exposed to breeze.
	2	168,826	320	50		
	3	78,223	160	30		
	4	78,773	160	45		
6. Cargo vessel	1	71,100	140	15	Clear; good breeze	Excellent; holds exposed to breeze.
	2	97,300	200	25		
	3	46,380	100	40		
	4	85,000	180	55		
	5	53,070	120	65		
7. Cargo vessel	1	92,070	180	95	Clear; very slight breeze	Poor; no breeze, account high docks.
	2	105,840	220	85		
	3	28,660	60	70		
	4	76,780	160	110		
	5	85,630	180	50		
8. Passenger vessel	1	98,176	200	150	Clear; slight breeze	Poor; deep holds protected by superstructure and docks.
	2	103,000	220	50		
	3	82.000	160	150		
	4	86,000	180	40		
9. Cargo vessel	1	57,740	120	30	Clear; fair breeze	Hold No. 3 damp from rain and sheltered by superstructure.
	2	75,500	150	40		
	3	64,200	120	75		
	4	30,720	60	55		
10 Cargo vessel	1	92,432	180	25	Clear cool; good breeze	Favorable; holds deep but dry.
	2	98,981	200	30		
	3	61,735	120	45		
	4	113,064	230	55		
	5	36,355	80	60		

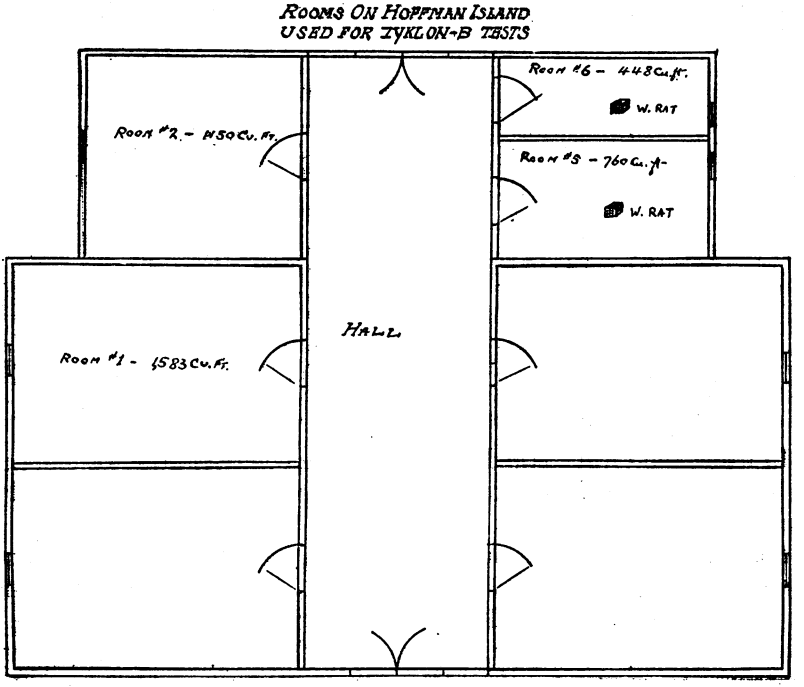
NOTE.—As each vessel was cleared by testing the holds in rotation, beginning with hold No. 1, it frequently happened that the other holds were clear before the test of the first hold was completed. For this reason, the clearing time of hold No. 1 is the best criterion on those vessels on which the holds were cleared in consecutive order.

The method followed in determining whether the holds were clear of gas after fumigation was to lower white rats in a cage to the bottom of the hold and observe them for signs of agitation during a period of 10 minutes, and also to make use of a methyl orange-mercuric

chloride filter-paper test, which is sensitive to approximately 0.1 ounce HCN per 1,000 cubic feet of air space, equivalent to 5 per cent of the concentration of gas used in fumigation. When both tests were negative, further observations by means of taste and smell were made during the actual inspection of the holds.

LABORATORY TESTS OF RESIDUE

As a check on the practical results of allowing the residue to remain in holds after ship fumigation, 75 grams of residue of Zyklon-B which had been used in routine fumigation was gathered up, after



two hours' fumigation and one hour's airing, in a tightly stoppered glass bottle and was brought to the laboratory and placed with a white rat in a large glass jar containing $1\frac{1}{5}$ cubic feet of air space. The top of this jar was covered with heavy paper and the rat was observed for a period of 19½ hours, during which time it showed no signs of agitation and was unaffected when released.

ROOM TESTS

Following the above test, a series of tests was undertaken at Hoffman Island, in a vacant building containing two rows of outside rooms with a large central hallway between them. These rooms

have walls of brick and tile construction and concrete floors, and are plastered and painted on the inside. The measurements as to air-space capacity are shown in the accompanying diagram. Rooms No. 5 and No. 6 contained ¾-inch holes in the doors, with stoppers to fit, through which the rats were observed.

