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TREASURY DEPARTMENT,
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Public Health Service.
LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
Office of the Secretary,
Washington, December 2, 1918.

Sir: In accordance with section 9 of the act of Congress approved July 1, 1902, I have the honor to transmit herewith the report of the Surgeon General of the Public Health Service for the fiscal year 1918.

Respectfully,

W. G. McAdoo,
Secretary.

The Speaker of the House of Representatives.
OPERATIONS OF THE UNITED STATES PUBLIC HEALTH SERVICE

1918
SIR: In accordance with the act of July 1, 1902, I have the honor to submit for transmission to Congress the following report of the operations of the Public Health Service for the fiscal year ending June 30, 1918. This is the forty-seventh annual report of the service, covering the one hundred and twentieth year of its existence.

The administrative organization of the bureau during the past fiscal year remained the same as in previous years. The following is a list of the divisions of the bureau through which the field work of the service was conducted during the fiscal year:

(1) Scientific Research.
(2) Domestic (Interstate) Quarantine.
(3) Foreign and Insular (Maritime) Quarantine and Immigration.
(4) Sanitary Reports and Statistics.
(5) Marine Hospitals and Relief.
(6) Personnel and Accounts.
(7) Miscellaneous Division.

The administrative heads of the service and the chiefs of the bureau divisions at the close of the fiscal year consisted of the following:

Chief Clerk, Daniel Masterson.
Secretary to Surgeon General, F. Gwynn Gardiner.

During the past year certain functions of the service were administered jointly by two or more of the bureau divisions. An instance which may be cited to illustrate such joint administration is the important work of sanitating the extra-cantonment zones. The sanitation of these areas necessitated the joint utilization of the scientific
and field forces of the Divisions of Scientific Research and Domestic Quarantine in carrying forward this work with a maximum of effectiveness. The Division of Sanitary Reports and Statistics likewise cooperated by compiling statistics of disease prevalent in these areas for the information of the Army and Navy, the Council of National Defense, and State and local health authorities.

Some of the most important developments in the work of the Public Health Service occurred after the expiration of the fiscal year, but as they are of more than passing interest to public-health authorities it is deemed advisable to mention them in this report.

The lack of coordination of Federal public-health activities especially concerned in the prosecution of the existing war caused the President, on July 1, 1918, to promulgate the following Executive order, designed to properly coordinate these various activities under the supervision of the Secretary of the Treasury:

**EXECUTIVE ORDER.**

Whereas, In order to avoid confusion in policies, duplication of effort, and to bring about more effective results, unity of control in the administration of the public health activities of the Federal Government is obviously essential, and has been so recognized by Acts of Congress creating in the Treasury Department a Public Health Service, and specially authorizing such Service "to study the diseases of man and the conditions influencing the propagation and spread thereof", and "to cooperate with and aid state and municipal boards of health;"

Now, therefore, I Woodrow Wilson, President of the United States, by virtue of the authority vested in me as Chief Executive, and by the Act "authorizing the President to coordinate or consolidate executive bureaus; agencies, and offices, and for other purposes, in the interest of economy and the more efficient concentration of the Government" approved May 20, 1918, do hereby order that all sanitary or public health activities carried on by any executive bureau, agency, or office, especially created for or concerned in the prosecution of the existing war, shall be exercised under the supervision and control of the Secretary of the Treasury.

This order shall not be construed as affecting the jurisdiction exercised under authority of existing law by the Surgeon General of the Army, the Surgeon General of the Navy, and the Provost Marshal General in the performance of health functions which are military in character as distinguished from civil public health duties, or as prohibiting investigations by the Bureau of Labor Statistics of vocational diseases, shop sanitation, and hygiene.

**WOODROW WILSON.**

The White House, 1 July, 1918.

