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Author(s): L. L. Stanley

Source: *Public Health Reports (1896-1970)*, May 9, 1919, Vol. 34, No. 19 (May 9, 1919), pp. 996-1008

Published by: Sage Publications, Inc.

Stable URL: <http://www.jstor.com/stable/4575142>

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**INFLUENZA AT SAN QUENTIN PRISON, CALIFORNIA.**

By L. L. STANLEY, M. D., Resident Physician.

The California State Prison at San Quentin was visited in 1918 by three distinct epidemics of influenza—the first in April, the second in October, and the third in November. These epidemics were similar to the widespread visitations of the respiratory disease which has attacked the inhabitants of almost every part of the world during the year.

The first epidemic began on the 13th of April with the entrance into the institution of a prisoner who had come from the county jail in Los Angeles, where, he stated, a number of other inmates had been ill. This man himself had been sick before he came here, having had pains over his body accompanied by fever. On his entrance to this prison he mingled with the 1,900 men who were congregated in the yard on Sunday, April 14, ate in the general mess with them, and at night was locked in the receiving room with about 20 other newcomers. His illness returned the following day, or at least was aggravated, for he was admitted to the hospital with a temperature of 101, chills, and an aching sensation in the back and bones.

From this time on until May 26 there was an epidemic of unusual severity, with 101 patients admitted to the hospital, of whom 7 developed broncho-pneumonia, and 3 died.

The height of the epidemic was on Tuesday and Wednesday, April 23 and 24, on which days 8 and 16 new cases, respectively, were hospitalized. On these days about one-half of the prison population of 1,900 men was ill. The records show that whereas ordinarily only 150 to 200 men call each day at the hospital for treatment, consultation, and advice, on these days 700 and 750, respectively, appeared. Instead of the usual number of from 3 to 7 being excused from work on account of sickness, at this time there were from 25 to 62. All of these men excused from their ordinary tasks were quite ill, having temperatures ranging from 100 to 101, with pains in the back and severe prostration. They should have been placed in the hospital, but it was impossible to put them there on account of lack of facilities. They were allowed to stay in the open air and were not permitted to go to their cells until evening, because it was believed that this unusual disease might be increased by confinement in stuffy rooms during the day.

Many other prisoners who were obviously sick stayed with their work, and after a few days felt somewhat improved. So many, in fact, were ill, that in the jute mill, tailor shop, furniture factory, and foundry it was almost impossible to keep up operations, and the advisability of a complete shut down was for a time considered.

The weather at this time was warm and balmy, with much sunshine, and the men who felt ill were allowed to leave the mills for periods to go outside. Many felt too ill to return to work and lay down on the ground in the sunshine.

The epidemic gradually subsided, but it is safe to say that over 500 of the men were ill.

It is a noteworthy fact that the disease reached its height on Tuesdays and Wednesdays of the second and third weeks. An explanation offered for this is that on every Sunday morning two moving-picture shows are held, one at 8 and the other at 10 o'clock. The room in which these shows are given is partly underground, poorly ventilated, artificially lighted, and at both shows tremendously crowded. Here, at one or the other of the shows, almost all of the 1,900 prisoners attend, and before the morning is over the room is moist, warm, and foul with smoke and human odors. Fans have been installed, but they are not efficient. Between the shows little time is allowed for refreshing the atmosphere, one body of prisoners entering as soon as the other leaves. Some prisoners remain for both shows, while others complain of acquiring headaches while there and refrain from attending.

Assuming that this respiratory infection attacked its victims at the shows on Sunday, it would seem that there was an incubation period of from 36 to 60 hours, which produced the sudden illness on the following Tuesday or Wednesday. A typical history of many of the cases is that on Sunday they visited the show, and that on Tuesday or early Wednesday they were seized with headache, fever, chills, bone ache, severe prostration, and sometimes nausea. Chart I (a) shows the incidence of the disease with the apparent Tuesday and Wednesday increase.

Reverting to the incidence of the disease, it seems probable that the epidemic was started and introduced in this prison by the new arrival from Los Angeles, for he was the first one ill, and others became sick shortly after he arrived. Of course, he was closely associated with the other men, and could probably have passed it on by droplet infection.

It was noticeable to members of the hospital staff that many of those who were under treatment for the influenza were also syphilitic, and previous to this had been given considerable mercury and salvarsan. Ten per cent of the 101 cases were afflicted with syphilis. This however, is the normal percentage of luetics among the prisoners as determined by the Wassermann reaction at the time of their entrance.

