

U.S. NAVY YARD, MARINE ISLAND, CAL.
Feb. 28, 1919.

12-11-19
J.M.C.

FROM : Medical Officer, Navy Yard, Mare Island, Cal.
TO : Bureau of Medicine & Surgery, Navy Department,
Washington, D.C.
Via : Commandant, Mare Island, Cal.
Subject : Influenza epidemic, Mare Island, Cal.;- special report on.

1. The following report is divided into four sections; the first section giving the history of the epidemic, chronologically; the second section, the activities of the Medical Department among civil communities; the third section, a discussion on therapeutics, and the fourth section, statistics:-

Section I.

HISTORY OF EPIDEMIC

2. The first intimation, other than vague newspaper reports, received at this station of the possibility of a widespread epidemic of influenza, was on September 20, 1918, when a warning letter from the Bureau of Medicine & Surgery dated September 10, 1918, was received from the Medical Aide to the Commandant, 12th Naval District, stating that the disease was prevalent at Naval Stations of the First Naval District.

Early Preparations.

3. At the time this was received, the Medical Department of the Station consisted of three main subdivisions, namely, that caring for the Naval Training Camp with a daily average complement of 5,699 men, the Marine Post and Naval Prison with a daily average complement of 2,369 men, and the industrial section of the Yard with a daily average complement of 8,400 civilian employees, a total of 16,468. In addition to this there was an unknown number of contractors employees and families. A copy of the warning letter from the Department was furnished the executives of these three subdivisions, and they were directed to study the disease, local situation and prepare for the approaching epidemic, and consultations were held with this end in view.

4. On September 23, 1918, recommendations were made to the Commandant relative to the publishing of an influenza circular for instruction of all personnel. This was issued on September 25th. (page 2).

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U. S. Navy Yard,
San Diego, California.

September 25, 1917

INFLUENZA

1. Influenza, Spanish Influenza, or Grippe, has made its appearance in the eastern and middle western States in the form of a rapidly spreading epidemic. Since it will undoubtedly be carried here the following information is given in order that you may be in a better position to prevent its spread, thereby protecting the members of your household and your neighbors.

2. No other communicable disease which involves epidemic proportions spreads so rapidly, or attacks so large a proportion of the population, no age, sex, or class of society being immune.

3. The infectious agent is the influenza germ which is carried by the secretions of the nose and mouth.

4. The modes of infection are: (1) directly from the infected individual by coughing, spitting, sneezing or by in any way coming in contact with the nasal or mouth secretions; (2) by indirect methods through contact with articles coated by the above mentioned secretions such as handkerchiefs, books, newspapers, etc. In this connection it must be remembered that the disease germs often persist in the nose and throat for some time after the symptoms of the illness have subsided.

5. The incubation period is very short, one to four days, average two.

6. **Methods of Control:** (1) Early recognition of the case: In order that cases may be early recognized a brief description of the onset and symptoms is given. Onset usually rapid with a chill followed by fever from 100° to 104°, great depression, weakness, dizziness, severe headache, malaise, pains and aches of muscles and joints all over the body, the throat may feel sore, the eyes are congested and do not bear the light well. There are practically always symptoms of a bad cold with running eyes and nose, soreness and tightness of chest with coughing. Anyone presenting the foregoing symptoms, or any one of them should report at once to a Medical Officer. (2) When the case has been recognized rigid isolation must be carried out; only one attendant for each case, attendant must wear gown and gaiter face mask.

7. Concurrent disinfection must be practiced to include all articles which have come in contact with the patient such as clothing, bedding, newspaper, books, papers, letters and all personal belongings of attendant. Careful washing in a warm, well ventilated room is an essential part of the treatment. Pneumonia is a common complication.

8. Terminal disinfection, thorough cleaning and airing of the compartment occupied and sterilization of all linen and bedding of patient.

9. Vaccination against influenza is partially successful.

10. General methods to prevent the spread of infection.

(1) Avoid crowded assemblages during the epidemic such as theatres, picture shows, public gatherings of all kinds.

(2) Avoid traveling on congested public conveyances.

(3) Do not cough, spit, or sneeze promiscuously; always use your handkerchief over your mouth when coughing or sneezing.

John L. Nelson,
Commander, Medical Corps, U. S. N.

Approved
HARRY GEORGE
Captain, U. S. Navy, Retired
Commandant

September 23, 1918.

Commandant, Mare Island, Cal.

Subject: Additional Medical Officers and Hospital Corpsmen for temporary duty, Mare Island, Cal.

It is requested that steps be taken immediately to have available for assignment to duty within a period of three days from the time of submitting telegraphic request for same, the following personnel:

Medical Officers - - - - 6
Hospital Corpsmen - - - 40
Nurses (female) - - - - 6

2. The Medical Officer has consulted with the Naval Hospital authorities and the consensus of opinion is that it will be impossible for the Hospital to care for all cases of Influenza which may develop as a result of an epidemic starting on this Station.

3. It is impossible to consider for an instant that an epidemic of this disease will not occur. The nature of this disease (which is the true Influenza) is extremely severe, and cases require careful nursing. Not only for the purpose of alleviating the disease itself, but also for the purpose of reducing to as large an extent as possible the occurrence of Pneumonia which is particularly prevalent in these cases.

4. As the result of the above condition, it is practically certain that it will be necessary to establish temporary Hospitals within the confines of both the Naval Training Camp and the Marine Barracks for the care of the cases themselves, limiting transfers to the Naval Hospital largely to cases of the severest type for those who develop Pneumonia.

5. Reports from the Naval Training Station, Great Lakes, shows that 20% of the complement is infected, and of the 20% infected, 10% developed Pneumonia. On the bases of the complement of this Station which is at present practically 8,000, this would mean an estimated number of cases of 1,600 and an estimated number of Pneumonia's as 160.

6. All these cases in all probability would develop within a period of approximately three weeks from the time the epidemic started.

7. The Hospital authorities state that they would be unable to spare 6 Medical Officers and 6 nurses and 40 Hospital Corpsmen for temporary duty at the Navy Yard, as the Hospital itself would be so active as to demand the services of all the personnel now attached.

subject : additional Medical Officers and Hospital Corpamen for temporary duty, Mare Island, Cal.

3. Until the epidemic is passed, it is urgently recommended that no Medical Officers or Hospital Corpamen will be detached from this station.

John L. Neilson.

September 24, 1918.

To : Commandant, Mare Island, Cal.

Subject : Influenza.

Enclosure: Provision for limiting spread of approaching epidemic and care of the sick.

1. The enclosure is submitted with the view to minimizing the epidemic of Influenza which is approaching, and to provide means for proper care of the anticipated sick.

2. The matter of spacing of the men in Barracks, the care of mess gear have already been taken up with the Commanding Officers of the Naval Training Camp and Marine Post.

3. The matter of establishing cubical isolation in sleeping spaces is already under investigation with a view to determining the amount of material necessary.

4. The matter of provision of additional personnel for the Medical Department and the publication of notices of instruction have already been taken up with the Commandant. The Medical Officer considers it essential to provide Hospital care and Medical attention to a certain type of federal civilian employee who may be affected with the disease. There are large numbers of this class of personnel who have no home other than a single room, and who depend upon restaurants for their meals. Such individuals if taken sick would be unable to provide themselves with proper nursing, medical attention or food. In view of the fact that these men are essential to war work, it is considered logical that the Government afford them these facilities in the present emergencies.

5. The enclosure is submitted as a plan of campaign after consultation with the Sanitary Officer of the 12th Naval District, and contains suggestions which should be put into effect as rapidly as possible. Certain elements in the enclosure which are of a purely medical nature will be cared for by instruction and observation of medical officers, but are included in order that the Commandant may be fully informed as to the steps taken.

6. Subsequent suggestions will undoubtedly become necessary and will be submitted at the earliest practicable moment.

John L. Neilson.

September 24, 1918.

Commandant's Order No. 386

Subject: Precautions to be observed in anticipation of an epidemic of influenza at Mare Island.

1. Controlling Officers shall comply as far as practicable with the following regulations:

(a) No recruits or drafts to be sent to this Station until the probability of a epidemic no longer exists.

(b) Sleeping space per man to be 50 square feet; overflow to be placed in tents.

(c) Cultural isolation to be established by hanging curtains between each bunk or cot and between each hammock. Sheets and other available material may be used for this purpose.

(d) A copy of this notice to be conspicuously posted, and all enlisted men and civil employes to be made acquainted with the contents thereof.

2. It is impossible to establish a strict quarantine at this Yard without closing the Yard, and no efficient separation between civilians and military personnel can be established. A modified quarantine as follows is hereby directed:

(e) Continue 21 day detention of all arrivals as at present.

(f) When cases develop in adjacent towns stop liberty; stop congested gatherings of personnel, such as theatres, moving pictures, recreation rooms, reading rooms, churches, class rooms, etc. Permit only drills, amusements and instruction in the open air.

(g) Strict isolation of cases of the disease, with concurrent and terminal disinfection. Attendants on cases to wear gowns and face mask and to observe strictly the disinfection of the hands after handling cases. Cultural isolation of patients as above provided to be complied with.

3. All spoons, knives, forks and eggs, and other articles of mess gear to be boiled in disinfecting machines for a period of five minutes. Competent persons are to be detailed to see that this provision is carried out.

4. Fatigue of personnel to be reduced by limiting drills and other military exercises. Clothing protection to be ample, and latitude to be permitted consistent with the maintenance of discipline. All washable clothing to be steam laundered, especially handkerchiefs and towels.

5. The swimming pool is to be given a little chlorine in excess of that used at present, and is to be closed entirely if influenza appears on the Station.

6. All sanitary drinking terminals with globe tips to have the porcelain globe portion of the terminal removed.

CARE OF SICK.

7. Additional personnel to cope with an anticipated epidemic has been requested by the Commandant. Provision for temporary hospital facilities for sick within the limits of the Naval Training Camp and Marine Barracks, to be accomplished either by hospital tents or the assignment of certain barrack buildings for that purpose. Severe cases or those developing into pneumonia to be sent to the Naval Hospital; mild cases may be cared for in temporary hospitals established in the camp.

8. Provisions for the care of civilian sick to be established at the Island, such civilian cases to be limited to those individuals who have no home where they can be nursed and fed while sick. The Naval Hospital has arranged to care for severe cases and pneumonia among civil employes, and if necessary, mild cases may be treated in temporary hospitals at camp or temporary hospital near Yard Dispensary.

HARRY GEORGE,
Captain, U. S. Navy, Retired,
Commandant

Appearance of First Case.

11. While the work of preparation was going on as rapidly as possible and the feeling still existed that considerable time yet remained before the epidemic would reach us, a case suddenly appeared on the Island on the night of September 25th. This case was in the person of a hospital corpsman who reached the Navy Yard at 8:30 p.m. that night, returning from three weeks leave in Oklahoma. This was a typical case, and had been taken ill on the train. He was transferred at once to the hospital, the dispensary cleaned up and all contacts given antiseptic sprays and kept under close observation.

12. On September 26th, the Health Officer of San Francisco telephoned that six cases had occurred in San Francisco, and as a result all leave beyond the regular 24 hour liberty was stopped and gatherings of personnel for instruction and amusement were limited to those in the open air.

Advance Consideration of Treatment.

13. On the night of September 26th, a conference of Medical Officers was held to discuss the subject of treatment as it was realized that a sudden rush of a large number of cases of the disease would undoubtedly result, and a definite decision must be reached as to the exact type of treatment to be carried out, and in the absence of information which gave any real satisfactory treatment, it was hoped that some suggestions might be offered. The general treatment was readily evident, namely absolute rest, evacuation of bowels, proper diet and careful nursing. The consensus of opinion was that Sodium Salicylate was the best drug but the usual difficulty existed in getting a large enough dose into the patient without poisonous symptoms. Lieutenant James J. Hogan, Medical Corps, USNRF, who was present at the conference, suggested the use of Sodium Salicylate intravenously in sterile solution as being the best method of exhibiting the drug. His opinion was based upon his previous research work in intravenous use of this and other drugs and his practical and successful use of Sodium Salicylate in other acute infections. Proof was offered as to the freedom from danger and published reports covering an investigation on the subject, and the method was adopted as being the best form of drug treatment then available. Thorough alkalization and a diet high in carbohydrates were considered essential features of the treatment. Telegraphic communications with Eastern authorities showed that no vaccine for prophylaxis or treatment was of value, that drug treatment had been solely by mouth using Sodium Salicylate, Aspirin, etc., with small degree of satisfaction, and that all cases should be considered potential pneumonias. Steps were at once taken to procure special equipment to carry out intravenous treatment.

Closer Approach of Epidemic.

14. On September 27th, numerous cases were reported in towns reached by men on 24 hour liberty, and 2 cases occurred in the City of Vallejo. As a result of this near approach of the disease, recommendation was made to the Commandant to put into effect certain of the provisions of his order No. 586, and the following order was issued. (See page 10). Also on that date telegraphic request was made upon the 12th District for the extra personnel arranged for, and all arrivals placed in detention were particularly observed for four days to detect possible influenza cases.

15. On October 4th, a tug brought to the Naval Hospital six influenza cases from the Naval Port Guard, San Francisco. All precautions were taken in unloading the sick, and the vessel was cleaned and quarantined. On this same day a case of the disease occurred in a Marine who had been on duty in Vallejo, this being the first case to actually develop at the Station.

Beginning of Epidemic.

16. On October 5th, two cases developed in the Naval Hospital personnel, three cases were reported in Vallejo, and one case appeared at the Naval Training Camp later in the evening, so it was deemed time to open the temporary hospitals as planned. Orders were issued to have buildings and tents previously selected turned over to the Medical Department. The temporary hospitals at the Naval Training Camp and Marine Barracks were ready for occupancy the evening of the 5th, and the one for Civilians (established in the new Medical Supply Depot building) was ready the following day. Early, on the morning of the 6th, to follow up verbal instructions, the attached written order was sent to the executives of the three subdivisions of the Medical Department. (See page 11).

17. On October 6th, the Health Officer of Vallejo was told of the near approach of danger, and was advised to close theatres, schools, poolrooms, etc., and to stop all public gatherings, but unfortunately he failed to see the necessity for early action along these lines and stated that he had had the theatres fumigated. However, sometime later these steps were finally taken and this coupled with the ordinance requiring the wearing of masks put into effect at a still later date, undoubtedly helped greatly in limiting the cases occurring in this town including those amongst the Federal Civilian employees.

Progress of Epidemic.

18. During the day of October 6th, cases appeared at the Naval Training Camp in considerable number and it was evident that the epidemic in this group of personnel was in full swing. Also that night

September 27, 1918.

From : Commandant.
To : Commanding Officer, Marine Barracks.
Captain of the Yard.
Commanding Officer, Receiving Ship & Training Camp.
Medical Officer in Command of Naval Hospital.
(Copy to each)

Subject : Influenza.

1. On account of Influenza having made its appearance in San Francisco, in Contra Costa County, Dunsmuir, and in Los Angeles and vicinity, the provisions of Commandant's Order 386 will be immediately complied with.

2. Particular attention is invited to (f) and (g), paragraph 2.

3. No liberty will be granted until the danger of an epidemic of Influenza shall have passed. All liberty is to be stopped from this station.

4. Petty officers and others attached to the various military units and to the industrial section of the Yard who are not provided with quarters on the Navy Yard will proceed to and from their homes as usual. All such persons should be provided with a copy of the Yard Surgeon's notice dated September 25, 1918, and instructed to comply therewith.

5. No bands, quartettes, athletic teams, orchestras or entertainers will be allowed to leave the Yard for the present. Societies and organizations whose requests for the services of enlisted men or marines from the Yard and which requests have been approved will be notified by those concerned that such engagements are cancelled.

6. The Captain of the Yard will immediately arrange to return to the Navy Yard the Yard Exhibit at the Pacific Land and Industrial Fair, Oakland, together with the personnel detailed for its care and protection.

(signed) Harry George.

W. Ford, Mare Island, California.
6 October 1918.

From : Medical Officer, Mare Island, California.
To : Executive, Yard Dispensary.
Executive, Sick Quarters, Naval Training Camp.
Executive, Sick Quarters, Marine Barracks.
Subject : Influenza.

2. Every possible step will be taken for the protection of cases one from another and of personnel from cases. Serious cases and those developing pneumonia will be sent to the hospital.

4. Until arrangements are completed as above all men sent to the hospital with diagnosis undetermined will be checked up daily to see whether or not they have been diagnosed as influenza. Cases sent to hospital with a definite diagnosis other than influenza and whose diagnosis is changed to influenza at the hospital will not be included in the daily report to the Yard Surgeon of cases of influenza occurring in the Navy Yard. "Diagnosis undetermined" will be freely used in all cases of acute illness in which there is doubt as to the diagnosis.

(315) John L. Wilson.

23 cases were taken from the U.S. Navy then fitting out at the Navy Yard.

19. On the 7th, arrangements were made to take crews from certain vessels that were at the Navy Yard and place them in tents on shore, Commandant's order No. 391 was issued (see page 13) and the Commandant telegraphed the Department recommending that no drafts or recruits be sent to or from the Navy Yard.

Transfers of Personnel During Epidemic.

20. Unfortunately this recommendation did not meet the Department's unmitigated approval, as except for brief periods, recruits and drafts continued to arrive almost daily and drafts were sent away. Naturally every effort was made to prevent introducing more disease from incoming drafts and to prevent the sending away of sick men by establishing incoming and outgoing quarantine with the use of masks and other precautions; also vessels fitting out at the Yard ready for departure were quarantined 4 days from development of the last case before leaving the Yard but the Medical Officer feels that even with these precautions it was dodging the real issue. Men arriving from the outside increased the station, prolonged the epidemic, and hindered rapidity of return to normal conditions, and therefore, prolonged the period of time during which the training of men and other war work was going forward at only one-half to three fourths normal speed. Men transferred to ships near at hand which were about to put to sea were infected and the very "urgent military necessity" that gave rise to their transfer was at once defeated as was evidenced in the case of the "Major Wheeler". This vessel was required to put to sea immediately with the crew provided from the infected Naval Training Camp. The crew, after observation, was transferred but before the vessel could clear, influenza appeared on board; the ship returned to the Navy Yard and was held two weeks by reason of developing cases. Furthermore, the Medical Officer believes that from the standpoint of humanity alone, the transfer of all men from point to point by railroad in the presence of this epidemic should have been stopped. The disease is one of great severity; very short incubation period, and the absence of complete rest and good nursing from the very start of the disease increases the danger to life; no matter what precautions are taken no assurance can be gained that cases in a draft will not appear within 12 hours after departure and a trip on a train is particularly dangerous not only from the infectious standpoint, but because of the ill effect produced on the sick individual. Furthermore, such transfers merely carry infection from point to point. The epidemic which occurred at this station amongst the Marine recruits is a good sample of the dangers of these transfers. The group of personnel at this Post had been comparatively free of the disease when recruits started to arrive as a result of placing the induction process into action. Many arrived desperately sick and practically all cases occurring at the Marine Barracks covering a period of twenty days occurred amongst these arriving recruits most of them within 4 days of their arrival. Out of the 210 cases thus brought to the Marine Barracks unduly high pneumonia

U. S. Navy Yard

Marine Island, California

October 7, 1918.