By virtue of this order, all civil public health activities carried on by any Federal executive department or agencies especially created for or concerned in the prosecution of the war were placed under the supervision and control of the Treasury Department to be administered through the Public Health Service, and the sanitary work previously conducted by the United States Shipping Board in connection with the maintenance of sanitary conditions in the 170 shipyards was assumed by the Public Health Service. Arrangements have also been completed with a view to having the Public Health Service assume supervision of all medical and sanitary matters in industrial plants having contracts with the Ordnance Department.

Medical supervision is also being exercised over the various Government nitrate plants at Nitro, W. Va.; Muscle Shoals, Ala.; Ancor and Toledo, Ohio; and at the plants located in Nashville, Tenn., and Richmond, Va.
Under the provisions of this order, arrangements have also been made with the Working Conditions Service of the Department of Labor with a view to formulating general sanitary codes for industries to adequately protect the health of workers in these war industries.

After the entrance of the United States into the world war, the need for protecting the military forces of the country from the ravages of venereal diseases soon came to be recognized by all as largely a civilian problem. Statistics show that a far greater number of men are infected before joining the military forces than contract the disease after entering camp. Accordingly, on July 9, Congress gave legal recognition to the need for controlling this disease by enacting legislation in the Army appropriation act of that date which created in the Public Health Service a Division of Venereal Diseases.

Under the authority of this act and the terms of the Executive order of July 1, the organization of the Division of Venereal Diseases was immediately begun, and much of the work hitherto performed by the Commission on Training Camp Activities in reference to venereal diseases was taken over by the Public Health Service. The work of this division was placed in charge of an Assistant Surgeon General of the Public Health Service. The same act also contained provisions for allotting funds to the various States for the purpose of controlling the disease under regulations to be issued by the Secretary of the Treasury. These regulations have been promulgated and funds allotted to the States in compliance with the terms of the law.

A long step forward in national public-health administration was taken on October 27, when the act to establish in the Public Health Service a Sanitary Reserve Corps was signed by the President. The measure reads as follows:

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of securing a reserve for duty in the Public Health Service in time of national emergency there shall be organized, under the direction of the Secretary of the Treasury, under such rules and regulations as the President shall prescribe, a reserve of the Sanitary Reserve Corps of the Public Health Service. The President alone shall be authorized to appoint and commission as officers in the said reserve such citizens as, upon examination prescribed by the President, shall be found physically, mentally, and morally qualified to hold such commissions, and said commissions shall be in force for a period of five years, unless sooner terminated in the discretion of the President, but commission in said reserve shall not exempt the holder from military or naval service; Provided, That the officers commissioned under this Act, none of whom shall have rank above that of assistant surgeon general, shall be distributed in the several grades in the same proportion as now obtains among the commissioned medical officers of the United States Public Health Service and shall at all times be subject to call to active duty by the Surgeon General and when on such active duty shall receive the same pay and allowances as are now provided by law and regulation for the commissioned medical officers in the said regular commissioned medical corps.

The public-health activities of the country can thus be properly expanded to meet acute situations and coordinated under the direction of the Federal Public Health Service in meeting national emergencies.
Health Reports on December 14, 1917, and issued as Reprint No. 441. This paper was based upon investigations previously made by the service.

TRINITROTOLUOL POISONING.

At the Hygienic Laboratory systematic studies were commenced in regard to the methods of absorption, detection, and prevention of trinitrotoluol poisoning. These investigations are expected to be of great assistance in providing sanitary requirements which will minimize the danger from trinitrotoluol, an explosive in general use by munition plants.

Trinitrotoluol is a high explosive derived by the nitration of toluol. It is used principally as a charge in high-explosive shells. Its manufacture is surrounded with considerable risk of poisoning, which may readily be fatal unless proper sanitary precautions are taken. The chief danger is chronic poisoning, as trinitrotoluol attacks the blood cells and may also attack the liver cells. The chief avenues for absorption are through the skin and through the lungs when inhaled as fumes. Owing to its slow solubility, it is not nearly so poisonous when swallowed.

In August, 1917, a survey was made of a large trinitrotoluol manufacturing concern at Barksdale, Wis.