Chart I (b) shows the age incidence. There were 27 per cent between the ages 20 and 25, and 26 per cent between the ages 25 and 30.

Seven per cent of the hospital cases developed pneumonia, among which three died. Those who died passed away very quickly, first becoming dyspnoic, cyanotic, and often expelling a thin, sanguineous fluid from the lungs.

In this epidemic 9 per cent of the cases, after two or three days, had a subsidence of all symptoms and were discharged from the hospital, but in about 10 days returned with a recrudesence.

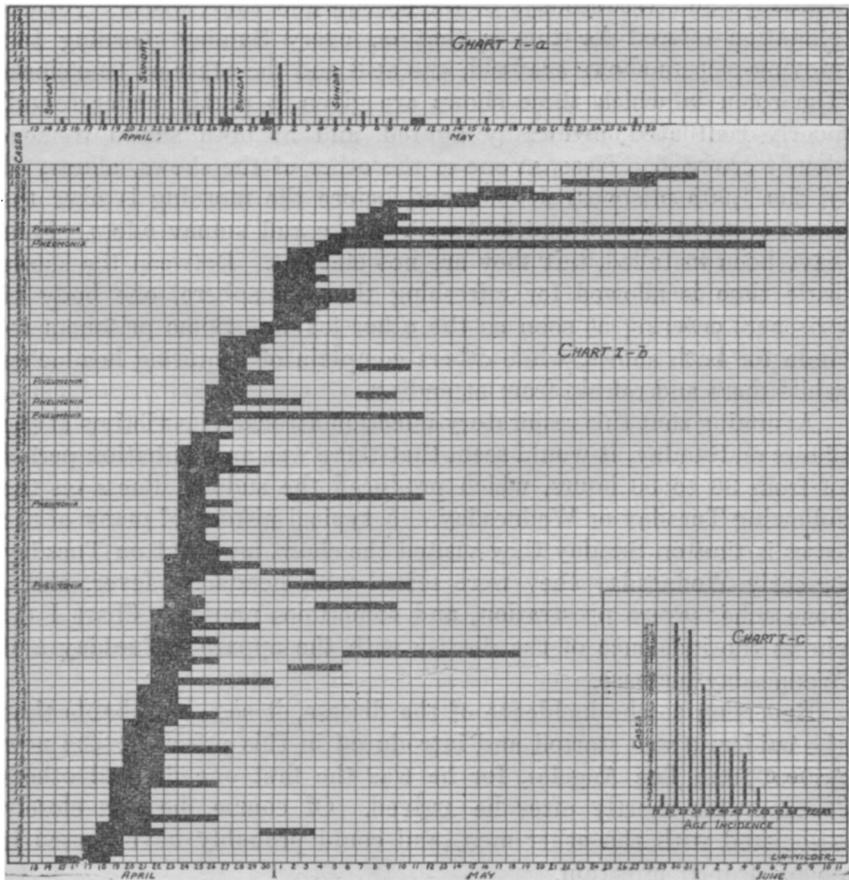


CHART I.—April-June epidemic:  
a. Morbidity and mortality; solid black rectangle shows mortality.  
b. Duration of disease in each case.  
c. Age incidence.

All races were attacked by the disease. Eighteen per cent were Mexicans, 6 per cent Negroes, and 3 per cent Chinese.

A number of those attacked by the influenza were probably so weakened that tuberculosis was able to develop in them. One, later, developed tuberculous glands of the neck. Four developed pulmonary tuberculosis, of which one died. One who had tuberculosis

in a latent state, was attacked, and had, as a result, an active, open phthisis.

A second epidemic broke out in the prison on the 3d of October, when it was probably reintroduced by a new arrival, likewise from the Los Angeles jail. This prisoner stated that one of the deputies who brought him to the penitentiary and who occupied a compartment with him on the night train, had complained of feeling ill, with cough, restlessness, and thirst.

On the day following his arrival at San Quentin, the prisoner became ill and was admitted to the hospital with typical Spanish influenza, which, at that time, was becoming epidemic on the Pacific coast. He had, however, before his admission to the hospital, spent one night in the receiving room where there were 10 other men, had taken his meals with the 1,900 other prisoners, and had been interviewed by many of the old-time prisoners who were anxious to get all the news from the outside of the jail.

The epidemic came on slowly and reached its height on October 21. In all, there were 69 cases with 8 or 12 per cent developing pneumonia, and 2 deaths. Unlike the April attack, there were fewer ambulatory cases, and all who became ill were placed in the hospital and kept there until defervescence and subsidence of symptoms. The disease may be said to have attacked only 3.7 per cent this time, while in the former epidemic about 27 per cent of the entire population was ill.