In making these tests, the results of which are shown in Table 2, the residue was gathered up on paper and transferred to the smaller rooms, in which a white rat in a wire cage was placed about 24 inches from the floor. During these tests all the rooms were made practically gas-tight by pasting paper over doors and such places as might permit of the escape of gas, particular care being taken in this regard with the two small rooms in which the rats were placed with the Zyklon–B residue.

TABLE 2.—*Residue tests in rooms*

Test No.	Room No.	Air space	Amount HCN used	"Standard" amount	Exposure	Aired	Residue removed to—	Air-space	Rat exposed	Results
		Cu. ft.	*Oz.*	*Oz.*	*Hrs.*	*Hr.*		*Cu. ft.*	*Hrs.*	
1	1	1,583	4	3.16	2	1	Room No. 6	760	21	Unaffected.
2	2	1,150	4	2.3	2	1	Room No. 5	448	21	Do.
3	1	1,583	8	3.16	2	1	Room No. 6	760	21	Do.
4	2	1,150	8	2.3	2	1	Room No. 5	448	21	Do.
5	1	1,583	12	3.16	2	1	Room No. 6	760	21	Do.
6	2	1,150	12	2.3	2	1	Room No. 5	448	21	Do.
7	1	1,583	8	3.16	2	1	Room No. 6	760	21	Do.
8	2	1,150	16	2.3	2	1	Room No. 5	448	21	Do.
9	1	1,583	4	3.16	2	1	Glass jar	2.36	21	Do.
10	2	1,150	4	2.3	2	1	do	2.36	3	Dead.

In using the term "standard amount" a concentration of 2 ounces of hydrocyanic acid gas per 1,000 cubic feet of air space, as used in routine ship fumigation, is indicated.

Comments.—In conducting these tests a concentration of gas from slightly above standard, as in test No. 1, to seven times standard, as in test No. 8, was used. In removing the HCN in test No. 1 to a smaller, gas-free room, the amount of residue used was two and six-tenths times greater than the amount of residue obtaining in the standard concentration used in ship fumigation, and in test No. 8 the amount used was eighteen times greater.

In tests No. 9 and No. 10 an increase in HCN of about 27 per cent over "standard" amount was used, and the residue was placed in glass jars closed with wax paper and of 2.36 cubic feet of air space, a space one six-hundred-and-seventieth as large as that involved in routine fumigation with an equal quantity of Zyklon–B. The fact that it took three hours to kill a white rat in test No. 10 and that the rat in test No. 9 survived shows that while a small amount of gas (probably chloropicrin) is retained in the residue, it is very far below the minimum lethal dose under open atmospheric conditions such as obtain following ship fumigation.

As the minimum time allowed under present regulations for the clearing of holds of vessels following fumigation is one hour, this period of time was adopted in conducting these tests as being the shortest possible period of airing that the fumigant would undergo in routine fumigation.

Hydrocyanic acid gas being readily absorbed and slowly released by water, it is evident that Zyklon–B can not be scattered on a wet floor of a hold or dumped into a bilge without materially increasing the clearing time of a vessel. For this reason *extreme care should be exercised not to throw the fumigant into the bilges or upon wet surfaces.* Canvas should be used when the floors of the holds are wet. In these tests, both on shipboard and ashore, Zyklon–B was scattered in such a manner as to allow the floor to be easily seen through the residue.

It should be emphasized that these restrictions relate to the holds of vessels and not to the superstructure. As Zyklon-B is corrosive (solvent) to painted or finished surfaces, it should not be used in furnished compartments of the superstructure without interposing heavy paper or waterproof canvas on the floors.

PUBLIC HEALTH ENGINEERING ABSTRACTS

Malaria. Rockefeller Foundation, International Health Board, Thirteenth Annual Report (1926), pp. 111–142. (Abstract by A. L. Dopmeyer.)

Field investigations.—Location of station was changed from Leesburg, Ga., to Edenton, N. C., in order to study a different type of malaria problem. Two major projects were concentrated on during the year, attention being directed toward ecological studies of anopheline mosquitoes. Another major project dealing with county-wide elimination of malaria by means of spleen surveys was begun late in the year. Attention was also given to incidence of sporozoites in the glands of Anopheles mosquitoes; the stage of ovarian development; and the relation of these to the probable age of captured females.

An anopheline control program was undertaken by the station and the town of Edenton. No draining was done and culicines were ignored. Paris green was relied upon to control Anopheles breeding. The actual per capita cost to the town was $0.027.

The board continued to assist in the operation of a training station in malaria control in Corsica. A malaria laboratory was installed at Bastia. A movement was started in Corsica with a view to the development of malaria control from local funds. Experiments were also carried on in Corsica with the use of Paris green and Gambusia, both with satisfactory results.

Laboratory studies.—Studies were continued of possible substitutes for quinine, and the use of the precipitin reaction in the diagnosis of latent malaria was studied.

Malaria control in rural areas in the United States.—On account of satisfactory results obtained in malaria campaigns in towns and cities and the completeness of this work, the board directed its activities to control of malaria in rural areas where the population is sparse, and the per capita income low. General