Up to the end of the fiscal year the work which the Division of Pharmacology has undertaken in regard to this matter has been confined to the study of the action of trinitrotoluol on experimental animals for the purpose of (1) obtaining a clear understanding of this intoxication; (2) discovering diagnostic means applicable to the human for the early recognition of poisoning; and (3) studying the influence of diet and alcohol on the susceptibility to trinitrotoluol poisoning. Many observations which promise to be of practical value have been made.

The Division of Chemistry has in hand the investigation of (1) analytical procedure for the detection of trinitrotoluol in the atmosphere and in animal tissues and excretions; (2) the chemistry of trinitrotoluol, its manufacture and impurities; and (3) the vapor pressure and volatility of trinitrotoluol as influenced by temperature and humidity.

Field studies of the hazards connected with the use of trinitrotoluol have been made in plants manufacturing the substance and in those loading it into shells.

SANITATION AND MEDICAL RELIEF AT GOVERNMENT EXPLOSIVES PLANT.

Upon request of the Secretary of War the Public Health Service undertook the sanitation and the medical and surgical relief at the United States Explosives Plant C, Nitro, W. Va., during the period of construction. This duty was assumed February 17, 1918. At the time of the assumption of these duties there was practically no construction completed on the site of the proposed plant.

A personnel of about 500 were employed in this work, including laborers, artisans, laymen in numerous capacities, 20 medical officers, and 30 nurses. The medical officers were acting assistant surgeons of the United States Public Health Service, with the exception of Past Asst. Surg. J. A. Watkins, who had been placed in charge.
Nurses were furnished by the Bureau of Nursing Service, American Red Cross.

Examination of applicants for employment.—A suitable building was erected and properly fitted out, both in supplies, equipment, and personnel, for the purpose of examining physically applicants for employment. In this way it was possible to prevent the introduction of communicable or infectious diseases, including venereal diseases. It was also possible to determine various physical defects or diseased conditions in men which were amenable under prompt and proper treatment.

Practically no rejections were made of any men because of physical disability. All capable of performing work at all were, through the physical examination, put at some occupation at which they were able to earn a livelihood in a manner not detrimental to their physical condition.

To date, 45,858 applicants for employment have been examined. Of this number approximately 0.008 per cent have been permanently rejected. Some of these rejections would not have necessarily been made in an established industrial institution, but were of necessity made in the type of work being carried on at Nitro.

It is of interest to note that the physical condition of the men, on the whole, was poor, and that of the number enrolled, approximately 0.11 per cent were enrolled with marked physical disabilities noted, such as loss of members, loss of sight, hearing, etc.

The temporary rejections for the fiscal period number 867, or approximately 0.018 per cent. These, relatively speaking, were all venereal cases, which were referred immediately to the proper department, where they were subjected to treatment, rendered noninfectious and immediately placed at work. Unless they deserted, they were eventually cured by continued treatment. In this way the labor supply was conserved, the men were not refused the right to earn a livelihood because of their unfortunate infection, and in addition, they were not thrown into society in an infectious condition.

Delousing.—While stripped for the physical examination at the employment office, the clothing of the applicants was searched for pediculosis. In addition, the bed clothing in the barracks was daily examined for cleanliness and infestation. In this manner 1,690 men infected with pediculosis were discovered.

In view of the increasing importance being placed upon the louse as a transmitter of disease, immediate steps were taken in each instance to delouse these men. For this purpose a set of three buildings were constructed: A temporary detention barracks; a delousing house; and a cyanide fumigation house.

The men discovered to be infested were temporarily placed in the detention barracks. They were then sent through the delousing house, where they were subjected to a cleansing bath, medical inspection and treatment. In the meantime their clothing was run through the sterilizer. Their bed clothing was placed in the small air-tight building and subjected to cyanide fumigation.

It is of interest to note, however, that in spite of most rigid inspection and treatment, cases of pediculosis constantly escaped notice, to be discovered at a later date.