No Sunday picture show was held on October 20 (Chart II (a)), but instead, there was an open air band concert by the Oakland Municipal Band. This concert was held in the open yard, but the prisoners crowded around the band, and were loud in their cheers. The day following this concert there was an increase in hospital admissions.

On October 22 masks were provided for all the men as well as for the officials and their families.

These masks were made of washed flour sacking, one ply, sewed in the shape of a bag which fitted over the nose and cheeks and up under the chin, and were fastened at the two corners by tape and elastic bands which went behind the head. They resembled in shape the nose bag used for feeding horses. Air, of course, could go through the cloth, and there was considerable air space in the bag, for in no way did the material touch the external nares or the mouth. For several days the men used the masks, but soon discarded them for the most part.

On account of the inconsistent manner in which the masks were worn, it is doubtful if they helped to any appreciable degree the stamping out of the epidemic.

Toward the end, about 30 of the hospital attendants and a few of the other prisoners were vaccinated with Leary vaccine. With this number the efficacy of the vaccine was indeterminable.

Chart II (c) shows the age incidence. Twenty of the 69—were between the ages 20 and 25. There were 17 per cent each between the ages 25 and 30 and 30 and 35.

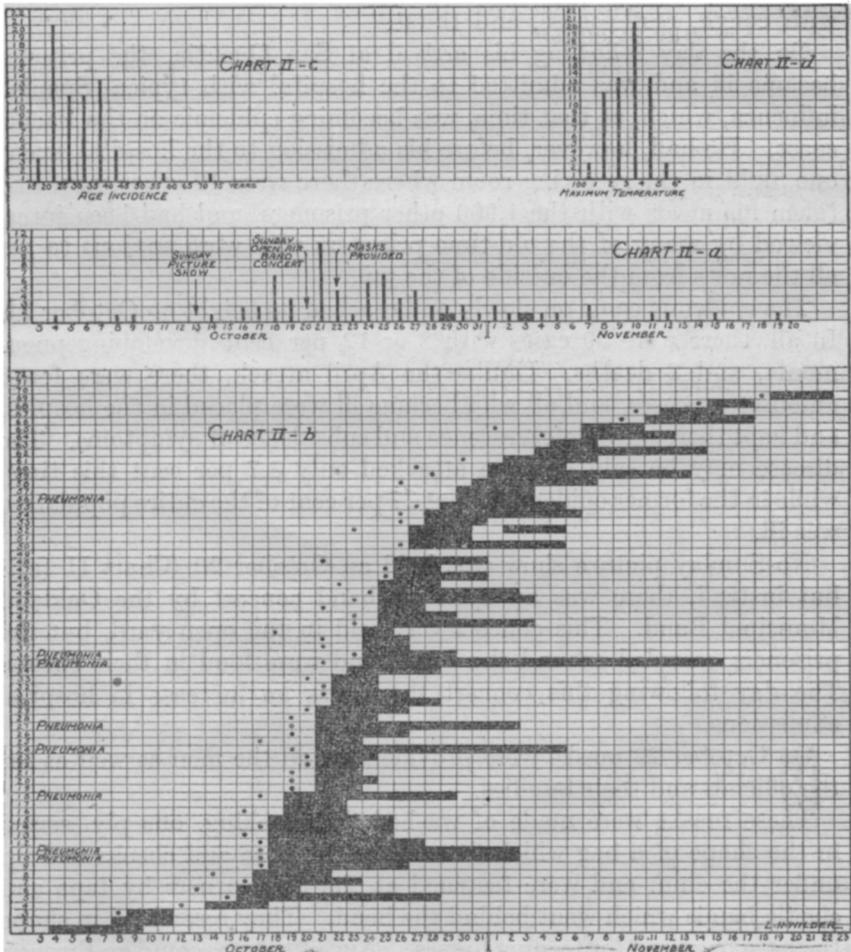


CHART II.—October–November epidemic:  
 a. Morbidity and mortality; solid black rectangle shows mortality.  
 b. Duration of disease; solid black shows days in hospital.  
 c. Age incidence.  
 d. Maximum temperature.

The temperature in most of the cases was high, the maximum in 29 per cent being between 103° and 104°, as shown in Chart II (d). Forty-two of the 69 prisoners attacked by the disease had entered prison since the April epidemic; twenty-seven of the 69 had been in

San Quentin at the time of the April epidemic and, so far as determinable, had not been ill at that time.