Commandant's Order No. 391.

Attention is invited to the Commandant's Order No. 286 of September 24, 1918, all provisions of which shall be immediately complied with.

Until further notice, no petty officers, enlisted men, non-commissioned officers or privates of Marines from the Training Camp, Receiving Ship, Marine Barracks or Naval Hospital will enter the residential or industrial portions of the Yard except on absolutely necessary duty.

Commanding Officers of these units have established lines just north of their respective commands, across which their men will not be allowed to pass without specific authority.

Men should be encouraged to spend as much time as possible in the open air, and the areas and roads south of the Training Camp, Hospital and Marine Barracks afford opportunities for this purpose.

Commanding Officers and Heads of Departments will restrict Naval personnel to the limits of the Yard as far as such persons can be accommodated with the present facilities.

Navy Yard Notice of September 25, 1918, shall be published for the information of all concerned, and all men, both in the industrial and military sections of the Yard made acquainted with its contents. The provisions of paragraph 10 of the Notice of September 25, 1918, will be carried out by all Navy Yard personnel, both Naval and civil, within and without the limits of the Navy Yard.

Until further notice, officers residing on the yard shall refrain from inviting friends to visit them, thus eliminating a source of possible infection and relieving the medical officers of possible additional work in case such guests contract influenza while on the yard.

The use of the swimming pool is to be discontinued until further notice. There shall be no entertainments, either in recreation halls and auditoriums or in the open air until further notice, and Commanding Officers and Heads of Departments will see that any congregation, such as close assemblies of personnel within the limits of their jurisdiction, is avoided. In the industrial section of the Yard, congested assemblies of men at Liberty Loan celebrations and entertainments will be avoided.

The Commandant regrets that the prevalence of influenza makes it obligatory to adopt these precautions, but feels assured that the personnel of this Navy Yard, both civil and Naval, will continue to respond as they have been doing to the Fourth Liberty Loan.

No visitors will be allowed on the Navy Yard except when necessary for official purposes, and such visitors will be conducted to and from their destination with as little contact as possible with Navy Yard personnel.

HARRY GEORGE,
Captain, U. S. Navy, Retired,
Commandant

rate was observed and 12 deaths occurred. Also, older men at the barracks who were assigned to duty with these recruits contracted the disease and it was only through the most strenuous efforts coupled with a large percentage of good luck that the whole Post was not infected. The numbers arriving were very large and not only did cases develop at once, but the disease was rapidly spreading amongst those who had previously arrived apparently not infected during their travels and still in detention. The number of cases steadily increased in spite of segregation in small groups, sprays, masks, sterilization of mess gear, etc. until, in response to most urgent appeals, further transfer of recruits to Mare Island was stopped and at once the number of cases dropped rapidly and ceased as soon as the last few stragglers had put in their appearance.

Special Prophylactic Measures.

21. Two special features in the way of prophylaxis were inaugurated at this time; namely, the formalin room and a prophylactic nose and throat spray. The "formalin room" consisted of an enclosed room with constant low saturation with formaldehyde gas in which personnel inhaled the gas for intervals of 10 minutes. The establishment of these rooms was based upon reports from factories and department stores in the East where success was claimed in the reduction of the ordinary diseases of the respiratory tract. At first the rooms were established only for the Medical Department personnel in attendance upon cases, but later their use was extended to include rooms in various shops for the use of civilian employees. Its efficacy is questionable and no statistical data is available to prove or disprove its worth.

22. The use of prophylactic nose and throat spray was considered not worth using until glowing accounts of the great value of the quinine sulphate spray reached the Station from the Naval Training Station, San Diego. In order to leave no stone unturned, spraying stations were at once established at the Naval Training Camp and Marine Barracks, each consisting of a battery of 20 nozzles. Quinine sulphate solution, 1 to 20,000, was used and all men sprayed twice a day or more frequently if desired. There is no evidence to show that this measure resulted in any special diminution of cases.

23. Isolation of well men was accomplished by hanging sheets between all hammocks and bunks either made fast to the bunks themselves or strung on wires. Use of vaccine was not deemed safe at this time (see page 19). Convalescents were required to wear masks and civilian workmen returning to Yard after an illness were required to appear before a Medical Officer before being reemployed.

24. In the hospitals established the following subdivisions were provided to prevent cross infections:-

- Admission Ward; subdivided into (a) low temperatures.
(b) high temperatures.
- Influenza Ward; with (a) subdivision for suspicious pneumonias.
(b) nose and ear complications.
- Pneumonia Ward. (Pneumonias largely treated in tents).
- Convalescent Ward. (almost invariably tent colonies).

placenta at Naval Training Camp.

25. The Naval Training Camp was the first group of personnel infected and the disease, of a severe type, starting on October 6th, spread like wild fire reaching the height of admissions on the 13th and rapidly fading away to a few cases by the 22nd. During this period the temporary hospital at the Camp handled a total of 800 men including suspects. The highest admission rate for any one day was 110 and the greatest number of cases in the hospital on any one day was 450.

26. Coming as it did with such a rush and before all preparations were completed and before the Naval Hospital was prepared to receive such a volume of patients, the strain on the Medical Department was heavy. As none of the requested special details had as yet arrived the regular personnel of the station was concentrated at this active point and volunteers from amongst seamen and apprentice seamen were taken on as acting hospital corpsmen and they proved themselves of inestimable value. After great difficulty owing to the then urgent demand in all communities, the Twelfth Naval District procured six women from the Pacific Division of the American Red Cross who reported for duty October 9th, followed later on October 11th by six more, and a few days later by still another, a total of seven graduate nurses, two nurses of two years' experience, and three practical nurses, and one nurses' aid. These women, while excellent, were but a drop in the bucket, especially as four promptly came down with the influenza, two were by that time necessary at the temporary hospital established for civilians, and one or two left by reason of severe illness in their families. The nursing situation was greatly relieved by the volunteering of three members of officers' families who unselfishly left their homes and worked nobly night and day catching what sleep they could in a tent nearby and rendering services of incalculable value and of a type that graduate nurses found difficulty in emulating.

27. Some relief to the overworked Medical Officers of the Station was obtained by the arrival of five additional Medical Officers from the 12th Naval District; one on October 9th, and 4 on October 10th, but this was promptly offset by three Medical Officers being taken down with the disease. Long hours and little sleep giving rise

as it did to excessive mental and physical strain unduly predisposed the personnel of the Medical Department to infection. However, all lived in tents close to the units to which they had been assigned and this open air sleeping undoubtedly helped to offset the ill effects of overwork.

28. While the Naval Training Camp epidemic was still on the increase, cases were being admitted to the temporary hospitals established at the Marine Barracks and in connection with the Yard Dispensary (new Medical Supply Depot building). The first case being admitted to the former on October 6th and the first cases to the latter on October 8th.

29. On October 12th, 450 cases were being cared for in the temporary hospital, Naval Training Camp, with a considerable proportion of pneumonias. The losses amongst the Medical Department personnel through sickness and the demands of all three temporary hospitals now actively engaged, coupled with the fact that there was no possibility of obtaining more personnel demanded that some relief be provided. By this time the Naval Hospital, (the resources of which had been put to a great strain by patients arriving from outside sources) had extended its facilities by tents and arrangements were made to send to this hospital from the Naval Training Camp the admissions on alternate days. That is, on odd days all admissions were kept at Emergency Hospitals and on even days all admissions were sent to Base hospital. This process continued for 5 or 6 days and automatically distributed mild and severe cases equally. Later, as ability to render proper nursing care to pneumonias at the temporary hospitals decreased owing to further illnesses and departures of Red Cross nurses, this transfer of cases to the Naval Hospital was further extended to include special serious cases. The first transfer of such picked cases occurred October 17th. In this way, a balance of "number of cases under treatment," "facilities" and "personnel" were maintained between the Naval Hospital and the temporary hospitals at the Navy Yard.

Epidemic at Marine Post.

30. The epidemic among the Marine personnel showed two distinct waves, one produced by infection among men under training, and the other among men performing straight duties.

31. That among the older men came first, never reached large proportions and lasted from October 8th to October 30th, at which time the temporary hospital for Marines was closed. Two sharp flareups occurred in these men and furnished the bulk of cases, one amongst the Marine Guard at the Naval Prison and one amongst Marine Guard at the Navy Yard Main Gate. The epidemic in the Prison Guard was synchronous with the outbreak among prisoners. The men of the main gate guard were in crowded quarters and at the most congested point of the yard constantly exposed to throngs of workmen coming and going. They were immediately placed in tents. The remainder of the cases amongst the

der men occurred as dropping cases spread over a considerable period time.

32. The second wave (that among men under training) lasted from November 4th to December 12th, the largest number being admitted between November 4th and November 25th. Arriving recruits gave rise to the bulk of cases. Most of them were infected prior to their arrival. It is interesting to note that out of 309 cases among Marine personnel, 238 (77.1%) were recruits at the depot less than 21 days and of the remainder, 71 (22.9%) several were men who were closely associated with the recruits as instructors, etc.

33. The Emergency hospital at the Marine Post opened October 6th and closed October 31st. During this period 100 patients were handled the greatest number under treatment on any one day being 51.

Epidemic in Naval Prison.

34. Influenza first appeared amongst the prisoners confined in the Naval Prison on October 10th and spread rapidly. As soon as possible all prisoners were moved out into tents on the back of the Island from which time cases rapidly dropped off, the last case appearing October 29th. The prison was thoroughly scrubbed down throughout and painted and prisoners were moved back November 21st and there have been no cases since that time.

35. All patients among prisoners were immediately transferred to the Naval Hospital. The total number so transferred was 122.

Masks.

36. The wearing of masks had from the start of the epidemic been compulsory for Medical Department personnel attending cases and persons entering wards, and on October 14th, as a result of receiving word to the effect that masks had been found of value in the Navy Department offices, the Commandant ordered the use of masks in the offices of the Yard and their use was gradually extended until on October 23rd and 24th all personnel were required to wear masks on the Yard, including civilian employees. On October 23rd Commandant's order #395 was issued (see page 18). In adjacent towns masking ordinances were very shortly put into effect thereafter.

37. Most of the masks issued by this department were made of eight layers of surgical gauze as this material was available in the large quantities necessary and were manufactured in the Flag Loft of the Navy Yard. For the Medical Department personnel masks made of three layers of buttercloth were used almost entirely and were furnished by the Vallejo Chapter of the American Red Cross. In all, 35,000 masks were issued, and to the Medical Officer this appeared to be one of the best of the preventative measures.

U. S. Navy Yard

Marine Island, California

October 28, 1918.

Commandant's Order No. 395.

Subject: Use of gauze masks.

In accordance with Radiogram No. 17022 from the Twelfth Naval District, all officers and office employees shall wear gauze masks while in their offices.

Officers and enlisted men in the Training Camp, Receiving Ship, Marine Barracks and Naval Hospital whose duties place them in danger of contagion shall wear masks when so employed.

All officers and enlisted men leaving the Yard for Vallejo, San Francisco and other way points shall wear their masks while on street cars, ferries and other conveyances, and places where people congregate.

HARRY GEORGE,
Captain, U. S. Navy, Retired.
Commandant.

Epidemic Among Civilian Employees.

38. Cases among the Ford employees straggled on much as those among the Marines until October 20th when Vallejo became badly infected. From this time to November 3rd work at the temporary hospital for civilian employees established on the Navy Yard increased steadily, then gradually fell away until the hospital was closed on November 30th. 287 patients were cared for in this institution from October 8th to time of closing. The greatest number of patients in the hospital on any one day was 70.

Prophylactic Vaccines.

39. On November 5th, influenza vaccine was obtained from the Naval Training Station, San Francisco, California, which at that time had developed sufficient quantities for issue and all Marines or Units not yet affected were vaccinated. At this time, it was not considered safe to use it unrestrictedly in all groups of personnel owing to constant exposure to infection, but on November 13th it was deemed safe to extend the inoculation to the personnel of the Naval Training Camp. The use of this vaccination was not considered to be of any great value but was carried out largely in the effort to prevent possible recurrence.

40. The vaccine used contained to each mil, 8,000,000,000 influenza, 3,000,000,000 pneumococcus, type one, pneumococcus type two, 1,000,000,000 pneumococcus type three, 100,000,000 streptococcus hemolyticus. Three doses were administered at intervals of 48 hours, the first dose being .3 mils, the second .6 mils, and the third .8 mils. The results from this inoculation are of necessity of little worth as in the Training Camp the epidemic had passed and, therefore, it was naturally assumed that those who had escaped must have a certain degree of natural immunity. However, there were 2,080 complete injections administered to hospital corpsmen, marines, and civilians who were subsequently exposed to the disease and of whom information could be obtained after epidemic conditions had subsided. Of these, 38 developed the disease from 5 to 27 days after the third injection. Of these 38, 15 were severe cases; three were pneumonias and two of the pneumonias resulted in death. All of the severe cases and pneumonias developed within 10 days after the receipt of the third inoculation. Certain civilians who requested the inoculation were taken ill before all three injections had been administered and all had very severe cases with pneumonia but no deaths occurred. No special ill effects at time of inoculation were noted. Slight tenderness at seat of injection was almost universal, a small number complained of dizziness and a few of headache, but no reactions resulted severe enough to interfere in any way with duty. When present, the symptoms noted were more marked after the second dose.

End of Epidemic.

41. Conditions had so far subsided by November 18th as to lead to recommending the relaxation of certain restrictions applicable to the military force and by November 18th, Commandant's order No. 405 was issued (see page 21) and when it was found that cases of milder type and in greatly reduced numbers were occurring in adjacent towns, still further relaxation was permitted by Commandant's order No. 406 (see page 22). On November 22, final and full freedom was granted by Commandant's order No. 406 (see page 22).

Recurrence of Epidemic.

42. From November 30, 1918, to the present time, February 1919, there has been no return of the disease in epidemic proportions among the military force of the station. Scattered cases have been continuously present amounting to an average of about one a day, the greatest number in any one day having been 7. The type of case was mild resembling the pre-epidemic form of the disease until about the second week in January when there were a few serious cases and one or two deaths.

43. While the disease had ceased in epidemic form on this station and in adjacent cities by December 1st, 1918, many towns readily reached by personnel of this station were still suffering from the epidemics and in the Southern part of the state recrudescences were occurring. It was, therefore, deemed advisable to reissue the influenza notice in slightly changed form and on December 9, 1918, this was done. (See page 24).

44. About the first week in January a second wave of the disease in epidemic form was plainly present in San Francisco and other bay cities and during the second week this wave reached the immediately adjacent town of Vallejo.

45. On January 9th, 1919, the Commandant issued a notice relative to wearing masks (see page 25) and on January 11, 1919, the Commandant of the 13th Naval District issued an order that masks were to be worn by all personnel of the district in and about San Francisco, and on January 14, 1919, the Commandant's order #416 was promulgated (see page 26) and followed up by his order #417 (see page 27).

46. This second wave of the disease while effecting civilian communities and personnel who lived at home in such communities did not have any perceptible effect upon the military force. During this second wave many of the cases were among men who had previously been afflicted with influenza during the first epidemic, and investigation of these cases showed that those who had the disease mildly in the

U. S. Navy Yard,
Marine Island, California.

November 19, 1918.

Commandant's Order No. 405.

Subject: Relaxation of Quarantine Regulations.

1. Commandant's Orders Nos. 388 of Sept. 20th and 391 of Oct. 7th are hereby modified as follows:

On and after this date gatherings for indoor entertainments, such as movies, instruction, musical entertainments, etc., at the Naval Training Camp, Marine Barracks and Naval Hospital are authorized, subject to the compulsory wearing of gauze masks.

2. Liberty may be granted to men who actually have homes to which they can go in San Francisco, Oakland, Berkeley, Vallejo, Benicia and Sausalito, such liberty to be subject to enforcement of the wearing of masks, and men to be instructed to keep away from localities and houses in which influenza is known to exist. This liberty will be restricted to cities on San Francisco Bay only, as influenza is known to exist in practically epidemic form in many of the smaller inland cities and in Southern California.

3. Liberty men will be instructed to wear their masks and to conform in all respects to the municipal regulations regarding influenza that may be enforced in the cities to which they go.

4. Attendance at dances is prohibited, either in the Navy Yard camp or outside the limits of the Navy Yard, until further instructions.

5. The above relaxation of restrictions to be subject to withdrawal in the event of an increase in the cases of influenza.

HARRY GEORGE,
Commandant, U. S. Navy, Retired,
Commandant.

U. S. Navy Yard,
Marine Island, California.

November 21, 1918.

Commandant's Order No. 408.

Subject: Relaxation of Quarantine Regulations.

1. The quarantine regulations as per Commandant's Order No. 406, of November 19, 1918, are further relaxed in that general liberty may be granted by commanding officers to men under their commands to visit Oakland, Berkeley and San Francisco.
2. Masks will continue to be worn within the limits of the Navy Yard and in transit to and from the above mentioned places. Masks will also be worn in the above mentioned cities if such is required by the municipal regulations.
3. Men who are granted liberty to Vallejo under the provisions of Commandant's Order No. 406 will wear masks.

HARRY GEORGE,
Captain, U. S. Navy, Retired.
Commandant.

U. S. Navy Yard

Haw Island, California

November 28, 1918.

Commandant's Order No. 409.

Subject: Influenza Epidemic.