Venereal control.—The matter of venereal control is mentioned in connection with the discussion of examination of applicants for employment.
A separate building in the general hospital unit was set aside for these cases, and a separate complete organization assigned to this work.

Very satisfactory progress was made in the matter of the curing of the venereal infected. The most recent methods were employed with good results. A number of unappreciative men deserted the hospital before a cure was effected.

Public health education.—The opportunity to extend knowledge of the cause, proper treatment of and prevention of disease, the maintenance of health, bodily and mental hygiene, was taken advantage of, and consisted in the distribution of such information among the employees, in the form of popular-worded leaflets, bulletins, barrack talks, Young Men's Christian Association talks, lantern slides, etc. Particular emphasis was placed upon the subject of venereal diseases and the value of prophylactic inoculation and vaccination.

Prophylactic measures.—At the time of enrollment, the men were vaccinated against smallpox and they were also encouraged to receive the typhoid inoculation. By means of the public health propaganda later carried on it has been possible to spread the knowledge of the value of these measures among those employed at this plant, with the result that 73,162 persons have received prophylactic typhoid inoculations. Owing to changes in personnel, it has not been possible to complete the course of treatment in many of these cases, though by far the great majority of those who remained on the plant have completed this treatment.

First aid instruction.—First aid instruction has been attempted in the case of police officers and those employed in the plant in the more important working positions, with the view to the prompt rendering of the correct attention to those seriously injured in the performance of their duties.

Hygiene of housing.—The employees of the plant during the period of construction were being housed in buildings similar in most respects to the barrack buildings as constructed for the use of the Army during the period of mobilization. With a view to the acquisition and maintenance of the proper hygienic conditions, a separate division was made of this subject and the proper and adequate personnel assigned to this duty, which consisted of the attention to such subjects as ventilation, illumination, the maintenance of proper temperature, washing, toilet facilities, baths, adequate and clean bed clothing, extermination of vermin, etc. In addition, an inspection was made from time to time with the view to determining at the earliest possible moment the presence of communicable diseases. Upon the discovery of such cases, isolation for the protection of the remainder of the force was carried out.

Public health activities.—Various employees, executive and others, are housed in bungalows in Nitro City, as distinct from the plant proper. The number thus assigned was relatively small, about 1,500. There was formed, however, a miniature health organization, modeled much after the organization of our larger cities, and carrying on the same duties.

As a result of the activities of the housing and public health divisions, it is possible to report that though at least one, generally two or more, cases of the more common infectious or communicable diseases were imported, no secondary case has occurred at Nitro.
Sanitation.—The matter of sanitation on a construction undertaking of this magnitude involved much labor and time. This was especially brought about by reason of the extensive area to be covered; the lack of availability of proper sewage and water distribution systems; opportunity for mosquito and fly propagation; and the immense amount of waste refuse, débris, etc., in connection with the arrival and erection of the enormous amount of material, equipment, and supplies, and the rapid construction of buildings. In addition it was necessary to employ in this work several thousand horses and mules, which were stabled at the most convenient point from the construction viewpoint, rather than from the viewpoint of the sanitary department.

To date there have been 1,055 latrines constructed. A total of 13,109 forty-gallon cans of garbage have been disposed of, while 14,083 wagonloads of refuse of various sorts have been incinerated.

A total of 11,970 tons of manure has been safely disposed of.

Food inspection.—The inspection and regulation of the quality and cleanliness of the food being served to the men on this plant has received special attention. Toward this end a special division has been created.

Foodstuffs are inspected and made subject to sanitary regulation from their source until the time of consumption on this plant. This regulation includes the control of the proper conditions under which it is produced, shipped, received, stored, handled, prepared, and served.

The value of such regulation from a health standpoint is evidenced by the fact that of the 1,673,123 meals served to date on this plant there has not yet come to the attention of this department, i. e., applied for medical relief, a single case of food poisoning.