The third epidemic began on November 25, the last case of which was admitted on December 4. It covered a period of 9 days, and began 11 days after the end of the October epidemic.

On Sunday, November 24, the picture shows were allowed to be opened after having been closed for over six weeks. Of course, there was a large attendance at both the 8 and 10 o'clock shows.

After this the epidemic broke out very suddenly, and from Tuesday noon, November 26, to Wednesday noon, November 27, there were 24 well-defined cases admitted to the hospital: Other cases appeared as shown in Chart III (a), there being in all 59 cases, with no pneumonias and no deaths. (Three not included on chart; in cells but not hospitalized.)

From noon of the 27th until Thanksgiving morning, November 28, no new cases appeared, but on this holiday three more prisoners became ill. As is usual on Thanksgiving Day, there was a field meet between the various departments of the prison. About 200 prisoners took active part in this meet, while about 1,600 others were spectators, crowded about the side lines. The meet was held in the open air, but the prisoners were closely packed. They cheered and yelled enthusiastically. For the three days following this celebration there were nine, five, and eight patients admitted, respectively.

The sudden flare-up after the apparent obliteration of the disease led to the belief that the disease had been reintroduced and that it had been spread in the Sunday show and during the field meet.

It was found that prisoner A had on Thursday, November 21, arrived by train from Colusa County, where the epidemic was raging, that he became ill the following day but did not report at sick call, and that he had been assigned to the receiving room with 10 or 12 other prisoners. Even though ill, he attended the 8 o'clock Sunday morning show, and was admitted to the hospital that evening with a temperature of 102 and unmistakable signs of influenza.

In this same receiving room were prisoners B and C, who slept in beds adjoining that of A. B stated that A accidentally sneezed and coughed in his face about 4 o'clock Sunday afternoon. At 9 o'clock Tuesday morning B began to have headache, fever, and chills.

C was closely associated with both A and B. He went to the first Sunday show and became ill about the same time that B did.

In these three cases it seems probable that A contracted the disease on the train coming to prison, that he spread it in the show, and infected B and C by close contact in the receiving room.

Working on the belief that the picture show on November 24 was the place where the infection was spread, interesting data on the incubation period were obtained.