1. It is considered that the epidemic of influenza is over, or marked danger past, on the Naval Station, in Vallejo and towns and cities that can be reached by men on 48-hour liberty.

2. On and after noon Wednesday, Nov. 27, 1918, Commandant's orders restricting liberty to the personnel of this Station and requiring prophylactic measures and the wearing of masks are hereby revoked. Personnel should be warned to avoid localities in which influenza is still active, and especially houses in which the disease exists.

3. If necessity requires such houses to be entered, masks should be worn and prophylactic measures observed.

4. All masks of the Navy personnel in good condition will be turned into the Yard Dispensary to be cleaned and disinfected. The civilian force will turn masks in good condition over to the shop foremen for transfer to the Yard Dispensary.

HARRY GEORGE
Captain U. S. Navy, Retired.
Commandant.

NOTICE!!!

U. S. Navy Yard,
San Francisco, California.

November 3, 1918.

INFLUENZA

1. A worldwide epidemic of influenza is occurring and cases will occur during the winter.

2. No other noncommunicable disease which assumes epidemic proportions spreads so rapidly or attacks so large a proportion of the population, no age, sex, or class of society being immune.

3. The infectious agent is the influenza germ which is carried by the secretions of the nose and mouth.

4. The modes of infection are: (1) directly from the infected individual by coughing, spitting, sneezing or by in any way coming in contact with the nasal or mouth secretions; (2) by indirect methods through contact with articles soiled by the above mentioned secretions such as handkerchiefs, towels, nosegear, etc. In this connection it must be remembered that the disease germs often persist in the nose and throat for some time after the symptoms of the illness have subsided.

5. The incubation period is very short, one to four days, average two.

6. *Methods of Control:* (1) Early recognition of the case: In order that measures be early recognized a brief description of the onset and symptoms is given. Onset usually rapid with a chill followed by fever from 101° to 104°, great depression, weakness, dizziness, severe headache, backache, pains and soreness of muscles and joints all over the body, the throat may feel sore, the eyes are congested and do not bear the light well. There are practically always symptoms of a bad cold with running eyes and nose, soreness and tightness of chest with coughing. Anyone presenting the foregoing symptoms, or any one of them should report at once to a Medical Officer. (2) When the case has been determined rigid isolation must be carried out; only one attendant for each case, attendant must wear gown and gauze face mask.

7. *Environment disinfection* must be practiced to include all articles which have come in contact with the patient, such as: clothing, bedding, shoes, gear, books, papers, letters and all personal belongings of patient. Careful washing in a warm, well ventilated room is an essential part of the treatment. Pneumonia is a common complication.

8. *Personal disinfection*, thorough cleansing and airing of the equipment, bedding, and sterilization of all linen and bedding of patient.

9. Vaccination against influenza is partially successful.

10. Present methods to prevent the spread of infection.

- (1) Avoid crowded assemblies during the epidemic such as theaters, picture shows, public gatherings of all kinds.
- (2) Avoid traveling in congested public conveyances.
- (3) Do not cough, spit, or sneeze promiscuously; always use your handkerchief over your mouth when coughing or sneezing.
- (4) Wear masks when it is necessary for you to be in crowds.

John I. Nelson,
Commander, Medical Corps, U. S. N.

Approved
HARRY GEORGE
Captain, U. S. Navy, Retired
Commandant

U. S. NAVY YARD, MARF ISLAND, CALIFORNIA.

January 9, 1919.

P O T I C E

To: Heads of all Departments.

Subject: Office Force - Wearing of Masks.

Until further instructions, all clerks, stenographers, draftsmen, and other persons employed in offices, both civilian and enlisted, will wear masks while in their offices. All office employees are requested to observe the precautions laid down in Commandant's Order of December 9, 1918.

The Yard Surgeon will supply Heads of Departments with the necessary masks.

HARRY GEORGE
Captain, U.S.N., Ret.,
Commandant.

U. S. Navy Yard

Mare Island, California

January 14, 1919.

Commandant's Order No. 416.

Subject: Influenza.

On account of the reappearance of influenza, the following precautions will be observed:

1. All Navy and Marine personnel to wear masks, which will be supplied as soon as possible by the Yard Surgeon.
2. As San Francisco and other cities on and in the vicinity of San Francisco Bay have adopted ordinances requiring the wearing of masks, all liberty men on leaving the station shall be so provided.
3. For the present, entertainments may be held in recreation halls and auditoriums as usual, care being exercised to prevent overcrowding. This privilege will not be rescinded unless centers of contagion are found to exist on Mare Island. Masks will be worn at all such entertainments.
4. Care shall be taken to prevent the overcrowding of the Officers' Mess, School, Artificer and Electrical Schools and masks shall be worn therein.
5. All instructional and barrack buildings shall be well ventilated.
6. Masks shall be worn by the civil force throughout the Yard. Civil employees are requested to provide their own masks if practicable. As soon as the enlisted men and marines have been provided with masks, the issuance of masks to such of the civil force as cannot provide their own will be undertaken.
7. Commanding Officers are requested to inform their men to avoid crowd gatherings and places of contagion.

HARRY GEORGE
Comdr. U. S. Navy, Retired.
 Commandant.

U. S. Navy Yard,
Marine Island, California.

January 16, 1919

Commandant's Order No. 417.

Commandant's order No. 416 will be rigidly complied with. All officers, enlisted men, and marines attached to the Navy Yard will wear masks at all times, and are directed not to appear within the limits of the Navy Yard without them. They will always be worn in all Navy Yard streets, buildings and offices.

Civil employees will be required to wear masks at all times while in the Navy Yard. Officers, enlisted men, marines and civil employees shall not be allowed to enter or leave the Navy Yard without masks.

Masks will be worn to cover the nose and mouth, and not hung around the neck.

The Captain of the Yard is directed to enforce this order, and all sentries, watchmen, masters of Yard craft, and others will be instructed accordingly.

HARRY GEORGE
Captain U. S. Navy, Retired.
Commandant.

first epidemic had it severely in the second and those who had it severely in the first epidemic had it mildly in the second. This would suggest two distinct types of infection.

47. The second wave passed quickly and little danger remained by February 1st, 1918, but restrictions were not removed and were maintained until February 4, 1918. (See Commandant's order 441, 442, 291)

48. It was during this second wave of the disease that the convalescent hospital was reestablished in Vallejo. (See page 42.)

Section II.

ACTIVITIES OF THE MEDICAL DEPARTMENT AMONG CIVIL COMMUNITIES.

49. After the worst trouble was over at this station, civil communities developed their epidemics, and from all parts of the State of California came calls for assistance. Aid was rendered to all as far as circumstances permitted, either by giving advice on sanitation, treatment or establishment and conduct of hospitals, or by actually performing these services. It would appear appropriate to mention those to which material aid was given.

San Francisco, California.

50. San Francisco was the first city to ask for help. Representatives of the San Francisco Chapter of the American Red Cross visited the Island to ascertain what had been accomplished here, and applied to the Commandant for a Navy Unit to conduct a Red Cross Hospital which they were planning to establish in San Francisco. The appeal for help was made to the Navy Yard as the 12th Naval District and the Army authorities were unable to meet the demand. The Commandant granted the request and immediately the Medical Officer at the request of the Chairman of the San Francisco Chapter of the American Red Cross formulated all plans for equipping and conducting a 150 bed hospital for acute cases to be established in the new headquarters of the chapter located in the Civic Center of San Francisco. This building had never been occupied but was almost completed and its arrangement was such that it could be readily adapted to a hospital of the emergency type. The arrangement made required the Red Cross to equip, provide and finance the hospital and the Navy to furnish all personnel and administer it.

51. At the last minute it was found necessary to change the plans to a 200 bed convalescent hospital and the institution was opened on October 29, 1918, in charge of a Navy Unit consisting of two Medical

U. S. Navy Yard

Marine Island, California

February 3, 1918

Commandant's Order No. 421.

Subject: Influenza Masks.

The use of influenza masks will be discontinued on this Station from February 4, 1918.

Heads of Departments and Commanding Officers of military units having new masks in their possession will return same to the Yard Surgeon as soon as practicable.

HARRY GEORGE
Lieutenant U. S. Navy, Retired,
Commandant.

Officers (later the number was increased to three) and forty hospital corpsmen. Female nurses and commissary personnel were furnished by the city. Four hundred patients passed through this hospital which was finally closed on November 24th, 1918. Three deaths occurred in the institution during this period. The attached letters express appreciation for this effort (see pages 31, 32, 33, 34, 35, 36 and 37).

Mar., California.

32. On October 28th in response to an appeal from the Navy Chapter of the American Red Cross, a medical officer was sent to this city where he spent five days establishing a hospital of fifty beds which was turned over to the chapter who were able to provide personnel for its conduct.

Vallejo, California.

First Epidemic.

33. The epidemic in this city had assumed large proportions about October 20, 1918, and the civilian practitioners were losing ground in their efforts to meet the situation.

34. The Vallejo General Hospital furnished the only hospital facilities available in the town and this small institution was unable to do more than meet the ordinary demands of the community, was filled with the usual run of cases, and happened at the time to be in quarantine as the result of the appearance of small pox amongst its patients.

35. Through the efforts of the Vallejo Chapter of the American Red Cross and representatives of the Vallejo Trades and Labor Council acting upon advice of the Medical Department of the Navy Yard, the city had established an emergency hospital of 40 beds in an annex to the Young Men's Christian Association building in an effort to concentrate patients and thus relieve the wild running about of physicians, conserve nursing facilities, and provide hospital care for the sick.

36. On October 24th, in response to an urgent appeal, six hospital corpsmen were ordered to this institution to help out in the nursing and did excellent work in the presence of great obstacles. Letter of appreciation is attached (see page 38). In fact, in the absence of any semblance of management on the part of the civilians, the senior hospital corpsman, Elmer L. Kotska, Hospital Apprentice, 2nd class, USN, stepped in and practically ran the hospital. This hospital was finally closed November 3, 1918, after handling about 100 cases.

37. During the early part of its career, this hospital (known as the city emergency hospital) was a deplorable place for patients suffering from this grave disease and at no time did it approach a really satisfactory condition. It was unheated, low ceilinged and poorly ventilated, unaccredited a bulk of the time, poorly equipped and poorly provided with nursing personnel and commissary and toilet facilities. Furthermore, there was no one to administer the hospital

REPRODUCED AT THE NATIONAL ARCHIVES

942 Market Street,
Douglas 2172

October 26th, 1918.

Captain Harry George, U.S.N.,
Commandant, Mare Island Navy Yard,
Sausalito, California.

Dear Sir:-

Permit me to extend the thanks of the San Francisco Chapter of the American Red Cross to you for the splendid response in assigning to San Francisco the Navy Unit from Mare Island to assist in San Francisco's hour of necessity.

I am advised by Dr. Neilson that you desire certain assurances from me with respect to the Unit, and which I most cheerfully comply with.

It is understood that the Unit is to operate as such, and only in connection with the hospital which the Red Cross has established in the new building;

That the personnel of the Unit is to be furnished without cost to the Red Cross, with the exception of the feeding, housing, and necessary laundry, which will be taken care of by the San Francisco Chapter;

That you will provide for the transportation of the tents and platforms from Mare Island to San Francisco, and that from the landing in San Francisco they will be transported, at the expense of the Red Cross, to the point or location selected by the Chief Surgeon;

That the Unit will have to do solely with influenza patients during its stay in the Red Cross building; and

That the Red Cross will provide all the equipment in the hospital, including commissary equipment, and assist through its Purchasing Agent in the purchase of necessary supplies in addition to the equipment.

For the purpose of designating the building in which the Unit will operate as such, I beg to advise it is located on the following described premises, situated in the City and County of San Francisco; namely, on the block bounded by McAllister Street on the North, Hyde Street on the West, Fulton Street on the South, and City Hall Avenue on the East.

Again thanking you for the splendid interest you have displayed in our necessities, I am

Very sincerely yours,

(Signed) John A. Britton.

Chairman San Francisco Chapter.

JAB/S.

Cy Mr. Bosart

October 28th, 1918.

Captain Harry George,
Commandant, Mare Island, Navy Yard,
Mare Island, California.

Dear Sir:-

After consultation with Dr. Neilson and notice from him that there was a probability of the Unit being required at Vallejo, conditions changed so rapidly in San Francisco that the health authorities deemed it essentially necessary that the Red Cross Building be used as a convalescent hospital. This I phoned to Dr. Neilson this morning.

I felt very reluctant in taking the action, as I knew of the splendid work the Unit would do in the hospital and felt sure that it could not work other than as a unit.

I wired you this afternoon respecting the possibility of your help in having some corporals to aid us in the personnel of the convalescent hospital which, of course, under the circumstances would have to be under the direction of the San Francisco Board of Health.

I hope you do not think that I was at all un- mindful of the splendid offer made, and if conditions had not changed so suddenly we certainly would have had your entire Unit in the hospital building some day this week.

If you can help us with any of your personnel it would be very much appreciated by the health authorities and by the Red Cross officials.

Very truly yours,

(signed)

John A. Britton

Chairman San Francisco Chapter.

JAB/B.
Cy Mr. Bogart.

Nov. 5, 1918

Captain Harry George, U. S. N.,
Commandant, Navy Yard,
Marine Island, Calif.

Dear Sir:

In behalf of the Department of Public Health of the City and County of San Francisco, I wish to join the American Red Cross, Local Chapter, in thanks and appreciation of your very kindly services in the influenza epidemic.

The corps of splendid efficient young men who are performing hospital duty at the temporary Red Cross Hospital at the Civic Center, has proved a Godsend to the city. Their efficiency and uniform courtesy has won for them the admiration of all with whom they come in contact, and it is indeed a fortunate thing for us that we were able to have placed at our disposal such excellent services.

Believe me, with great respect,

Very truly yours,

Arthur H. Barendt,
President, Board of Health.

MAYOR'S OFFICE
SAN FRANCISCO

November 18, 1918.

Commandant Harry George,
Navy Yard, Mare Island,
California.

Sir:

As the epidemic of "Spanish Influenza" draws practically to a close in San Francisco, I take this means of expressing the City's thanks to you for your splendid cooperation in our fight to save lives and prevent suffering. Your assignment of Doctors White, Judy and Hare, with their complement of men, to work at the Red Cross hospital in this city, was one of the big things that helped to overcome the epidemic, and, in expressing the City's thanks to you, it gives me great deal of pleasure to commend in the highest possible way the work of the officers, non-commissioned officers, and men who have rendered such excellent service in the care of the men, women and children in their charge at the Red Cross hospital.

I had frequent occasion to observe the fine spirit of all these men in taking care of their patients, and desire at this time to compliment you upon the personnel of the Unit. I assure you that San Francisco greatly appreciates all that has been done by you and every one connected with your hospital service, and, in behalf of all the people, I thank you very sincerely for the help you so promptly rendered in our time of need.

Yours very truly,

JAMES ROLPH JR

Mayor.

San Francisco

November 18, 1918.

Commander John L. Neilson,
Yard Surgeon, Mare Island,
California.

Sir:

Permit me to express to you the thanks of the people of San Francisco for your assistance in arranging for the assignment of the Mare Island Hospital Unit which has been on duty in the care of influenza convalescents at the temporary Red Cross hospital, here.

The Unit has been of very great assistance in handling the influenza epidemic, now happily at an end, and I beg to extend my compliments to you, as Surgeon of the Navy Yard, upon the personnel and spirit of your men, whose work I have had many occasions personally to witness.

Very sincerely yours,

(signed) James Rolph, Jr.

Mayor.

DEPT FOR YARD SURGEON

November 26, 1918.

Captain Harry George,
Commandant, Mare Island Navy Yard,
Mare Island, Calif.

My dear Captain:

On behalf of the San Francisco Chapter of the American Red Cross I extend to you its appreciation of the splendid service that you rendered and your cooperation with the Chapter and the relief authorities of San Francisco in the recent epidemic. To Doctors White, Judy and Hare, and to the Corps men that were assigned to our work is due more than the ordinary mete of praise; their cheerfulness at all times and their willingness to sacrifice themselves to this great cause are deserving of more than the ordinary consideration by the people of San Francisco, and almost daily visits to the hospital convinced me personally of their wonderful work. The city of San Francisco is greatly indebted to you and to them for their efforts in stamping out our epidemic and reducing losses caused by it to a minimum.

Yours very truly,

(SIGNED) JOHN A. BRITTON
Chairman San Francisco Chapter

JAB/B
Cc Mr. Bogart.

242 Market Street,
Douglas 3173

November
twenty sixth
1918.

Commander John L. Neilson,
Yard Surgeon,
Mare Island, California.

My dear Doctor:

Now that the work of your contingent is through and the men and boys have returned to their posts, I desire to express on behalf of the San Francisco Chapter of the American Red Cross my deep appreciation of the magnificent service rendered; more especially may I commend the doctors who untiringly gave of their time and ability in the hospital and who were certainly the predominating factor in closing up the epidemic in San Francisco.

May I ask you to extend to the doctors, and to the boys, whose entire conduct was so magnificent that its memory will never be erased from our minds, my appreciation?

Yours very truly,

JAB/B
Cy Mr. Bogart.

(S) John A. Britton
Chairman San Francisco Chapter.

Vallejo, California.
November 16, 1918.

Dr. J. L. Neilsen,
Mare Island, Cal.

Dear Sir:

At the time when help was most needed at the City Hospital at the "Y", several corpsmen from Mare Island, under your supervision, were sent in to relieve the situation. As a representative of "The National League for Women's Service" I was struggling with the problem of a kitchen organization and, now that the hospital is closing and the struggle is ended, I take this opportunity to express to you my appreciation of the assistance and hearty co-operation which the corpsmen gave me and all with whom they served. Especially do I wish to mention the young corpsman in charge, Mr. Kostka, whose efficiency, manly conduct and courtesy can hardly be commended too highly.

With apologies for addressing you non-officially and thanking you, I am,

Respectfully,

Mrs. Morgan Jones.

...rise to untold confusion and largely defeated the object of the hospital, namely, to conserve the time and strength of the doctors and afford proper care for desperately sick patients. If one man had been assigned to the duty of caring for the hospital alone, he could have managed it and treated all patients therein without difficulty, but none among the civilian practitioners was willing to accept the responsibility and at the same time, give up his remunerative practice for the public good.