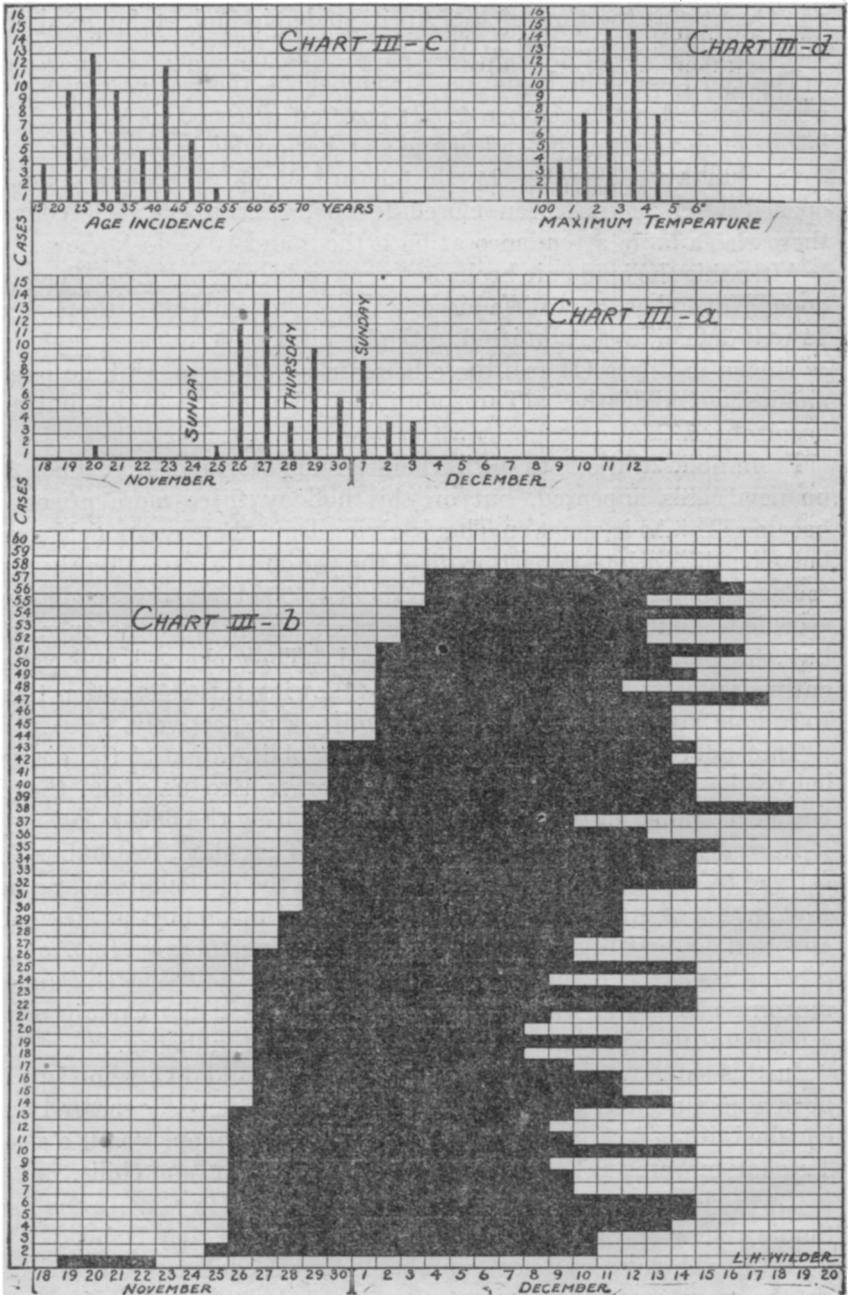


CHART III.—November–December epidemic:  
 a. Morbidity chart.  
 b. Duration of disease in each case; solid black shows days in hospital.  
 c. Age incidence.  
 d. Maximum temperature.

The following table indicates the man's prison number, his theater location number, the show he attended, the day he became ill, and the number of hours elapsing between attendance at show and becoming ill:

Prisoner's number.	Theater location number.	Sunday show attended.	Day became ill.	Hours elapsed.
31852.....	18	Second.....	Monday.....	15
25852.....	12	do.....	do.....	36
29854.....	4	do.....	do.....	38
31081.....	5	First.....	Tuesday.....	45
31889.....	17	Second.....	do.....	44
32102.....	13	do.....	do.....	56
32106.....	14	First.....	do.....	46
26019.....	9	Second.....	do.....	42
29399.....	8	do.....	do.....	52
31330.....	10	do.....	Monday.....	31
31718.....	15	First.....	Tuesday.....	52
32024.....	25	Second.....	do.....	32
31865.....	23	do.....	do.....	48
32023.....	21	do.....	Monday.....	22
31855.....	22	First.....	Tuesday.....	58
31866.....	19	do.....	do.....	50
30795.....	27	do.....	Wednesday.....	76
31660.....	28	Second.....	Tuesday.....	57
25290.....	29	First and second.....	Monday.....	34
29561.....	34	First.....	Wednesday.....	84
31831.....	35	do.....	Thursday.....	90
30880.....	37	do.....	do.....	92
32094.....	43	do.....	Wednesday.....	72
31400.....	44	do.....	Tuesday.....	50
28012.....	45	do.....	Thursday.....	108
27139.....	44	do.....	Friday.....	134
31693.....	45	do.....	Saturday.....	146
27704.....	48	Second.....	Friday.....	125
32041.....	49	do.....	Monday.....	24

From these figures it appears that the period of incubation is about 48 hours. It is probable that those who became ill after Thursday obtained their infection at the Thanksgiving Day field meet, or, secondarily, from some one ill before that time, and not at the show.

In order, if possible, to prove that the picture show was the means of spreading the disease, a ground-floor sketch of the room (Chart IV) was made. This diagram was shown to each of those ill and he was directed to indicate as nearly as possible the relative position he occupied.

The circles indicate those at the first show and the squares those at the second. Although their positions could not be accurately determined, it is seen that there were approximately five foci about which the infected sat. The largest one was in the center of the room, while at each corner, apparently, there was a focus. More were infected at the second show than at the first.

None was infected in the orchestra pit, where there were about 10 men. The pit is about 9 feet in front of the first row of seats.

In this epidemic it has been found that certain groups were attacked. In one room of 18 men where night school is held and the prisoners come in close contact during their studies, 4 were infected.