58. By October 26th, the loss of civilian employees from the Navy Yard had reached a large number, but in spite of this and the common knowledge that Vallejo was saturated, few cases were being reported to the municipal Board of Health and the health officer of Vallejo stated that the situation was well in hand. Investigation showed, however, that the Red Cross Chapter was swamped with most urgent appeals for nursing assistance and medical attention as individual efforts had failed. Furthermore, the two medical officers assigned to Vallejo to cover calls of Navy personnel reported the condition as serious.

59. A survey of the situation was made by medical officers of the Navy Yard. Whole families were found sick with no one to nurse or feed them; civilian practitioners in their efforts to cover the ground were unable to give proper attention to their cases, and perforce limited their efforts to infrequent and hasty visits; in many cases, especially among the poor, the services of a physician could not be obtained at all and seriously ill patients, many with pneumonia, were lying unattended for long periods; many Yard workmen were found sick without care or food, in rooming houses, often in small ill ventilated rooms or shacks occupied at night in conjunction with several other men not yet infected with the disease.

60. Suggestion was made that the town be divided into districts, each district to have its quota of doctors and nurses, all calls for nursing and medical aid to be centralized at Red Cross headquarters and assignments made therefrom. This suggestion failed of acceptance for various reasons, the most potent (in the opinion of the medical officer) being a lack of willingness and public spirit among the medical and nursing personnel who were loath to thus interfere with their own private affairs.

61. It was, therefore, evident that the only way to meet the situation was for the Federal Government to step in, provide for the concentration of patients, and then to properly care for them.

62. As stated above, the building in which the City Emergency Hospital had been established was of a most unsatisfactory type and further, it was by this time, full so nothing worth while

...have been accomplished by taking over this institution. The situation was averted by the representative of the Dominican Order of Priests (Father O'Brien) who offered the St. Vincent's Boys School building for use as a hospital and the services of the Dominican Sisters as nurses. This building, new, heated, well lighted and ventilated, and provided with plumbing, made an admirable hospital with a convenient outbuilding for gally and mess hall.

63. On October 30th, the Commissioners of the City of Vallejo acknowledged their inability to cope with the situation and requested the Commandant's aid. The Vallejo Chapter of the American Red Cross furnished the funds for the City Emergency Hospital and had been engaged in other activities in connection with the epidemic, and, therefore, could not equip or provide the hospital.

64. The Commandant immediately authorized the establishment of a one-hundred-bed emergency hospital in the St. Vincent's Boys' School which was opened for patients at noon on November 2nd, fully equipped and provided with personnel. When the hospital was first opened the personnel consisted of four medical officers, 24 hospital corpsmen, 1 Chief Quartermaster, 30 seamen, 1 Chief Commissary Steward, 9 cooks, 9 mess attendants, 4 Yeomen, 1 Chief Machinist's Mate, 1 Machinist Mate, 1 Electrician and 1 Fireman. Six sisters acted as nurses.

65. As the hospital rapidly filled up and several of the sisters were taken ill, it was necessary to employ female nurses as none at the time could be procured from the Navy Nurse Corps. Two civilian nurses were finally obtained and three women volunteered as nurses, one of whom was the daughter of the Commandant who had previously acted as a nurse during the epidemic at the Naval Training Camp. Further, a relative of one of the medical officers volunteered and performed the duties of night superintendent. Later four members of the Navy Nurse Corps Reserve Force became available from the Naval Hospital, Mare Island, and their aid came at a most effective moment as the number of women and children in the hospital had greatly increased.

66. Two ambulances and three private automobiles were donated by public spirited citizens to provide transportation and the manufacturer of the alkaline water ("Calco") which had been found of such inestimable value in alkalinizing patients continued to provide the water free of charge as he had done to the Emergency Hospitals established on the Navy Yard.

67. This hospital remained in operation until November 30th and during its activities handled 190 patients of whom 67 were men, 81 women and 42 children. The greatest number of patients in the hospital any one day was 71.

68. During the epidemic in Vallejo the city authorities arranged with the medical officers of the station to act as health officers of the town as their own health department officials were ill with the disease. It was found that certain households existed where virulent pneumonia was prevalent and being treated by civilian practitioners. The agreement was reached that all such cases should be immediately reported to the navy authorities and cases either removed immediately to the hospital and houses disinfected or the houses to be quarantined and cleaned up after disposal of the cases. On November 18th, it was discovered that several deaths had taken place from influenza-pneumonia which had not been reported by civilian practitioners and it was feared that many cases might still be unknown to the Naval authorities, and it was considered that such conditions were a grave menace to the yard civilian force. To clear up this doubt a house to house canvas was made on November 20th and fortunately it was discovered that there was little disease not already known to the Medical Officer, and that the few cases that had not been reported had occurred in the practice of only one physician.

69. One particularly interesting circumstance arose in connection with the work of the Medical Department in Vallejo.

70. Just prior to the onset of the influenza, Vallejo had had a little flare up of small pox and there were still two or three cases in quarantine in different parts of the town.

71. One of these was a woman (Mrs. X, with a six months old baby) whose husband, a Federal civilian employee, was a patient in the Naval Hospital with a compound fracture of the thigh. This woman had passed through the acute stages of small pox but was still in the infective stage. She was being nursed by a neighbor and attended by a civilian practitioner.

72. On October 23, the nurse was taken with influenza and no other woman could be found to take her place so supplies were passed in to Mrs. X by another neighbor. The baby had evidently been sick for a few days prior to the day the nurse was taken sick and on October 25th it showed unmistakable signs of small pox. Then to cap the climax, on October 28th, the mother (Mrs. X) was taken with influenza.

73. All the above circumstances were reported to the Medical Officer on the night of the 28th by the neighbor who had been furnishing Mrs. X with supplies who also stated the civilian doctor in attendance was unable to get any one to nurse the mother and baby and could find no place to put them where they could get care.

74. Appeal to the Health Officer and the Red Cross Chapter of Vallejo failed to produce any results so a medical officer was dispatched to investigate and reported that Mrs. X could stand little transportation as she was seriously ill.

The nearest hospital where it would have been possible for these patients to gain admittance was 25 miles away. The association of small pox and influenza in the same patient barred her from any hospital available in Vallejo. The Medical Officer decided to bring the mother and child to Mare Island and care for them at the Emergency Influenza Hospital established for Yard workmen as no other arrangement could be made.

76. A tent was erected at an isolated spot near the Emergency Hospital, provided with necessary equipment, electric lights, call bell, and an incinerator near by. One of the Red Cross Nurses attached to the Emergency hospital volunteered her services. A second tent was put up near the first for the hospital corpsman who volunteered to act as go-between and stocker for the incinerator. Every precaution was taken to prevent introduction of small pox into the hospital, and by the intelligent obedience of those associated with the cases, this was accomplished.

77. Both mother and child recovered and were ultimately discharged.
Second Epidemic.

78. When the second wave of the epidemic struck Vallejo, the same conditions existed, in a less degree, as those mentioned above. At this time, neither the Red Cross Chapter nor the City was able, in any way, to meet the requirements, and it again became necessary for the Federal Government to step in in response to the urgent requests of the citizens of Vallejo, as this second wave, while of smaller proportion, was of the same severe type of disease as the first. Again the St. Vincent's Boys' School was offered by the Dominican fathers.

79. On Saturday of January 11, 1919, in the evening, it was decided to re-establish the emergency hospital with 75 beds and on the evening of Monday, January 13, 1919, it was in full running order and patients were being received and the doors of the institution remained open until January 28, 1919.

80. During this period, 55 patients were handled; 20 men, 25 women and 10 children. The greatest number in the hospital on any one day was 39.

81. The personnel used consisted of the following:- 4 Medical Officers, 8 Navy Nurses (female), 24 hospital corpsmen, 1 Chief Commissary Steward, 4 cooks, 6 mess attendants, 2 Chief Petty Officers and 9 Seamen and 5 civilian employees. These latter managed the heating plant, acted as chauffeurs on the ambulance and cars necessary for transportation and attended to the plumbing and electric systems.

82. Attached are papers of interest in connection with the activities of the department in Vallejo (See pages 43 to 51).

Commandant, Mare Island Navy Yard,
My dear Sir:-

I would not feel just right if I did not express in writing the appreciation of my wife and myself for the very fine treatment we received at the U.S.N. Hospital Unit No. 1, when we were both so very sick with the Influenza.

My wife was the first patient received at the Unit, while I was the second male patient received, and I must say that from the first moment of entry everything possible was done to alleviate our suffering, the boys standing in readiness for any service in their power, and no service was too menial for them to perform. In fact it was a revelation to see how those young boys were so willing to be of service and that they were so capable in performing that service, and the experience will live long in our memories, and I remarked more than once that it was no wonder to me that the Germans were so frightened of the boys in our Navy, for they can work as a unit and as individuals as well, and when they do anything they do it thoroughly.

The Sisters of the Convent were so kind to us, also, and I would not do justice if I were not to mention them.

It seems hard for me to express myself just right, for the many kindnesses come before me so quickly that I would like to mention one, when another comes before me.

The Navy Doctors treated us so kind and considerate, and were so up in their work and I am confident that if the Unit were started when the epidemic first arrived, that there would have been practically none to lose their lives.

I have noticed that there are, generally speaking, two kinds of men at the head of a nation or it may be a department of a nation. One man can see an emergency and act at once, thereby saving much loss or suffering. Another man will see the emergency after it passes and could tell just what he should have done.

I would place you in the first class, Capt. George, and thank God that you are where you are, not only for this case, but other cases where you proved that you would see farther than selfish men, and I am confident that your action in this emergency has saved many lives of the citizens of Vallejo.

I wish the Navy Department could know just how the Influenza cases were handled on the Yard and in Vallejo by your forces, for I know that if they knew the facts instructions would be issued for all Navy Doctors to become familiar with this system of cure.

Please pardon my writing you at length, but I feel so grateful for the way we were treated that I cannot help but express my feelings in the matter.

Sincerely,

(Signed) R. L. Cassidy

Asst. P. M.

Vallejo, Calif., November 25, 1918.

Captain Harry George:
Commandant Mare Island Navy Yard,

Dear Sir:-

The Board of Health of the
City of Vallejo takes this means to thank you for the
valuable assistance given by you in the stamping out of
the Influenza epidemic in this community.

What you have done and the work
of MR. J.L. Neilson and his assistants is greatly appreciated
and will never be forgotten by the people of Vallejo.

Yours very truly,

(SIGNED) B.J. KLOTZ, M.D.
President Vallejo Board of Health.

Copy to:
Yard Surgeon.

That as a token of appreciation and gratitude the sincere thanks of this Council and the citizens of the City of Vallejo, be, and they are hereby extended to the Honorable Josephus Daniels, Secretary of Navy, and Captain Harry George, U.S.N. Ret., Commandant, Navy Yard, Mare Island, for the prompt and efficient action taken in stamping out the recent Spanish Influenza epidemic in this city; to John L. Neilson, Surgeon, U.S.N. and the Medical Staff of the United States Navy by whose untiring efforts and unceasing care of the afflicted persons has resulted in the eradication of the epidemic; to the nurses and hospital corpsmen of the U.S. Navy connected with St. Vincent Naval Hospital whose valuable assistance time and devotion so cheerfully given to the cause of the sick and afflicted; and to all others of the Navy Personnel the sincere thanks of gratitude and appreciation are extended by a thankful and appreciative community.

Further resolved, that these resolutions be spread on the minutes of this Council and copies forwarded to the above mentioned persons.

Adopted by the Council of the City of Vallejo at a regular meeting held November 27th, 1918, by the following vote:

Ayes: Commissioner Wilson and Mayor Roney.

Noes: None. Absent: Commissioner Pierce.

Attest:

Jan. Roney.
Mayor.

Alf. Edgcombe.
City Clerk.

For;

Comdr. Med. Corps, USN.

640 Louisiana Street,
Vallejo, California.
December 3, 1918.

Captain Harry George, U.S.N., Ret.,
Commandant, Navy Yard,
Marine Island, California.

Dear Sir:

I wish to express my grateful appreciation of the skillful, kind and courteous treatment received by my wife and two daughters during their sickness with influenza at the U.S. Hospital organized by you at the St. Vincent's School in Vallejo. The Navy Surgeons and Stewards were most untiring in their generous treatment. The kindly efforts of the Sisters of the Convent to alleviate the suffering is also gratefully acknowledged.

The citizens of Vallejo certainly owe you a tribute for your prompt action in organizing this splendid hospital unit while the epidemic was at its highest and which, from its inception, has proved the greatest boon and undoubtedly saved many lives.

Yours very respectfully,

T. LONGWORTH
Assistant Shop Superintendent,
Hull Division
Marine Island Navy Yard.

Vallejo, Cal.

December 10th 1918.

Capt. Harry George, U.S.N.
Commandant, Mare Island Navy Yard,
Mare Island, California.

Dear Sir:

Kindly permit me at this time to express to you and through you to the Medical Corps on Mare Island, my appreciation and thanks, for the kindly and skilful professional and sympathetic attention and care given me during my confinement to the emergency hospital from Nov. 7th to Nov. 25th 1918, for treatment for Influenza sickness.

Very Sincerely Yours,

W.H. Householder,
Policeman,
Navy Yard .

615 Indiana St.

Vallejo, California.

December 11, 1918.

Captain Harry George, U.S.N.,

Commandant, Mare Island Navy Yard.

Dear Sir:--

Having just recovered from a severe attack of Spanish influenza and being one of the many citizens of Vallejo who underwent treatment at the Naval Hospital maintained at the St. Vincent's Parish School in this city during the epidemic, I deem it my duty to express to you my appreciation of the very excellent care and treatment given me during the time that I was confined to the hospital. Words are inadequate to convey the praise due the naval surgeons and hospital corpsmen for the wonderful results accomplished at this temporary hospital. The naval surgeons proved to be gentlemen in every respect and in their contact with the patients were courteous, painstaking and thoughtful at all times. Their conduct at all times reflected credit not only upon themselves, but the United States Navy as well. Too much cannot be said for the hospital corpsmen, all of whom took an exceptional interest and went out of their way to look after the welfare of the patients. There was nothing that these boys would not do to relieve the suffering of the patients and make them more cheerful and nothing can ever recompense them for the splendid services rendered.

I cannot help but think that the surgeons and corpsmen never had any idea when they entered the Navy that they would

called upon to serve in this capacity, it being their patriotic desire to serve their country against a foreign foe, but although they did not have the opportunity to participate in the world-war they have the satisfaction of knowing that they achieved the greatest victory that could be hoped for--victory over death--for due to their efforts many American citizens are enjoying life today. I know that I express the gratitude of every person who underwent treatment at the Naval Hospital in Vallejo when I express to you my appreciation for the humane spirit that actuated you when you directed the naval unit to come to Vallejo and save the lives of its citizens. One and all will ever feel, under a lasting obligation to you for your kindly action and ever remember that it was through your friendship for the people of Vallejo that another bright page has been written into the glorious history of the United States Navy. Trusting that Surgeon J.J. Hogan, U.S.N., his fellow surgeons and the hospital corpsmen who served under them will derive satisfaction from knowing that men who served under them will derive satisfaction from knowing that their wonderful work was appreciated I beg leave to remain

Most sincerely

William H. Clarke

Fire Chief, City of Vallejo.

January 13, 1919.

NOTICE

The Commandant, by authority of the Secretary of the Navy, has established in Vallejo an emergency hospital in the St. Vincent school building, for the treatment of persons residing in Vallejo suffering from influenza, especially the more serious cases.

While this temporary hospital is established primarily for the benefit of the families of officers and enlisted men of the Navy and Marine Corps, and all civilian employees and their families, others requiring hospital treatment are cordially invited to avail themselves of these facilities.

This temporary hospital will be ready for service this evening, January 13th. It will be thoroughly equipped with medical and nursing staff, laboratories, hospital equipment, and a commissary department. No charge will be made for treatment.

The Commandant takes this occasion of thanking the Rev. Father J. D. O'Brien of St. Vincent's Parish for his public spirit in placing at the disposal of the Navy Yard the St. Vincent school building, which is so admirably adapted to hospital purposes.

HARRY GEORGE
Captain, U.S.N., Ret.,
Commandant.

AN IS RESOLVED BY THE COUNCIL OF THE CITY OF VALLEJO, as follows:

That the sincere thanks of the City Council and the citizens of this city, be, and the same are hereby extended to J.L.Nielsen, Surg.U.S.N. and Walter J.Avery, Surg.U.S.N., and the medical staff of the U.S.Navy for again rendering such valuable assistance to the citizens of this city during the recent recurrence of the Spanish influenza, by whose untiring efforts and most valuable assistance the epidemic was speedily and effectually stamped out.

Adopted by the Council of the City of Vallejo at a regular meeting held Jan. 29th, 1919, by the following vote:

Ayes, Commissioners Pierce and Wilson and Mayor Roney.

Noes, None.

Absent, None.

Jas. Roney, Mayor

(SEAL) Attest: Alf. E. Edgecombe, City Clerk.

83. About October 15th influenza became epidemic in the Marine Guard of the Radio Station at Eureka, Cal., and one doctor and one hospital corpsman were immediately dispatched to their assistance.

84. While this medical officer was there the disease appeared in epidemic proportions in the town of Eureka and the situation rapidly became so severe that it was taken over by the Eureka Chapter of the American Red Cross.

85. The health officer and a large proportion of the physicians were infected with the disease early in the epidemic, and the medical officer at the radio station immediately volunteered his services which were accepted and he untiringly devoted himself to the care of the sick and sanitary problems in a most creditable manner until the epidemic subsided. Certain papers of interest in connection with this activity are attached (see pages 53 to 54).

Watsonville, California.

86. On November 17, 1918, a telegram was received from the Chapter of the American Red Cross at Watsonville, California, requesting hospital corpsmen and six men who had had experience at the Naval Training Camp were immediately sent to their assistance where they remained until their services were no longer required December 5, 1918. The detail was in charge of Pharmacist's Mate, 3rd class, A. M. Roark, USN.

87. A letter of appreciation for these services rendered is attached. (See page 55).

Section III.

THERAPEUTICS.

Early Efforts.

88. As stated above, the Medical Officers of the Navy Yard prior to the arrival of the epidemic at the Station had decided upon an initial system of treatment in order that there might be as little confusion as possible resultant upon the sudden rush of large numbers of cases.

89. From all reports and textbooks it was plain to be seen

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WESTERN UNION

TELEGRAM

NEWCOMB CARLTON, President

GEORGE W. E. ATKINS, Vice President

Send the following message, subject to the terms on back hereof, which are hereby agreed to:

COPY

Yard 344095

Received at
 784fx 159 Blue
 Eureka Calif 345pm Nov 5 1918

Commandant
 Mareisland Calif

The following communication is forwarded at the request of the mayor of Eureka comma chairman Humboldt County defense council comma Humboldt chamber of commerce comma red Cross chapter comma county medical society comma judiciary colon the undersigned learn with regret that Lieutenant Charles D Bloom medical corps U S N R F having performed the service for which he was detailed to the radio station Eureka is about to return to Mareisland period Lieutenant Bloom has performed a signal service to our community and we re he to be recalled at this time we feel that it would be a terrible loss to us period we the undersigned representative bodies and physicians of this community expressly request that you take this matter up officially with the commandant of the Navy yard at Mareisland and ask for Lieutenant Bloom be stationed here to continue his humane work among us until such time as his services can be spared 15305

Commander Section Naval Base

Eureka

4202

Watsonville, Calif.,
December 4, 1918.

Commandant,
Navy Yard,
Mare Island, Calif.

Sir:

Pharmacist's Mate Roark and Hospital Apprentices Baker, Fulghum, Martin, La Grant and Humphrey, having completed their services here and having received transportation papers departed for Mare Island on the train due to leave Watsonville Junction at 8:00 o'clock P.M., December 4th, 1918.

These young men were of the very greatest services to us. Had we not secured them I do not know how we should have got on at all. The epidemic hit Watsonville very hard. There were a great many of the sick who had to go to the hospital or die from want of care. We could secure only a few trained nurses locally and none from elsewhere. Thirty-four of our local nurses and aids were taken ill. We had more than fifty patients and a good prospect of being compelled to neglect them seriously, when the boys arrived.

They did their work well, were always on the job, conducted themselves at all times as gentlemen and did credit not only to themselves but to the service.

Personally, and on behalf of Watsonville Chapter, A.R.C., I beg to express our most sincere thanks and appreciation.

Respectfully yours,

(SIGNED) J.E. GARDNER,
Chairman Watsonville Chapter,
American Red Cross.

JEG/EG

...or could be done in the way of specific medication, dependence being largely placed upon rest, good nursing, proper diet and hygienic surroundings, aided by symptomatic treatment. Sodium Salicylate was plainly the most favorite drug treatment, and as previously stated it was determined to exhibit this drug by the intravenous method. The following outline of treatment was issued with the directions that should be followed (with due consideration for individual cases) until such time as developments, experience or further information should lead to a change. (See page 57). In addition, usual therapeutic measures, baths, pneumonia jackets, alcohol rubs, ice caps, etc. were used.

90. Very early in the epidemic, it was found that the alkaline drink given in outline of treatment, could not be taken by patients except in limited quantities and for a brief period of time as the taste could not be disguised sufficiently for it to remain palatable, and large quantities of the alkaline drink were absolutely necessary. For this, was substituted an aereated water known to the Medical Officer as an active antacid which could be readily obtained from the manufacturer in Vallejo and arrangements were made to procure this water, (known as "Galso") in sufficient quantities. The manufacturer of this water patriotically donated large quantities free of charge, and it was found by mixing it with lemon, orange, or grapefruit juice, patients could take several quarts a day without developing the slightest distaste and at the same time be kept well alkalized and have thirst relieved. Magnesium sulphate was used to produce Catharsis.

91. It was unfortunate that the most severe epidemic in any group should have been the first, as little time could be spared for scientific research or comparison, but a rough comparison between the results of treatment by mouth and treatment by intravenous method was possible by dividing in half the patients in each ward, treating one group by mouth and the other intravenously. In a very brief space of time it was apparent that in general those treated intravenously were better off than those treated by mouth all other things being equal, and it was soon determined to use the intravenous treatment in all cases where temperature persisted above 102.5 for thirty-six hours.

Sodium Salicylate, Intravenously.

92. In the beginning it was hoped that the practical use of Sodium Salicylate, intravenously, would bear out the findings of scientific research in pharmacology which show that the non-toxic Sodium Salicylate circulates in the blood as such unless it comes in contact with a degree of acidity sufficient to change it to salicylic acid. Such high acidity is found in inflamed and cedematous tissues as a result of accumulation of large amounts of CO_2 and, therefore at these points it was hoped that Salicylic Acid would become available and have direct influence upon the inflamed and cedematous areas. It is possible that some such effect was produced, but it was soon demonstrated that certainly the greater value of Sodium Salicylate in

OUTLINE OF TREATMENT
FOR
INFLUENZA CASES.

1. Give intravenous injection of sodium salicylate 5.0 in 10 c.c. distilled water. If any toxic symptoms of an alarming nature appear give 250 c.c. of 4% Soda Bicarb. intravenously.

The Salicylate mixture should be prepared fresh each day 50 grams Salicylate Soda placed in flasks and brought up to 100 c.c. with fresh distilled water and boiled, makes it ready for use.

2. Cases should be controlled by Urinary Examinations and blood counts before and after treatment. The Urinary Examination should consist of determining the acidity of urine with Methyl Red paper. Examination for albumen and casts should also be done. To determine if there is an upset in Carbohydrate Metabolism also examine for Acetic and Diacetic acid. Complete blood count should be made before the intravenous use of Salicylate and 6 hours after.
3. The urine should be kept alkaline to Methyl Red and this can be done by giving the patient a teaspoonful of the following mixture every 3 hours. Give it until urine becomes alkaline and keep it so:-

Soda Bicarbonate	100.0
Magnesium Oxide Pond.	25.0
(Heavy Calcined)	
Calcium Carbonate Precip.	25.0

4. Patient should have at least 500 grams of Carbohydrate daily. This may be divided between milk, malted milk, cereals, the various sugars, ice cream and alcohol if necessary. Egg Nogs made with sugar, canned milk and enough alcohol to disguise flavor.
5. Control cough with codeine and heroin. Control restlessness by liberal use of opiates.

the doses administered was the immediate relief of pain and restlessness without the slightest evidences of Salicylic Acid poisoning and without the grave depression, drenching sweats and lowered blood pressure which followed the use of Aspirin.

93. It was observed that in cases which were initially very severe, aspirin would temporarily relieve pain and reduce temperature but the drain on the individual appeared to reduce his power of resistance to the disease and temperature and pain rapidly returned after the effects of the drug passed off. The relief from pain and restlessness and the return of the patient to a bright and happy frame of mind which invariably followed the use of Sodium Salicylate intravenously, was remarkable to see, and even if the disease progressed in severity, the period of freedom from the extreme toxemia placed the individual in a more favorable position to combat the disease.

94. In the administration of the sodium salicylate intravenously, it was found that vomiting occurred in a large percentage of cases starting within a minute after the administration of the drug and continuing for from 5 to 10 minutes; also, there was some pain at the seat of injection. These symptoms were transient and were largely counteracted by greater dilution (using 20 c.c. of distilled water instead of 10) and by adding a small amount of sodium bicarbonate. It would be logical to assume that even greater dilution would be still better and now looking back upon the early experiences it would appear that dilutions of 200 c.c. given as perfusion would be better than the more concentrated solutions given by injection. A few cases developed a small abscess at the seat of injection which healed rapidly and was no doubt due to a small amount of the solution gaining access to the tissues outside the vein. In a few of the early cases vein irritation was noticed, a little soreness indicating this condition, but in only one case did thrombosis result and in this one case the cause was questionable as no sign of the condition appeared until two weeks after the injection (according to the history given by the patient) and the case was not seen by a medical officer until one month after the injection, the patient in the meantime having left the Navy Yard for special duty at the Naval Training Station, San Pedro, California.

95. In view of the good effects of Sodium Salicylate used intravenously with proper precautions as to dilution and sterility, its freedom from danger and the poisonous symptoms so frequently encountered when administered by mouth and its freedom from the bad effects produced by aspirin, it is the opinion of the medical officer that, as a symptomatic treatment to be administered early in the disease, Sodium Salicylate by intravenous method is the best.

Magnesium Sulphate Intravenously.

96. It was soon found that Sodium Salicylate, as above stated was largely a symptomatic treatment as in a certain percentage of

...diseases progressed to more serious stages; namely, to the so-called Pneumonias with the now well known symptom of marked cyanosis.

97. Autopsies observed at this time showed that certainly in most of these so-called Pneumonias, death was produced not so much by an inflammatory process as lung oedema and again, the research work done and knowledge of physiological chemistry possessed by Lieutenant Hogan came to the fore and as a result of his recommendation the intravenous use of magnesium sulphate was instituted on the principles that it was the most active known dehydrator of living tissues and through this an active combatant of streptococcal infection, as by relieving the oedema more oxygen reached the part and this higher oxygen content was less favorable to growth of streptococci which organism is known to thrive best in low percentage of oxygen.

98. The use of this drug at times produced very marked results and it was found that the earlier it was used in a case which had begun to show signs of cyanosis, the better were the results. Associated with its use there was a slight rise in the leucocyte count and marked improvement of the general condition of the patient and it apparently also had a beneficial effect upon the brain symptoms (which were those of oedema of the brain) as the mentality of the patient cleared in a remarkable short time after the injection. Still later in the progress of the epidemic, it was found that better results were obtained in the use of the Magnesium Sulphate if a certain amount of bleeding was permitted through the small caliber needle, 19 or 21 gauge, before injection was started and once or twice during the progress of the injection and where bleeding was not considered to be sufficiently profuse through the needle, the vein was opened on the opposite arm. It was found absolutely essential to give the injection slowly devoting at least one-half hour to administration, otherwise patient complained of a burning, tingling sensation all over.

99. An apparatus devised by Colonel A. Fiaschi of the Australian Medical Corps for administration of colloidal solutions in shock and used by the British during the war is most adaptable to the use of the Magnesium Sulphate solution as it is simple, easily sterilized and the container will keep the solution sterile over long periods of time, readily transported, easily and quickly made ready for use and handled, reduces to a minimum danger of air entering the vein and with the aid of small caliber needle (19 or 21 gauge) makes it impossible to give the solution too rapidly. (See page 64 A and B).

100. By about October 20th, the following directions had been formulated for the use of the Sodium Salicylate and the Magnesium Sulphate. (See page 60).

101. Improvement even in desperate cases followed the use of magnesium sulphate and it was observed that the effect was produced rapidly. Improvement in general condition followed in 12 hours and often temperature fell rapidly to normal and the white count (raised at first) fell to normal and patient made a quick convalescence.

Absence of complications and sequelae was notable. The benefit produced struck the Medical Officer as distinctly artificial. The drop in temperature was precipitous; seldom was there a marked or persistent increase in white count which is usually associated with nature's method of overcoming infection but instead often a fall coincident with improved general condition, fall in temperature and evident convalescent state. In several cases it was noted that the white count, rather high before administration, fell rapidly to normal and patient recovered. A not uncommon experience was that of failure of first injection but success with a second injection twenty-four hours later.

Blood Transfusion.

102. In spite of all efforts, it was found that a certain percentage of cases failed to yield to any form of treatment and progressed to death, even in the absence of heart or kidney conditions of such a nature as to reduce the chances of a successful outcome. In these cases the beneficial effects of the Magnesium Sulphate were transient and all medical officers were on the qui vive to further develop treatment in an effort to reduce morbidity and mortality.

103. About November 5th, Lieutenant Commander C.W. Ross, Medical Corps, USN, called to the attention of the Medical Officer a brief article on the use of immune serum but the difficulty of carrying out such treatment was rendered impracticable. A few days later Lieut. (jg) Erwin J. Hund, Medical Corps, USNRP, suggested that instead of an immune serum, citrated whole blood from individuals recently recovered from a severe attack of Influenza complicated by Pneumonia would be of even greater value than the serum, since in addition to ease in application it would not only furnish possible benefit from antitoxin present, but other elements of the blood, important in maintaining viscosity and the tone of the blood vessel walls would be retained. Doctor Ross, who was in charge of the temporary hospital on the Navy Yard, for civilian employees, at once, with the aid of his junior medical officers, (especially Lieut. (jg) Hund, Medical Corps, USNRP) developed the necessary system and technique (see pages 62 and 63) for transfusing patients with whole citrated blood, and proceeded to use it with remarkable results.

104. Many cases, unconscious, deeply cyanosed, with little or no breathing space left and with extremely low white counts and temperatures of 106 and 106, were relieved of symptoms indicating critical illness in 24 to 48 hours and progressed to a satisfactory outcome. It was notable that the diffuse pneumonic process rapidly localized to a lobar type. The effect produced appeared to be slower than that brought about by Magnesium Sulphate but more often permanent and resembled more a cure by nature with its produced high white count and slower temperature fall. Convalescence once started was rapid and complete and complications and sequelae were nil.

Apparatus and Technique for the use of Filtered
Immune Blood in the Treatment of Pneumonia
Complicating Influenza.

105. With safety of application the best results will be obtained by early use. On diagnosis of Pneumonia with the cyanosis, rise in temperature and low blood count, a transfusion should be performed. It is the better policy to transfuse a case in the earliest possible time. It is well to repeat transfusion in twelve or twenty four hours time if the response is not obtained by the first transfusion.

Technique.

106. Donors should be people, who have recently recovered from a pneumonia complicating influenza. The best time of selection is from three days to six weeks (the height of immune content). The donor should have a Wassermann test performed and the blood of the donor and recipient should be tested for isohemolysins and isohemagglutinins. The various tests having been completed and satisfactory the blood is taken, collected in a paraffined jar, containing a 1% solution of Sodium Citrate in normal salt. The closed method and apparatus as seen in the diagram is the better and safer method. A platinum needle about 17 caliber is the better. Any of the veins of the arm are used and usual surgical technique is followed. From 250 to 400 c.c. of blood is the usual dose, and 2 parts of blood to 1 part of citrate solution is used. The patient is fortified with a one-fiftieth grain of digitalin hypodermically, to care for the extra load. A one-fiftieth grain of atropine is kept in readiness in case anaphylaxis develops. The blood is given by the closed apparatus, as shown in the accompanying diagram with the usual surgical technique, and an even flow is obtained by the use of the pressure gauge. From forty to sixty millimeters of mercury is the better pressure. The blood should be kept warm by a suitable water bath. The usual reaction after transfusion is a chill, followed by a perspiration, and a rapid dropping of temperature. During such, the patient should be watched closely and supportive measures be used if necessary.

Tests Before Transfusion for Isohemagglutinins
and Isohemolysins.

107. Two or three c.c. of blood are obtained from each donor from a vein at the elbow and 0.5 c.c. is placed at once in a centrifuge tube containing 5 c.c. of a 1 per cent sodium citrate in normal salt solution. The remainder is placed in a small, dry test-tube until coagulation has occurred and the serum has separated.

108. From the recipient, 3 to 4 c.c. of blood are necessary; 0.5 c.c. is placed in sodium citrate solution, and the remainder is allowed to coagulate and the serum collected.

is pipetted off, and the cells are washed again with normal salt solution. After the final washing enough normal salt solution is added to the sediment of cells to bring the total volume up to 5 c.c.

110. The serum tubes are also centrifuged, so that clear serum is obtained. These should preferably be free from hemoglobin stain.

111. The following mixtures should be set up within twenty-four hours of the time of collecting blood, in order that native complements may not have undergone deterioration. Measurement may be made according to a drop from an ordinary 1 c.c. graduated pipet held vertically. Small sterile test-tubes (8 by 1 cm.) are to be used.

- Tube 1: 4 drops of donor's serum plus 1 drop of recipient's red cell emulsion.
- Tube 2: 4 drops of recipient's serum plus 1 drop of donor's red cell emulsion.
- Tube 3: Control: 4 drops of donor's serum plus 1 drop of donor's red cell emulsion. Should show no agglutination and no hemolysis.
- Tube 4: Control: 4 drops of recipient's serum plus 1 drop of recipient's red cell emulsion. Should show no agglutination or hemolysis.
- Tube 5: Control: 1 drop of donor's red cell emulsion plus 4 drops of normal salt solution. This serves as a control on the toxicity of the corpuscles and isotonicity of the salt solution.
- Tube 6: Control: 1 drop of recipient's red cell emulsion plus 4 drops of saline solution.

112. One cubic centimeter of salt solution is added to each tube and the tubes are gently shaken and placed in the incubator for two hours. They are to be inspected every half hour. Agglutination is recognized macroscopically by the clumping of the red blood cells into small masses that later sink to the bottom of the tube as a small clot.

113. Hemolysis is likewise easily detected, as corpuscles tend to become precipitated within two hours. If doubt exists, the finer grades of hemolysis may be detected after the tubes have been allowed to stand over night in an ice-chest, or at once by thorough centrifugalization. A blue print of the apparatus used is attached. (See page 64).

Quinine Sulphate Intravenously.

114. Based upon an article appearing in one of the Medical Journals claiming that Quinine Sulphate, intravenously, raised the white blood count and produced good results in Influenza a trial was made of the method.

repeated, giving a total of six injections. The injections were given early in the influenza. All four cases subsequently developed pneumonia and two received Blood Transfusion.

116. Ten grains of Quinine Sulphate in 20 mls of distilled water were given at a dose into the vein at the bend of the elbow.

117. Close watch was kept on the white blood count before and repeatedly after without discovering any change either increase or decrease.

118. There was no apparent effect upon the patient either for good or for bad.

119. The administration of the drug was not continued.

Final Development of Treatment.

120. The final stage to which treatment was developed and with which the best results were obtained was as follows:-

- (a) Absolute rest in bed.
- (b) Thorough and constant alkalization.
- (c) Sodium Salicylate intravenously only in cases not complicated by pneumonia and then only when pain, restlessness and high temperature evidenced severe toxæmia.
- (d) Magnesium Sulphate intravenously in pneumonia cases showing bad general condition, high temperature and falling white count.
- (e) Blood transfusion (citrate method with whole blood) in pneumonia cases showing cyanosis, rise in temperature and either when first seen or after failure to react permanently to Magnesium Sulphate intravenously and a falling white count.
- (f) Stimulation used most sparingly and only when indicated for special purpose or in selected case. Whiskey used as stimulant.
- (g) Sodium Iodide in simple cough mixture to relieve bothersome dry cough.
- (h) Magnesium Sulphate by mouth for catharsis.
- (i) Carbohydrate diet.