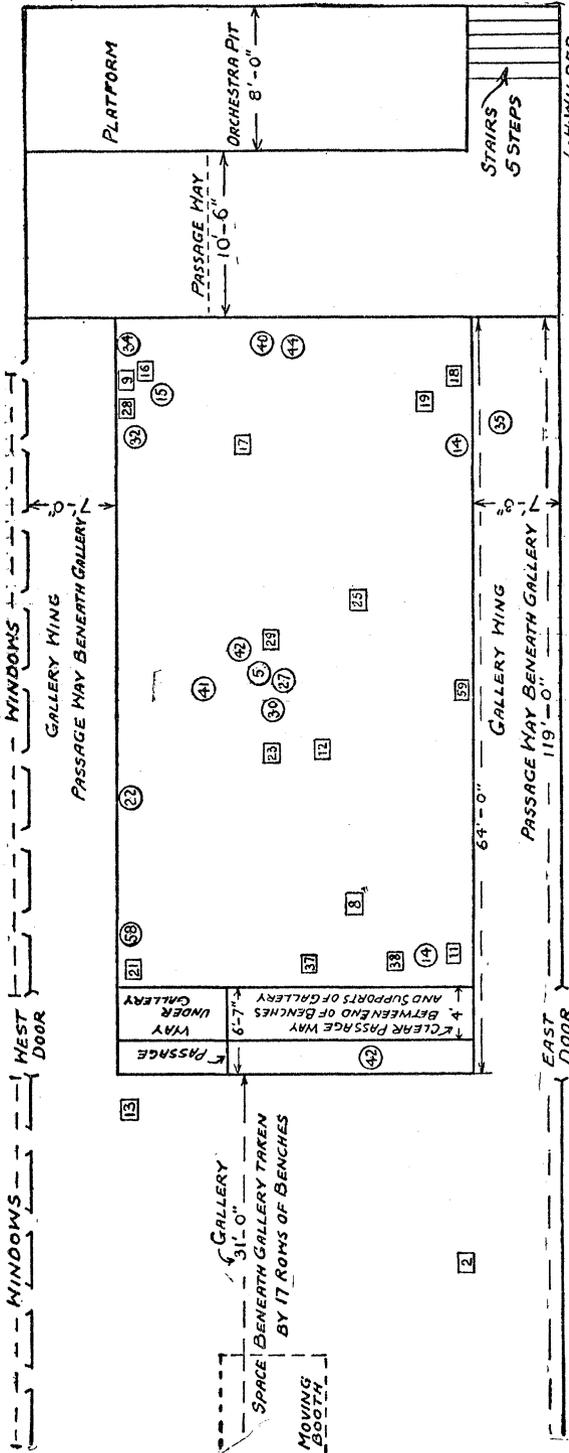


CHART IV.—Grouping of prisoners who became ill with influenza after attending movies, Nov. 24, 1918. Circles represent prisoners at 8 o'clock show; squares, those at 10 o'clock show.

In another instance, prisoner D became ill Tuesday at 2 o'clock, but did not go to the hospital. That evening, although quite ill, he had occasion to go to the prison vault with the State clerk. Both remained in this close place for 15 minutes, inspecting some records. On the next Thursday at 10 o'clock the State clerk became ill with influenza. This was just 40 hours after the two had been in the vault together.

Another case is that of prisoners E and F. E went to the first show, worked all day Monday, and became ill on Tuesday. Next to his loom in the jute mill was one operated by prisoner F. Both men were in close contact all day Monday. F had not attended the Sunday show, had been in a single cell, but became sick on Tuesday afternoon. Possibly E gave the disease to F while the two were working together in the mill.

All of these instances lead to the belief that the disease is transmitted by close contact.

At this prison there is a woman's department which had, at the time, 30 female inmates. They were in a separate building and did not come in contact with the men at all. None of the women was ill with the Spanish influenza in any of these three epidemics.

Chart III (c) shows the age incidence in this last epidemic, in which 20 per cent were between the ages of 25 and 30, while 18 per cent were between 40 and 45 years. Those of the older ages were attacked more in this wave than in the previous ones.

Chart III (d) shows that the greatest number had maximum temperatures of 102 to 103 degrees.

Of the 58 cases in this epidemic, 26 entered prison before April, and none of them, so far as can be determined, was ill at that time. Thirty-two had arrived since April.

Masks were not used in this last epidemic, since, from the previous experience of the October visitation it was believed they were of little value because the prisoners would not use them. It was considered better to warn the inmates against close contact and congregating in inclosed places. All assemblages were prohibited.

As soon as an inmate reported ill he was immediately placed in the hospital and quarantined. Here he was held for at least 10 days after subsidence of symptoms.