121. It was particularly noted that patients treated by intravenous administration of Sodium Salicylate, Magnesium Sulphate or blood transfusion made a far quicker convalescence than those treated by mouth symptomatically and this is born out by table 11 and comparison of tables 6 and 8, and by chart 7. Also deaths were reduced by intravenous treatment as shown by table 10 and comparison between tables 6 and 8.

122. The objection could be raised that this was the result rather of improved condition existing at the two civilian hospitals in that they did not, as the Training Camp hospital did, labor under great rash of patients, reduced personnel and inexperience. This, however, cannot be accepted as a just argument since identical cases, under best possible conditions at the base hospital had higher death rate and from two and one-half to three times the number of sick days per case.

123. Those treated by mouth were weak for days after all acute symptoms had subsided and showed a marked tendency to develop complications (Sinus and ear trouble, myocardial insufficiency, and following pneumonias, massive pleuritis and lung abscess). The use of aspirin appeared particularly to predispose to prolonged convalescence.

124. Those treated intravenously were notably free of such complications and sequelae (only two or three cases in all so treated) and even the severest cases were active and strong soon after the acute symptoms passed. Furthermore, the decline in death rate shows the good effects of the development of treatment.

125. Table 9 indicates the saving of sick days in the difficult pneumonia cases that resulted from the more specific forms of treatment. This table is based solely upon cases treated throughout their course in emergency hospitals and it is to be remembered that those receiving Magnesium Sulphate and Blood Transfusion were largely among the later cases and in the civilian hospitals as the epidemic reached them later than that of the military forces and it was these civilian groups that furnished the more desperate cases, cases ill for 6 and 10 days before admitted without nursing care, little food and often surrounded by most squalid conditions. In other words, in spite of a worse type of case the more direct forms of treatment yielded better results than the symptomatic treatment did among the best type of case, namely, physically picked men living under excellent hygienic conditions seen early in the disease and, during its entire course, receiving the best of care under excellent surroundings.

126. Chart 7 shows graphically the delay in recovery of cases treated symptomatically alone. This delay would be more evident had the cases treated symptomatically in the emergency hospitals been left out. From this chart it will be seen that of the pure influenza cases treated throughout their course in the Emergency Hospitals 94.5% were

... 70% were so discharged;— whereas of the cases treated throughout their course in the base hospital symptomatically only, it will be seen that of the pure Influenza cases only 89% had been discharged by the 10th day of their disease and of Pneumonia cases only 25% had been so discharged.

127. No comparison between the results obtained can be entertained for those cases treated part in Emergency and part in Base Hospitals, as these were selected cases of severe type. The necessary transfer of these cases totalling 116 naturally, favors the figures of the special treatment and are therefore to be left out of consideration except as vaguely indicative.

128. Table 10 gives the percentages of death in Pneumonia cases treated by the different methods. This table brings out forcibly the failure of Sodium Salicylate in pneumonia cases, it shows clearly the fall in death rate that took place following introduction of Magnesium Sulphate and Blood Transfusions. In this table a most striking comparison is available for here we have the death rate following purely symptomatic treatment among pneumonia cases occurring in physically picked men, seen early in the disease and treated throughout their course, in a well established and equipped base hospital. Under the column "Blood Transfusion", "Civilians, Vallejo" the percentage cannot in fairness be taken as indicative as these two deaths occurred in patients brought to hospital late in the disease and who were in a moribund condition when transfusion was given.

129. Certainly when a treatment will save an average of four sick days per case, reduce sequelae of pneumonia and other complications to a practical 0, and leave the patient strong and fit for work when discharged from hospital it deserves at least serious and honest consideration. And when there is a strong indication that this treatment will further save the lives of 17 to 21 men out of every 100 who would most certainly die, then it deserves more than consideration. It deserves a trial.

Conclusions.

130. Sodium Salicylate used properly can be given intravenously without harmful effects and produced a favorable result in that it relieved pain and restlessness and saved the patient from the wear and tear of a severe toxemia and placed him in a better position to fight more serious developments of the disease, and if progressing to health without pneumonia complication, showed rapid convalescence with a minimum of sequelae. Sodium Salicylate should not be used if there is evidence of beginning pneumonia.

131. Magnesium Sulphate used properly can be given intravenously without harmful results and on most patients produced a most marked effect in improving general condition of patients and in relieving oedema of the lung and brain. Its best effect is produced when administered at the start of pneumonia and oedema and if used at this time its effect upon blood count is more apt to be permanent. When used

11. its favorable action was transient. Patients receiving Magnesium Sulphate showed rapid convalescence with minimum of sequelae. The great advantage of the Magnesium Sulphate solution lies in the readiness of materials, brevity of preparation, the fact that it can be prepared in advance and kept for long periods and the simplicity of equipment required.

132. Blood Transfusion using whole blood by citrated method can with care, be used safely under even unfavorable conditions as regards asepsis. Tests, previous to use, for syphilis, ischaemolytins and ischaemoglutins are essential to safety. Results in pneumonia cases even of several days duration, unconscious and deeply cyanosed were markedly favorable (oedema cleared, pneumonic process localized, brain symptoms disappeared, white count rose) and general condition improved and rapid convalescence followed, with a minimum of complications. The draw back to blood transfusion lies in the difficulty of obtaining immune donors (especially early in the epidemic), the protective tests necessary, and the elaborateness of equipment required.

133. For the treatment of the acute respiratory infection which has been so prevalent during this epidemic blood transfusion has produced better results than any other one method of treatment.

Section IV.

11103.

General Remarks.

137. The term "Navy personnel" and "Navy" designated that part of the naval personnel other than "Marines."

138. The main statistics of this epidemic will be found in the tables on pages 76 to 98.

139. Like all statistics, they can be taken only in the broadest sense and considered only in connection with the remarks submitted which bear upon their interpretation. Unlimited variation of influences acted upon the different groups. These variations were more marked between the military and civilian groups and of the subdivisions of the military force, the most marked variations of conditions existed between the prisoner group and the groups of personnel having their freedom.

140. One of the most pronounced influences bearing upon comparison of results in different groups, and especially when comparing the results of treatment, is that of the time of occurrence of the epidemic in the particular group. At the beginning of the epidemic we were in the dark as to the true character and course of the disease and even more so as to any satisfactory form of treatment. As time passed and our experience increased, successive groups received more intelligent care and treatment than those preceding and minute comparative study of cases of the same type shows a steady decline in the average number of sick days and the percentage of deaths coincident with increased experience and development of treatment.

141. Furthermore, the first group affected (Naval Training Camp) was also the group in which the greatest number of cases developed and developed most rapidly. It is the feeling of all, "If we had only at first known what we now know, it is certain that sick days and deaths would have been reduced, etc." While such feeling is natural under all circumstances when happenings are viewed in retrospect, without doubt in this case it is not merely supposition and the saving of life and sick days would have actually occurred had we known before what we now know.

142. Statistics dealing with admissions are based upon cases admitted between October 4, 1918, when the epidemic began in the first group, to November 30, 1918, when the epidemic had passed in all groups.

143. As some cases were continued on the sick list a very prolonged period and straggling cases were constantly occurring following a subsidence of epidemic conditions, it was necessary for the purpose of this report to pick a date on which records of discharge should

140. Records showed that the bulk of cases were discharged 15 days after their admission and, therefore, December 15, 1918, was taken as the date for deciding to record discharges of cases remaining on December 15, 1918, as "Remaining." This is a venture which may or may not be materially in violation of statistics as to average days spent in hospital, for should such cases have been followed out and their sick days added to the total days credited to the hospital, it would be therefore to the grand total.

141. It is clearly shown by studying records that if a case was not discharged on or about the 15th day, convalescence was tremendously prolonged, even into months as is indicated by the fact that the average days per case of those remaining in the hospital, December 15, 1918, was 46.6 days. Of those who were admitted and discharged during the period October 4, 1918, to December 15, 1918, the greatest number of sick days for any one case was 55. For those cases remaining on December 15, 1918, the greatest number of sick days for any one case was 59 (on December 15). It is further to be noted that of those remaining on December 15th of those treated in emergency hospitals, all such cases being Base Hospital cases and that this was not the result of transfer from emergency to base hospital, at the last minute.

142. At best, the total sick days are appalling, 20,391, which is equivalent to the Government having lost completely the services of one man for an average lifetime (55.8 years) or 13.9 men for one complete year's enlistment. And all of this loss was concentrated in a brief period of time of two and one-half months.

143. Every effort has been made to eliminate all cases which were not definitely influenza, wherever possible, this being accomplished by keeping patients who were treated in hospitals immediately under the control of the medical officer for 48 hours before a diagnosis was made and by admitting all cases who had to be transferred immediately to the Base Hospital as with "Diagnosis Undetermined" in order that they might remain under observation at the Base Hospital until a possibility of other disease had been ruled out. A minority of patients were, unfortunately, transferred to the Base Hospital under the diagnosis "Influenza" upon the first day seen but these transfers occurred largely at a time when experience had taught us were tending to recognize at first sight actual influenza cases and, therefore, the error in diagnosis as to any grave degree influenced the figures presented.

144. Another difficulty in interpreting statistics results from the fact that the clinical condition of the patient frequently failed to conform to the interpretation placed upon symptoms such as temperature, pulse, respiration, etc. For example, a patient's condition might be such that the temperature pulse and respiration were all accurately taken often at intervals of only a few hours and if viewed merely as a record of times showed the patient in excellent condition whereas a glance at the patient showed him plainly to be in desperate straits, cyanosed, showed weakness and worried expression.

the patient by his general appearance and actions, the white blood count urinary reaction and to some extent his blood pressure.

146. Many men carried on the books of this station for administrative purposes were actually never on the station and have no contact with it their physical location being at various shipyards, wireless stations or other types of detached service. Such men are eliminated both from records of cases and from figures used to compute average complements.

147. Cases are only included which came directly under the care of the Medical Department of the station either at their homes, in emergency hospitals or base hospital. Cases are not included which were treated by civilian practitioners or Medical Officers of other stations as in such cases it was impossible to obtain accurate information as to whether such cases were actually Influenza, whether or not Pneumonia or other complication developed or any idea of influences existing having a bearing on number of sick days.

148. This procedure naturally prevents the figures submitted from being representative of the total actual occurrence of the disease among all those credited to this station but such figures would not be representative and therefore are not considered worth presenting.

149. It has been impossible to figure even approximately any rates based upon the average complement of Civilian employees or obtain any information indicative of the degree to which cases occurred among this group owing to the fact that a high percentage of the cases occurring in this group never will be known to the Medical Officer or the authorities of the Yard and of those cases known the large majority were treated by civilian practitioners in the civil community in which they happened to be living and no information worth while could be obtained without untold labor.

150. All figures given for this group are, therefore, based solely upon those civilians treated in the emergency hospitals on the Navy Yard and in St. Vincent's Boys School, Vallejo, and, in the case of the hospital established in Vallejo, all such cases were not Navy Yard employees.

151. Furthermore, no records are available to show results or accurate numbers for civilians treated by Navy units at San Francisco, Eureka, Watsonville or in the City Emergency Hospital, Vallejo. The most accurate information relates to cases treated in San Francisco but since this was only a convalescent hospital the information is of no value.

152. Comparison of charts 1 to 6 gives clearly the sequence of the epidemic among the different groups cared for, and the successive points of greatest activity for the Medical Department. Charts 4 and 5 do not indicate prevalence but merely when the Emergency Hospitals were in operation as the epidemic among the civilians in Vallejo and the Yard

153. The sudden overwhelming attack on the Naval Training Camp where practically all Navy personnel were living is plainly seen in Chart 1.

154. Charts 1 to 3 bring out the relation between the apex of admissions and the period during which deaths occurred. Also the four periods of an epidemic frequently mentioned; - period of rapid rise, apex of epidemic; period of rapid decline, and period of slow decline.

Incidence of disease in Medical Department Personnel.

155. The incidence of the disease among the Medical Department personnel actively engaged in handling cases and therefore more exposed than those performing duties not constantly bringing them in contact with the disease, is given below:-

Table 1.

	Medical Officers.	Nurses.	Hospital Corps.
Number of persons.- - - - -	27	38	223
Cases of Influenza. - - - - -	6	7	27
Rate per 1000 of personnel-	222.22	184.21	121.07
Cases developing Pneumonia- - - - -	2	0	3
Rate per 1000 of personnel- - - - -	74.07	0	13.00
Percent of Influenza cases- - - - -	33.3	0	11.1
Deaths- - - - -	0	0	1
Rate per 1000 of personnel- - - - -	0	0	4.48
Percent of Influenza cases- - - - -	0	0	3.7
Percent of Pneumonia cases- - - - -	0	0	33.3

Special Observations.

156. Unfortunately these important features of the records are not available for the 1119 cases occurring at the Naval Training Camp as the rush of work precluded proper attention being paid to the recording of the finer details of observation and clerical work.

157. In fact there was only one group in which observations were sufficiently and accurately recorded to enable them to be used, namely, The Emergency Hospital established on the Yard for civilians.

158. The percentages of occurrences given below are based upon 277 cases treated there in and it must be remembered that a large percentage of these cases had been ill a considerable period before admission. The average days ill before admission was 3.3 and in certain cases it ran as high as 7 to 10 days.

Influenza cases without Pneumonia.

Symptom.	Present on Admission.	Developed during course of disease.
General Pains.	66%	3%
Headache.	57%	24%
Backache.	41%	26%
Cough	33%	---
Congested sclera.	20%	---
Sore chest.	9%	20%
Chill.	7%	---
Pain in eyes	6%	---
Intestinal (Bloody stools diarrhoea, cramps.)	6%	---
Vomiting.	3%	7%
Epistaxis.	3%	7%
Pain in legs.	1.5%	---

Influenza cases with Pneumonia.

Symptom.	Present on Admission.	Developed during Course of Disease.
General Pains.	12%	---
Cough.	6%	18%
Congested sclera	2%	6%
Chill.	1.2%	---
Backache.	1.2%	---
Headache.	1.2%	1.2%
Delirium.	---	20%
Vomiting.	---	3%
Epistaxis	---	1.2%
Cyanosis (first, fingernails, second lips, third ears, fourth hands and feet, fifth general. Face pale unless temperature high).	100.0%	100.0%

Table 3.

Differential Blood Counts.		Influenza without Pneumonia.	Influenza with Pneumonia.
Polymorphonuclears		64%	65.7%
Large Lymphocytes		8%	12%
Small Lymphocytes		16%	10%
Large Mononuclears		7.3%	7%
Transitional		4%	3%
Eosinophiles		7%	1%
Basophiles		---	1.3%

Urinalysis.

Albumen	Positive	21%	26%
	Negative	79%	72%
Sugar	Positive	1%	1%
	Negative	99%	99%
Chlorides	Normal or present	45%	45%
	Diminished or absent . .	55%	55%

Blood Transfusion Tests.

Number tested	105
Incompatible	37
Hemolysins	27
Agglutinins	7
Both	3
Anaphylaxis	2

Statistics in Brief.

159. Includes all cases from time of admission to time of discharge to duty to change of diagnosis, dead or remaining December 15, 1918, including those transferred to Base Hospital. The progress and final outcome of latter obtained from Base Hospital.

Table 4.

Total average daily complement on station - - - - -	16,468
Military force- - - - -	8,068
Civilian force- - - - -	8,400

Military force:

Influenza cases, total- - - - -	1,536
Rate per thousand of personnel- - - - -	190.38
Total sick days- - - - -	20,391
Average sick days per case- - - - -	13.2

Rate per thousand of personnel- - - - - 163.11
 Percent of Influenza cases- - - - - 85.6
 Total sick days- - - - - 15,265
 Average sick days per case- - - - - 11.6

Influenza cases developing Pneumonia- - - - - 220
 Rate per thousand of personnel- - - - - 27.26
 Percent of Influenza cases- - - - - 14.3
 Total sick days- - - - - 5,126
 Average sick days per case- - - - - 23.3

Deaths- - - - - 66
 Rate per thousand of personnel- - - - - 8.18
 Percent of Influenza cases- - - - - 4.2
 Percent of Pneumonia cases- - - - - 30.0
 Total sick days- - - - - 514.8
 Average sick days per case- - - - - 7.8

Cases discharged to change of diagnosis- - - - - 17
 Average sick days per case- - - - - 29.8

Cases remaining December 15, 1918 - - - - - 39
 Average sick days per case- - - - - 44.0

REPORTS OF INFLUENZA EPIDEMIC ON PERSONNEL OF NAVY AND MARINE
CORPS AND OTHERS: TREATED BY MEDICAL DEPARTMENT OF THE YARD AND NAVAL HOSPITAL,
NAHE ISLAND.

	Navy Personnel	Marine For.	Prisoners	Civilians	Total	Total for Navy
Cases	1119	309	106	416	1958	1536
Rate per 1000 of personnel	198.10	142.72	589.41	---	---	180.32
Recovered	1048	289	94	323	1654	1431
Rate per 1000 of personnel	163.90	133.48	460.76	---	---	177.63
Percent of cases	93.7	93.5	67.0	94.4	93.4	93.1
Died	49	12	5	22	88	66
Rate per 1000 of personnel	8.69	5.54	24.50	---	---	9.16
Percent of cases	4.3	3.6	4.6	5.6	4.6	4.8
Diagnosis changed as result of complication or intercurrent disease	12	1	4	0	17	17
Remaining Dec. 15, 1918.	22	9	9	0	39	39
Pneumonia Cases	155	46	20	94	314	220
Rate per 1000 of personnel	27.12	20.76	98.03	---	---	27.26
Percent of influenza cases	13.8	14.5	18.5	22.6	16.0	14.3
Deaths	49	12	5	23	89	66
Percent of influenza cases	4.3	3.8	4.6	5.6	4.5	4.2
Percent of pneumonia cases	31.5	26.6	25.0	24.4	28.3	30.0
Diagnosis changed as result of complication or intercurrent disease.	8	0	3	0	11	11
Remaining Dec. 15, 1918.	9	1	6	0	16	16

	Navy Personnel	Marine Personnel	Prisoners	Civilian Personnel	Total Personnel
Influenza cases not developing pneumonia	964	264	68	322	1618
Average days ill before seen	1.0	1.4	1	2.8	1.3
Average days on sick list	10.4	11.6	11	5.8	9.7
Average days ill	11.4	13.0	12	8.6	11.0
Pneumonia Cases	155	45	20	94	314
Average days ill before seen	1.0	1.5	1	3.7	1.8
Average days on sick list	22.1	19.3	30.2	9.4	18.4
Average days ill	23.1	30.6	31.2	13.1	20.8
Average day pneumonia developed after onset of influenza	?	?	?	?	?
Average day death occurred after onset of influenza	8.2	9.2	12.6	6.6	8.7

Average complement on which rates per 1000 based:- Navy Personnel 5699, Marine Personnel 2165, Prisoners 2 Total 8068. Certain cases in whom diagnosis was changed as result of complication remained on sick list December 15 as complication was direct continuation of influenza. "Complication" means a complication other than pneumonia. "Civilians" include only those treated at Emergency hospitals on Navy Yard and in Valley. No records available for civilians visited at their homes or treated in emergency hospitals in Europe and France 1900.

Cases of Influenza treated part of the time in Emergency Hospital and part of the time in the Naval Hospital. Mare Island, Cal. (1)

	Navy Personnel	Marine Personnel	Total
Cases	114	2	116
Recovered	86	2	87
Percent of cases.	74.5	100	75.0
Died.	28	0	28
Percent of cases.	19.8	---	18.9
Diagnosis changed as result of complications or intercurrent disease.	5	0	5
Remaining Naval Hospital, Dec. 15, 1918.	8	0	8
Pneumonia			
Cases	73	1	74
Percent of influenza cases.	64.0	50.0	53.7
Deaths	28	0	28
Percent of influenza cases.	19.8	---	18.9
Percent of pneumonia cases.	30.1	---	29.7
Diagnosis changed as result of complication or intercurrent disease.	5	0	5
Remaining Dec. 15, 1918.	8	0	8
Influenza cases not developing pneumonia.	41	1	42
Average days ill before seen.	1	1	1
Average days in hospital.	4.0	2	4.7
Average days in hospital.	16.0	12	15.9
Average sick days	21.0	15	21.6
Pneumonia Cases.			
Average days ill before being seen.	73	1	74
Average days in hospital.	5.9	16	8.8
Average sick days.	29.3	13	29.0
Average day pneumonia develop. after onset influenza	7	7	7
Average day death occurred after onset influenza	9.2	---	9.2

(1) Emergency Hospital for Navy Personnel closed October 31, 1918, that for Marine Personnel closed Nov. 4, 1918.

Cases of influenza admitted to Nov. 20, 1918 and transferred to Naval Hospital, Mare Island immediately after being first seen.

	Navy Personnel	Marine Personnel	Prisoners	Total
Cases	287	220	108	615
Recovered	264	200	94	558
Percent of cases.	91.9	90.9	87.0	90.7
Died	6	12	5	23
Percent of cases.	2.7	5.4	4.6	4.0
Diagnosis changed result of complication or intercurrent disease.	6	1	4	11
Remaining December 15, 1918.	15	8	9	32
Pneumonia				
Cases	23	42	20	85
Percent of influenza cases	8.0	19.0	18.6	13.6
Deaths	8	12	5	25
Percent of influenza cases	2.7	5.4	4.6	4.0
Percent of pneumonia cases	34.7	28.6	25.0	29.4
Diagnosis changed result of complication or intercurrent disease.	2	0	3	5
Remaining Dec. 15, 1918.	2	1	4	7
Influenza cases not developing pneumonia.	264	178	88	530
Average days ill before seen.	1.2	1.6	1	1.2
Average days in hospital.	11.9	12.5	11	11.6
Average sick days.	13.1	14.1	12	13.0
Pneumonia cases.	23	42	20	85
Average days ill before seen	1.2	1.6	1	1.2
Average days in hospital	26.8	19.6	30.2	25.6
Average sick days	28.0	21.2	31.2	26.7
Average day pneumonia developed from onset of influenza.	?	?	?	?
Average day death occurred after onset of influenza	12.0	9.2	12.6	11.2

Cases carried as with "Change of Diagnosis" are also included in those "Remaining" as the effect continuation of influenza. "Complication" means complications other than pneumonia.

DEATHS: INFLUENZA - PNEUMONIA CASES
TREATED BY NEPHROANT AND INTRAVENOUS METHODS

	Month	Sodium Salicylate	Intravenous Marmesium Sulphate	Blood Transfusion
Emergency Hospital Naval Training Camp				
Cases	17	18	8	NONE
Deaths	5	7	1	
Percent	29.4	38.6	12.5	
Emergency Hospital Naval Barracks				
Cases	1	NONE	1	NONE
Deaths	0		0	
Percent	0		0	
Emergency Hospital Cavilians, Navy Yard				
Cases	21	NONE	17	28
Deaths	9		6	5
Percent	42.8		35.2	21.4
Emergency Hospital Cavilians, Val 1010				
Cases	4	NONE	24	5
Deaths	1		1	8
Percent	25.0		4.1	40.0
Base Hospital Military Force				
Cases	25	NONE	NONE	NONE
Deaths	6			
Percent	24.7			
Totals				
Cases	66	18	50	35
Deaths	23	7	8	8
Percent	34.8	38.8	16.0	24.2

Treatment at Base Hospital almost entirely confined to expectant and symptomatic treatment.

Average days Duration from onset to disposal Influenza Cases.

	(1):	Recoveries:	Deaths:	Change of	Remaining	Average for				
		Cases:	Cases:	Diagnosis:	12/15/18	Group:				
		Days:	Days:	Cases:	Days:	Days:				
Cases of Influenza not developing pneumonia	1057	9.7	0	9 (2)	10.2	0	1066	9.7		
Treated solely in Emergency Hospitals.										
Treated part of time Emergency Hospital and part of time in Base Hospital.										
Emergency Hospital	48	16.1	0	0	---	0	---	48	16.1	
Base Hospital										
Total	21.7							21.7		
Treated solely in Base Hospital	1601	11.8	0	5	28.8	23	28.4	530	13.1	
Average for Group	11.8	0	---	14	28.8	23	28.0	1630	11.1	
Cases of Influenza - Pneumonia.	109	16.5	42	7.8	4	14.3	0	0	156	13.4
Treated solely in Emergency Hospitals										
Treated part of time in Emergency Hospital:										
part of time in Base Hospital.										
Emergency Hospital.	39	6.9	22	5	6.2	6	9.7	74	6.6	
Base Hospital.										
Total.	23.9	25.0	4.3	5	32.4	6	54.0	74	22.5	
Treated solely in Base Hospital.	48	21.9	9.3	5	30.6	7	63.7	85	29.1	
Average for Group	26.3	25	11.8	5	32.6	7	45.5	85	25.4	
	196	21.7	69	9.1	14	39.1	15	49.6	314	20.8

1) "Recoveries" covers cases discharged to duty well before Dec. 15. Those cases carried under "Change of Diagnosis" and "Remaining" were also recoveries as none had died to date of report.

2) "Change of Diagnosis": these nine cases of Influenza all well of Influenza and diagnosis changed to distinct disease. Practically all others were complications of Influenza and direct continuation of the disease.

This table includes Civilians treated in Naval Emergency hospitals. All cases treated part of time in Emergency Hospital and part of time Base Hospital were transferred from the former to the latter before October 31. These 116 transfers were severe cases 22 had pneumonia before being transferred and 52 developed pneumonia in hospital.

CHART 1.

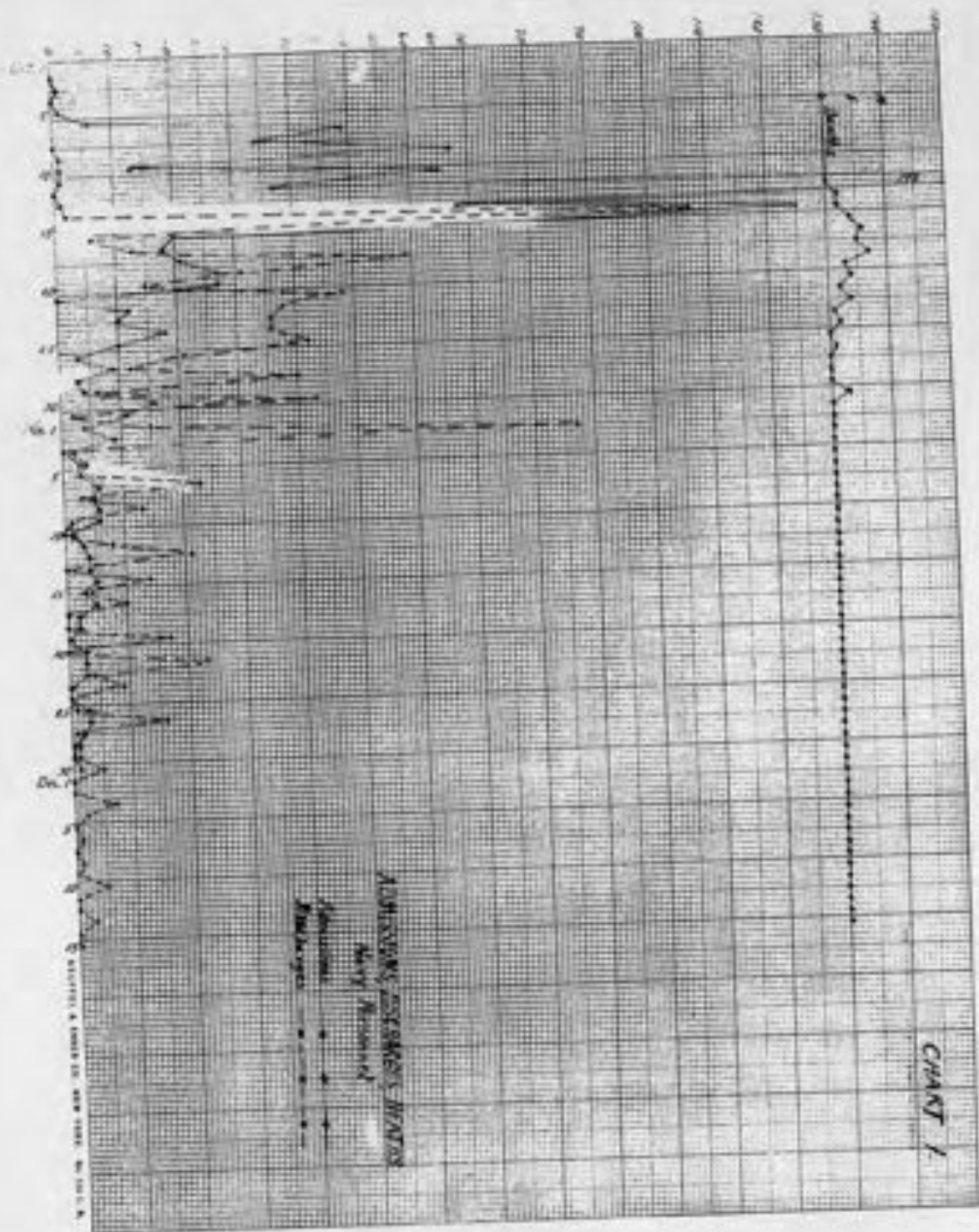
This chart shows the number of admissions, discharges and deaths among Navy personnel.

It is based upon 1,119 cases, all that were handled by the Medical Department of this Station in emergency hospitals, base hospitals or both.

It includes both complicated and uncomplicated cases.

Those cases sent to base hospitals direct as with Diagnosis Undetermined and later determined to be Influenza are recorded on the day of the original admission and not on the day that the diagnosis was determined.

Practically all these cases came from the Naval Training Camp where the vast majority of navy Personnel live.



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CHART 3.

This chart shows the number of admissions, discharges and deaths among Marine Personnel.

This chart is based on 309 cases, all that were handled by the Medical Department of this Station in emergency hospitals, base hospital or both.

It includes both complicated and uncomplicated cases.

Those cases sent to base hospital direct as with Diagnosis undetermined and later determined to be Influenza are recorded on the day of original admission and not on day diagnosis was determined.

The chart shows the two distinct epidemics occurring among Marines; the first among older men, slow, straggling and without deaths; the second among Recruit Depot men, sudden, sharp and accompanied by deaths.

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CHART 3.

This chart shows the number of admissions, discharges and deaths among prisoners confined in the Naval Prison either as General Court Martial prisoners or awaiting action.

This chart is based on 108 cases, all that occurred in this group. All these cases were at once transferred to the base hospital.

It includes complicated as well as uncomplicated cases and covers all cases occurring in this group.

Those sent to base hospital as with Diagnosis Undetermined and later determined to be Influenza are recorded on the day of original admission and not on the day the diagnosis was determined.

The prisoners were removed from the Naval Prison and spread in a tent colony on November 31, 1918.

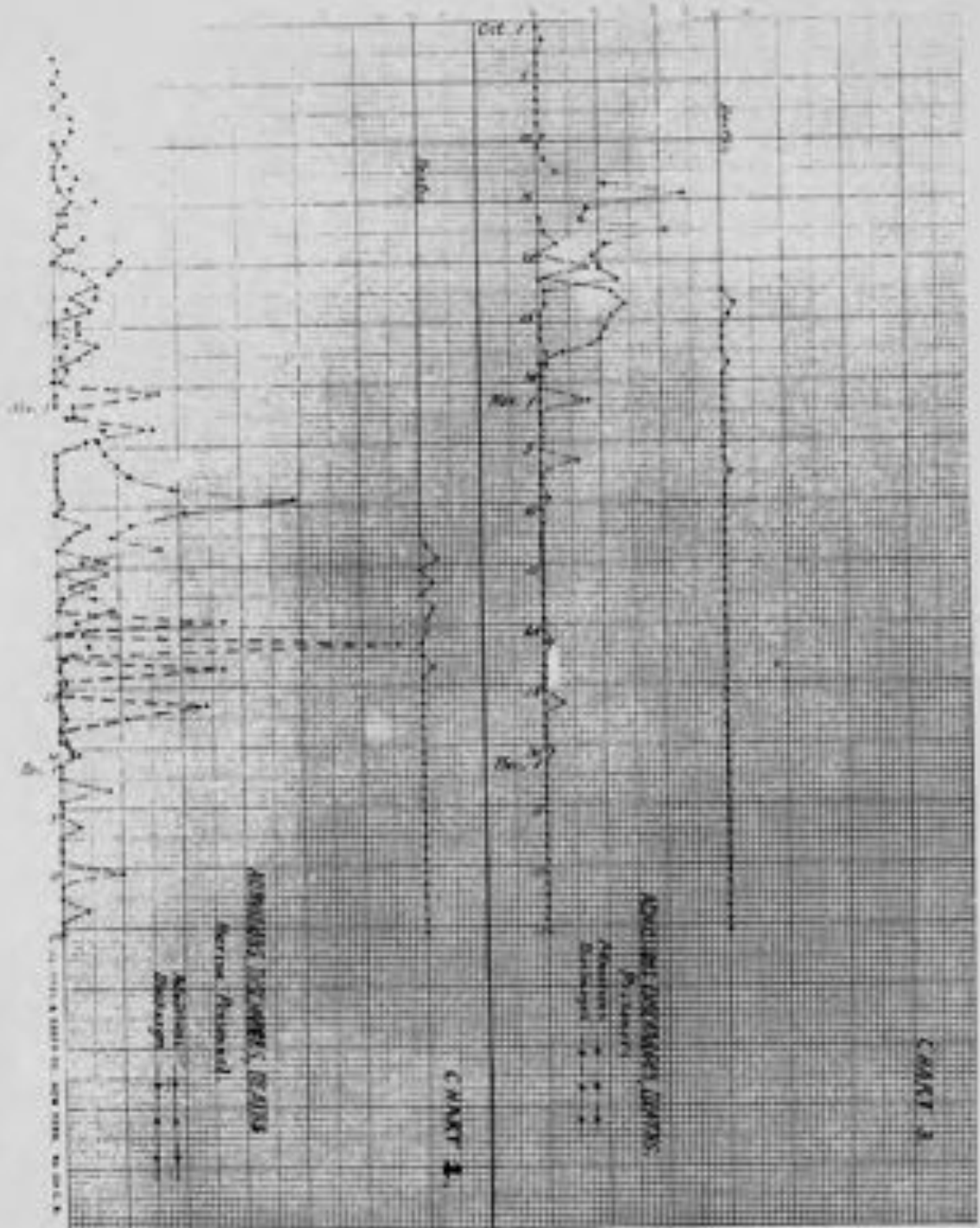


CHART 4.

This chart shows the number of admissions, discharges and deaths among Navy Yard civilian employees treated in the emergency hospital established in the new Naval Medical Supply Depot building, and covers all such cases so handled.

The chart is based on 283 cases and includes complicated as well as uncomplicated cases.

This chart is merely indicative of the activities of this emergency hospital during the time that it was in use from October 7, 1918, to November 30, 1918, and does not in any way indicate the number of cases occurring amongst these civilian employees, as civilian employees were admitted to this hospital only when they had no home in which they could be nursed and fed.

It does, however, ⁱⁿ dicates the period of time during which the epidemic attacked the civilian employees on the first wave of the disease.