To provide against introduction of the influenza into the prison by possible carriers, it was arranged to place all new arrivals in isolation for at least four days before allowing them to be turned loose in the yard with the other men. It was also arranged that masks should be worn by all prisoners who had receptions with friends or relatives. At these receptions the visitor sits at a narrow table opposite the prisoner. It was believed that masks would prevent a possible carrier from infecting the prisoner.

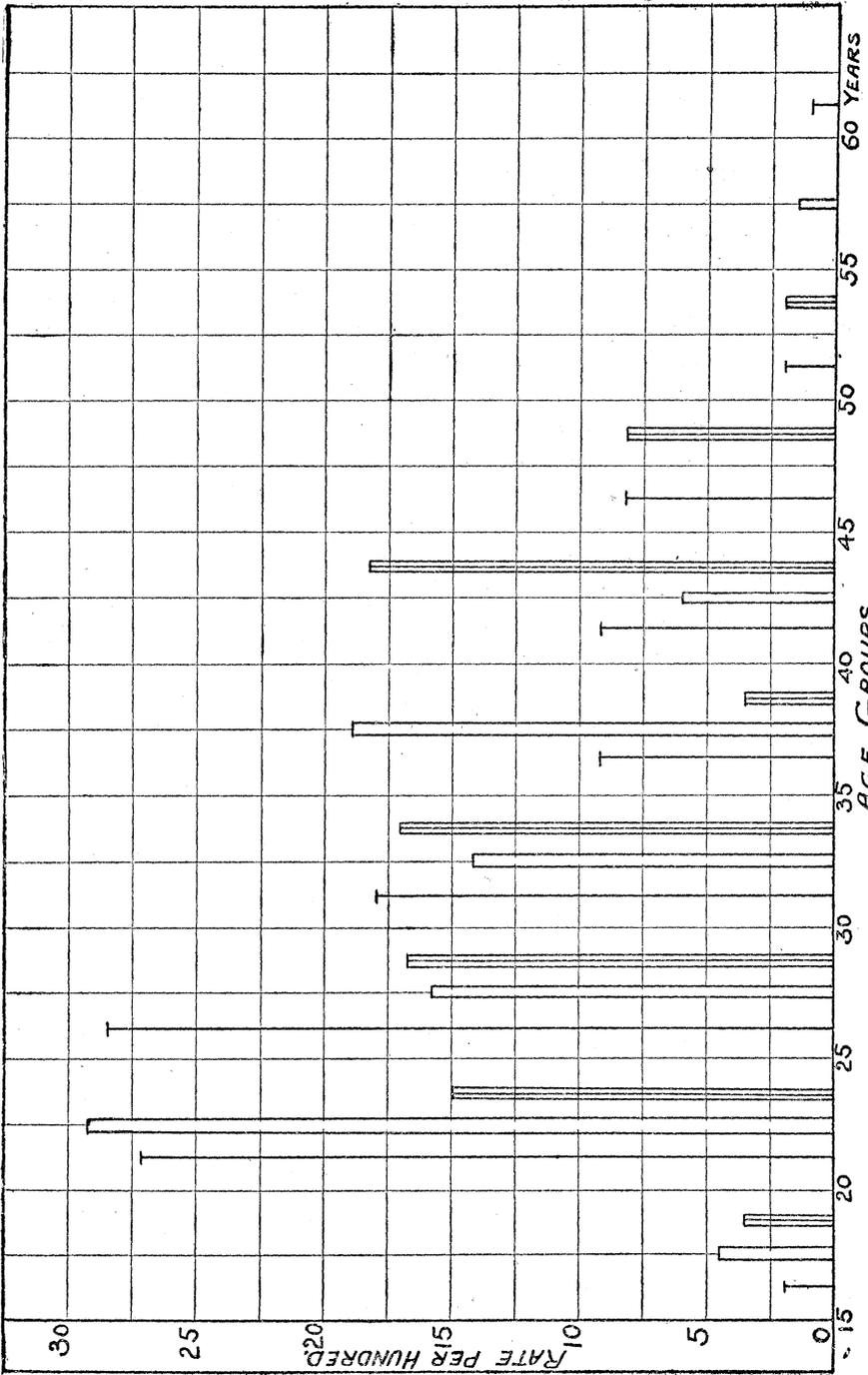


CHART V.—Comparative age incidence. Single line, April-June epidemic; double line, October-November epidemic; and triple line, November-December epidemic.

Probably as a result of these precautions there was no return of the epidemic, although surrounding cities had many cases after December.