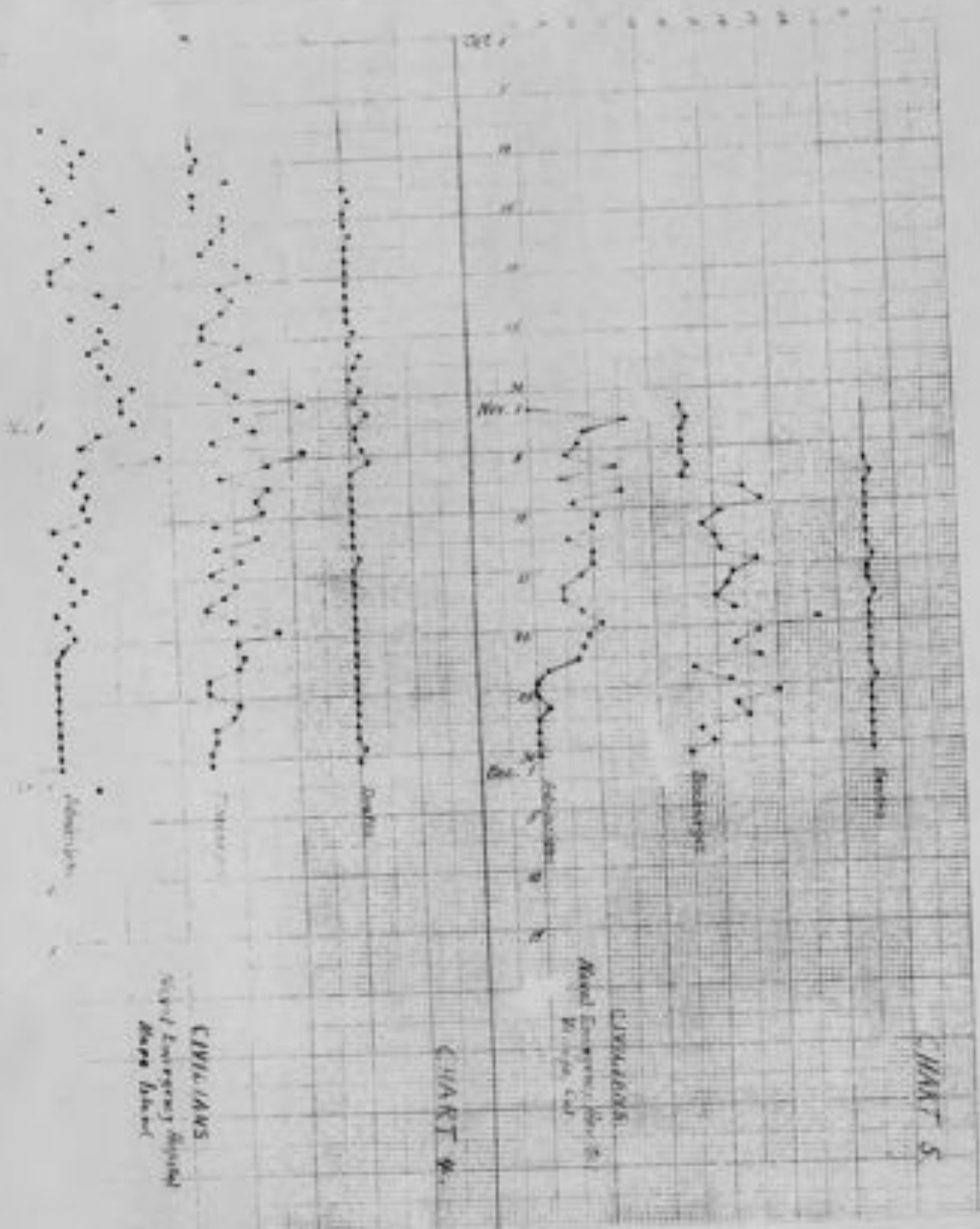
CHART 5.

This chart shows the number of admissions, discharges and deaths among civilians handled in the emergency hospital, Vallejo, and includes all cases so handled, both complicated and uncomplicated.

This chart is based on 133 cases derived from the inhabitants of Vallejo, both Navy Yard employees and others. It includes men, women and children.

This chart is in no way indicative of the number of cases occurring in Vallejo but merely represents cases handled in this emergency hospital, such cases having been admitted thereto because it was impossible for them to obtain proper nursing, care and food or medical attention in their homes or in other hospitals.

It covers merely the period of time that this hospital was in operation, namely, from November 1, 1918, to November 30, 1918. It is, however, indicative of the period of the epidemic in Vallejo from its height to about its close.



CIVILIAN
Navy Emergency Signal
Group Sheet

CIVILIAN
Navy Emergency Signal
Group Sheet

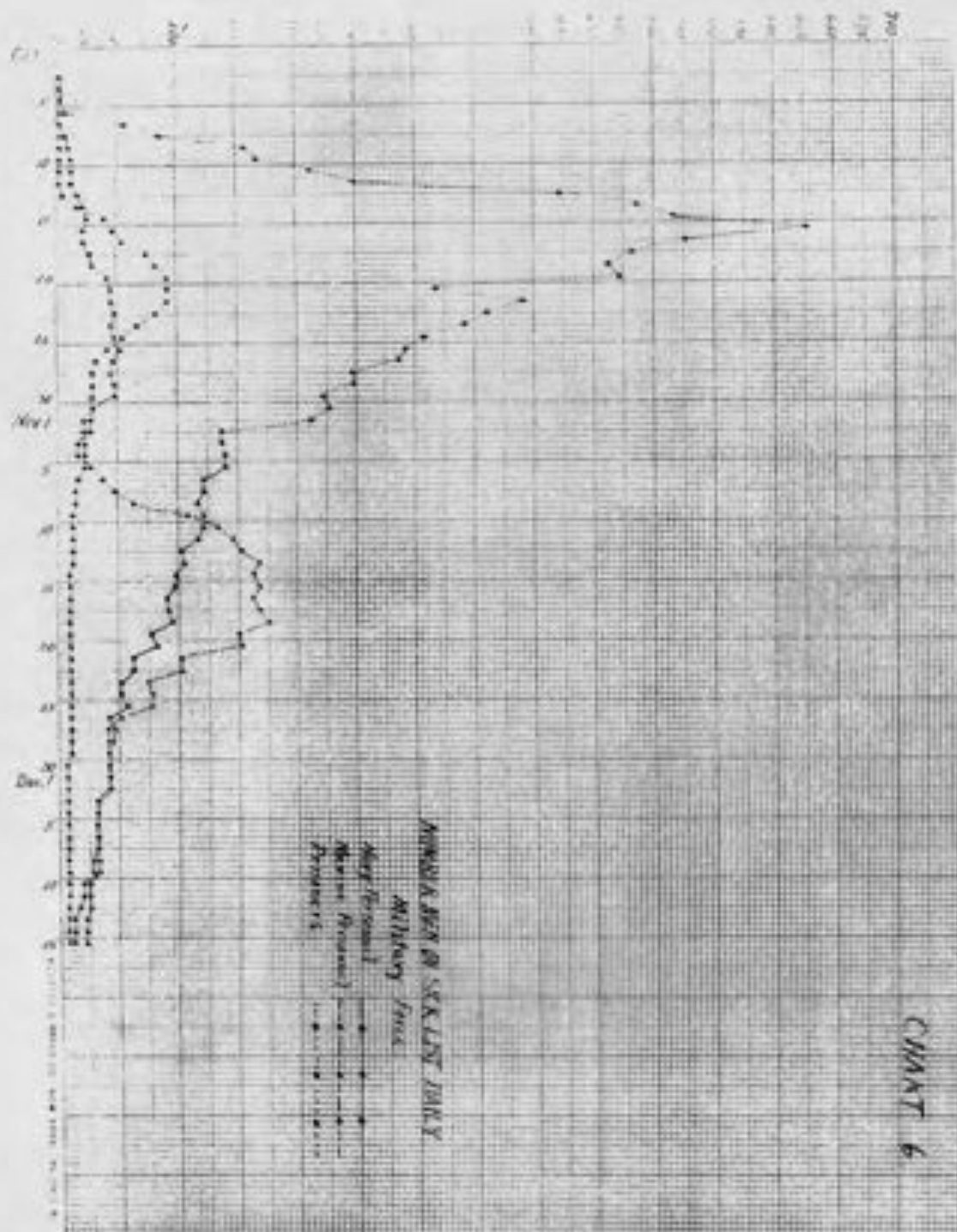
CHART 6.

This chart shows the number of men remaining on the sick list at midnight of each successive day of the epidemic.

This chart is based on 1,536 cases, all the cases occurring among the three groups of the Military Force attached to the Station, treated by the Medical Department of the Station. It includes complicated as well as uncomplicated cases and whether treated in emergency hospitals, base hospital or both.

It clearly shows the sudden and tremendous attack upon the Naval Training Camp, where the vast majority of Navy personnel live. It also shows the two distinct epidemic waves among Marines, the first among older men, the second among recruits in detention. Also it shows the wave of the disease among prisoners starting eight days after the Training Camp and reaching its apex five days after the Training Camp.

These curves also show very clearly the three periods of the epidemic which have been frequently mentioned in accounts of epidemics in the East, namely, the period of sudden rise, the apex, the period of sudden decline and the period of slow decline.



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This chart shows the percentage of cases discharged, arranged according to the number of days they were on the sick list.

This chart is based on 1,718 cases which include cases from the military force of the Station (Navy, Marines, Prisoners) and the civilians treated in Emergency hospitals. It includes only cases that were admitted and discharged well of Influenza during the period from October 3, 1918, to December 15, 1918, thus omitting all the prolonged cases which remained on the sick list at the base hospital on December 15, 1918. It includes all such cases of Influenza whether complicated or uncomplicated, that were treated either in emergency hospitals or base hospital.

This chart shows four curves, two (A,B) are for cases of Influenza uncomplicated by Pneumonia, and two (C,D) for cases of Influenza complicated by Pneumonia.

The four curves are also to be considered in pairs; one pair (A,C) showing uncomplicated and complicated cases treated in emergency hospitals only, and one pair (B,D) showing such cases treated solely in base hospital.

To formulate this chart, cases were first grouped under their respective heading in accordance with the place of treatment and each such group was subdivided into straight Influenza and Influenza complicated by Pneumonia, thus giving four subdivisions. Then the cases forming each of the four subdivisions were grouped according to the number of the days on the sick list and a percentage obtained

for each "day group", based on the number of cases in the subdivision.

The main object of this chart is to show graphically the percentage of cases discharged fully recovered on any given day of illness, for example-- on the eleventh day 81.8% of group A were discharged well, 80.5% of group B were discharged well, 32.8% of group C, and 10.3% of group D.

This chart also demonstrates the fact that if the case had not been discharged well on or about the 15th day of the disease, it remained on the sick list for a prolonged period.

In considering this chart, the following points are especially to be kept in mind:

(a) Curve A is based on 1057 cases (military and civilian) treated solely in the four Emergency Hospitals. Many of the civilian cases sick two to three days before admission.

(b) Curve B is based on 502 cases (military) treated solely in Base Hospital. Transferred to Base Hospital after one day of illness but as soon as first seen.

(c) Curve C is based on 109 cases (Military and Civilian) treated solely in the four Emergency Hospitals. Majority of civilians sick three to four days before admission and a few from 7 to 10 days.

(d) Curve D is based on 48 cases (Military) treated solely in Base Hospital. Transferred to Base Hospital after one day of illness but as soon as first seen. All pneumonias developed in Base Hospital as none of these cases were pneumonias when transferred.

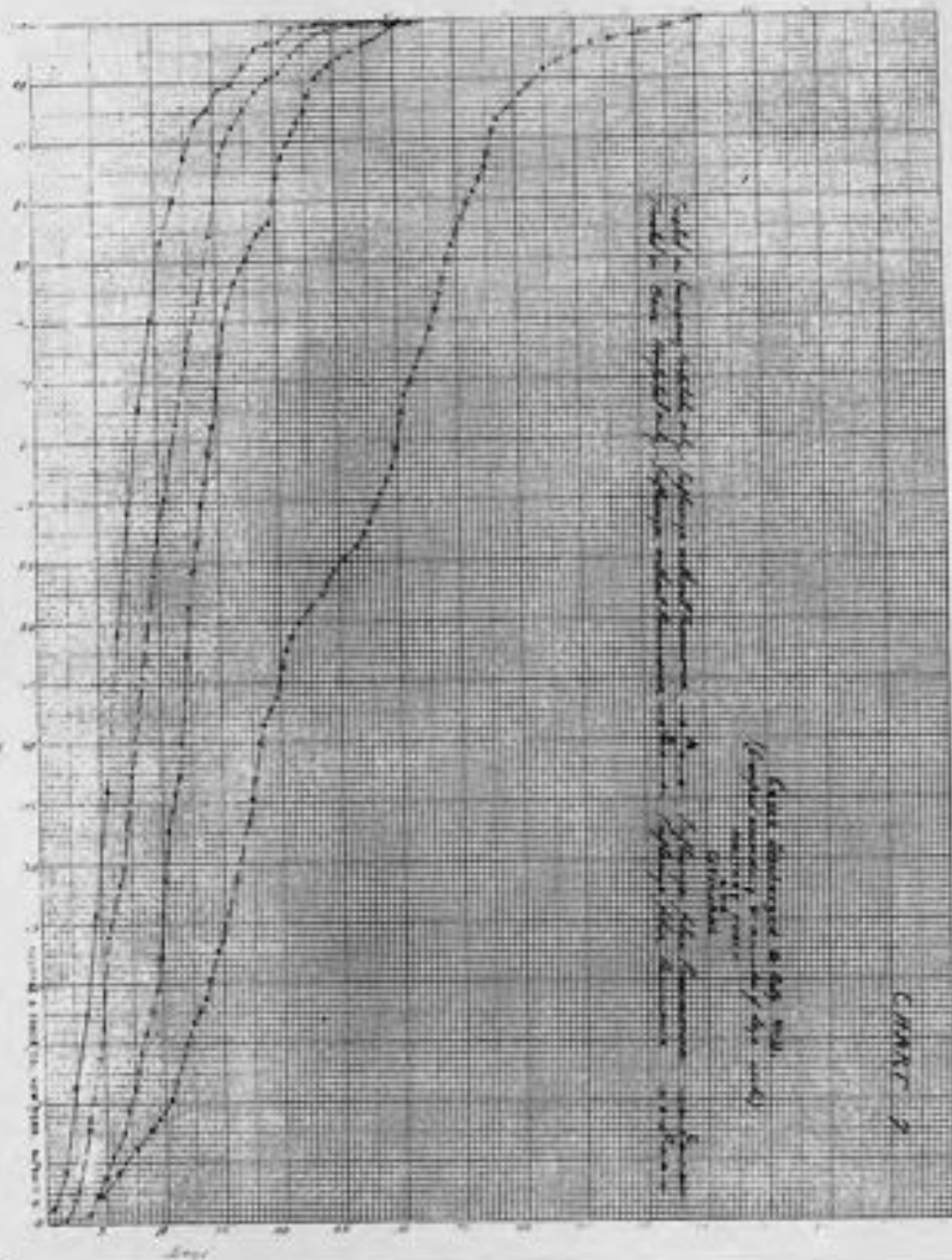
(e) At the Emergency Hospital at the Naval Training Camp and Marine Barracks, Influenza cases uncomplicated by Pneumonia were treated symptomatically by mouth and by Sodium Salicylate intravenously. Pneumonia cases were treated symptomatically or by Sodium Salicylate intravenously and a few were treated by Magnesium Sulphate intravenously. All received alkalization treatment.

(f) Cases in the Emergency Hospital for civilians on the Navy Yard and in Vallejo uncomplicated by Pneumonia received largely Sodium Salicylate intravenously or mouth treatment. Pneumonia cases received mostly Magnesium Sulphate intravenously and some blood transfusion. All cases received alkalization treatment and it was carried out more thoroughly in the Civilian Hospitals than in the Hospitals treating members of the Military force and it was especially pushed in Pneumonic cases.

(g) Cases treated at the Base Hospital with possibly a few exceptions received only symptomatic mouth treatment and a certain degree of alkalization.

(h) Stimulative and supportive treatment by mouth and by hypodermic largely used at Base hospital (Argot, pituitrin, camphor). Stimulative and supportive treatment used little in Emergency hospitals except at Naval Training Camp at first of epidemic.

(i) That these curves are based upon all the cases treated under the conditions mentioned that were discharged to duty recovered prior to December 15, 1918, and that they are not selected cases.



Section V.

SUMMARY.

159. In closing this report the Medical Officer desires to briefly state a few thoughts which have been impressed upon him during this trying experience.

160. The acute respiratory disease that gave rise to this epidemic can only be called Influenza through lack of a better name.

161. Absolute rest in bed is the most essential element of treatment.

162. A patient flat in bed from the very onset of the disease is better off without any form of mouth medication other than catharsis, than when loaded with analgesics, sedatives and cough mixtures. Thorough alkalization is the only treatment necessary in the bulk of influenza cases.

163. All other things being equal the best results in influenza cases of a severe type uncomplicated by pneumonia will be obtained by proper exhibition of sodium salicylate intravenously.

164. All other things being equal the best results in Influenza complicated by Pneumonia will be obtained by properly applied transfusion of whole blood by the citrate method.

165. In cases complicated by pneumonia when transfusion of blood is not available the best results will be obtained by proper administration of Magnesium Sulphate intravenously.

166. The use of the more specific forms of treatment at this station, shortened convalescent period, reduced sequelae of disease, reduced complications following pneumonia and reduced death rate.

167. There was a distinct decrease of mortality and morbidity with increase in experience with more specific forms of treatment. Frequent chest examinations are essential in cases of influenza.

168. The usual clinical records do not form a guide to the actual condition of an influenza patient. Blood counts are essential.

169. A stationary white blood count either high or low is favorable.

170. A falling white count is a danger sign and general condition of patient must be closely watched.

171. A falling white count, with rise in temperature indicates a serious condition of the patient.

172. Cyanosis appearing shows a patient critically ill.

173. Literature indicates that vast majority have "sat tight" contented with "expectant" and "Symptomatic" treatment by mouth or hypodermic. The very fact that no recognized method of treatment availed should stimulate to most active effort to find better.

174. Deaths did not occur from influenza but from the so-called pneumonia or from defects existing prior to the onset of influenza which rendered the patient unable to cope with the pneumonia.

175. Water for intravenous use should be distilled in glass; kept tightly corked until used and once opened must be used right away or discarded.

176. Masks are the best single method of combating the spread of influenza, all other conditions being equal.

177. Proper spacing of men and partition sheets ("sneeze sheets") between hammocks and bunks are essential elements in combating the disease.

178. Cleansing of hands and sterilization of mess gear must not be neglected. Sterilization of mess gear by dishwashing machines cannot be counted upon unless under the constant supervision of an exceptionally responsible person.

179. Bacteriological and pathological investigation was eliminated entirely on the Navy Yard as time and energy would have been wasted with the limited facilities at hand.

180. Investigations at the base hospital made largely on cases from the Navy Yard showed that the pneumonias were "Streptococcic" and an "influenza like bacillus" was found.

John L. Neilson
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