On Sunday, December 20, after a lapse of one month following the last outbreak, the picture shows were allowed to open again. At these shows it was arranged to have one-half of the men wear six-ply gauze masks and the others to act as controls without this protection. No influenza developed in either group. On Wednesday, December 25, the same experiment was tried with a like result. Several other subsequent shows were in this way tried out with no developments.

During the year all State prisoners were committed to San Quentin. In case they were found to be recidivists, they were sent, in turn, from this place to the California State Prison at Folsom, 100 miles away.

Folsom prison had been free from Spanish influenza until December 23, when prisoner G arrived that evening from San Quentin with a temperature of 102.6 and unmistakable signs of influenza. This prisoner G had been in quarantine at San Quentin for four days, and when he left for Folsom on the morning of December 23 his temperature was normal, and he had no symptoms. An examination of these transfers is always made to prevent such an occurrence.

Two days afterwards, one of the guards who accompanied this prisoner to Folsom became ill, and within two weeks there were over 100 cases there, including the resident physician, the pharmacist, and three nurses. It may be said that at San Quentin during all three epidemics, none of the hospital force, including staff, nurses, and attendants, became ill.

From a study of these three epidemics various conclusions can be fairly definitely drawn:

1. Each epidemic was apparently introduced by a recently infected entrant.
2. Close contact in crowded, poorly ventilated show rooms probably spread the infection.
3. The incubation period is from 48 to 60 hours.
4. The second epidemic was less severe than the first, and the third less severe than the second, as shown by the number diseased, number of pneumonia cases, and number of deaths in each.
5. The infection spread in definite groups by close contact, as shown by its course in the rooms where night school was held.
6. The disease in the first and second epidemics attacked more prisoners between ages 20 to 25, but in the third, more between the ages 25 and 30 as well as 40 to 45 became ill.
7. The most effective means available for combating the spread of the disease in this prison were hospitalization, quarantine, isolation, and closure of congregating places.
8. From the first epidemic it is seen that 5 per cent developed tuberculosis.

9. It appears that those men who entered prison after the April epidemic were attacked in greater numbers than those who had come before, although there were more of the latter than the former.

### INFLUENZA AMONG AMERICAN INDIANS.

The following is a summary tabulation of cases (as reported) and of deaths from influenza among American Indians during the period October 1, 1918, to March 31, 1919, the data having been furnished through the courtesy of the Office of Indian Affairs, Department of the Interior:

*Number of cases of influenza reported and of deaths from influenza among American Indians during the period Oct. 1, 1918-Mar. 31, 1919, by States and geographic divisions: Indicated morbidity rate and case fatality rates and mortality rates.*

Geographic division and State.	Population.	Number of cases.	Number of deaths.	Indicated case rate per 100.	Death rate per 1,000.	Indicated case fatality rate per 100.
ATLANTIC STATES.						
New York.....	5,982	800	80	13	13.4	10
Florida.....	585	66	10	11	17.1	15
North Carolina.....	2,343	781	37	33	15.8	5
Total.....	8,910	1,647	127	18	14.3	8
CENTRAL STATES.						
Michigan.....	1,097	50	2	5	1.8	4
Wisconsin.....	9,696	2,557	156	26	16.3	6
Kansas.....	2,275	860	20	38	8.8	2
Nebraska.....	2,834	861	60	30	21.1	7
North Dakota.....	9,216	2,349	120	25	13.0	5
South Dakota.....	23,890	8,559	755	36	31.6	9
Minnesota.....	5,792	1,633	85	28	14.7	5
Oklahoma.....	118,227	15,217	861	13	7.3	6
Iowa.....	353	125	9	35	25.0	7
Total.....	173,383	32,211	2,068	19	11.9	6
MOUNTAIN STATES.						
Arizona.....	45,707	17,237	1,948	38	4.3	11
Colorado.....	1,222	399	59	33	48.3	12
Idaho.....	4,208	634	72	15	17.1	11
Montana.....	12,079	2,037	138	17	11.4	7
Nevada.....	2,854	964	49	34	17.2	5
New Mexico.....	22,005	10,550	1,214	48	55.2	12
Utah.....	1,704	448	72	26	42.6	16
Wyoming.....	1,696	16	1	1	.6	6
Total.....	91,475	32,285	3,553	35	38.9	11
PACIFIC STATES.						
California.....	16,416	4,398	256	27	15.6	6
Oregon.....	4,355	1,097	94	25	21.6	9
Washington.....	10,315	2,013	172	20	16.7	9
Total.....	31,086	7,508	522	24	16.8	7
Grand total.....	304,854	73,651	6,270	24	20.6	9