Medical and surgical relief.—In rendering medical and surgical relief to employees of this plant there are being constructed four six-bed emergency dressing stations about the plant, one out-patient dispensary in the bungalow section, a 40-bed emergency hospital, and a 325-bed general hospital.

In addition to the relief of those acutely ill or injured, relief is afforded to those afflicted with disabilities of greater duration, and constructive and repair work, such as eye, nose, and throat afflictions, dentistry, etc., is to be carried out.

Admissions.—To date 478 people have been admitted to the hospital for medical or surgical relief.

Safety first.—The safety-first work is under the direction of Mr. C. B. Hayward, who is acting representative of the United States Employees' Compensation Commission. This department is established in the medical division, and the proper cooperation and coordination of efforts exist.

Conservation.—With a view to conservation, even under the conditions of rapid construction and extreme pressure of business, endeavor is being made to turn over all garbage to hog raisers, manure to farmers, and an 8-acre garden has been established in connection with the operation of the general hospital.

Industrial hygiene.—The matter of industrial hygiene is being given attention with a view to the acquisition and maintenance of such hygienic working conditions as will assist in the maintenance of the health and efficiency of the working force.
States Army, United States Navy, National Training School for Boys, and for various State boards of health and practicing physicians.

Prof. Henry B. Ward, of the University of Illinois, has recently reported the first recognized case of the presence of Gongylonema as a parasite of man. Another case of infection of man by this same nematode has been determined by the Division of Zoology.

Specimen collection.—The specimen bottles have been freshly filled and arranged under a new system of classification. Cards were made for each bottle, for the collection had grown until there had been some difficulty in locating specimens. This work also included the collection for which Dr. Stiles is curator at the New National Museum.

Fauna of sludge.—Studies in regard to the fauna of sludge were carried on until November.

DIVISION OF CHEMISTRY.

Prof. E. B. Phelps has continued in charge of this division.

Detection of small quantities of poisonous gases in the atmosphere.—During the early part of the year the activities of the division were seriously curtailed by reason of the necessity for rather extensive field details of members of the divisional staff. Work under way at that time upon the examination of air for the detection of minute quantities of various deleterious substances was, however, continued as a matter having distinct war interest. Exact methods for the measurement of small quantities of analin and nitro-benzene have been developed, and the first of these published. This investigation was later merged with the T. N. T. investigation, with which it is closely associated. (See p. 41.)

Possibilities of central milk pasteurizing plants.—In connection with service activities at Newport News, the importance of milk pasteurization led to the study of the possibilities of a central pasteurizing plant for that city. Mr. A. F. Stevenson, who had already made similar studies for Tuscaloosa, Ala., was assigned to this study and has prepared complete plans and in part supervised the installation of this pasteurizing plant. The plant at this time is complete and in operation under the general supervision of the Public Health Service.

Demonstration of possibilities of reconstructed milk.—A similar need for a satisfactory milk supply having arisen at the Government powder plant at Nitro, W. Va., plans were originally prepared for a pasteurization plant, but it was later decided to undertake at that point a demonstration of the possibilities of reconstructed milk. It has been found entirely feasible upon a small scale to prepare a milk of satisfactory physical characteristics and of most excellent sanitary quality from dry skim milk powder, butter fat, and water. Although the process as a whole has not hitherto been carried out upon a large scale in the preparation of a market milk, yet both the homogenizing of butter fat for the preparation of cream and the use of dry milk powder have become established practices. There remains, therefore, only the demonstration of the practicability of preparing market milk in this way, and in view of the great difficulties in the way of securing a proper milk supply for Nitro, the situation seemed especially favorable for making this demonstration. The study thus far has entailed several trips of inspection to milk pow-
der plants and a considerable amount of work in preparing specifications for mechanical equipment. The machinery has now all been ordered and is being installed.

Routine work.—The routine work of the division has comprised the preparation of manuscripts and reports, especially the report upon the Ohio River investigation. The final report of sewage investigations has been edited and prepared for publication, and two industrial waste reports, namely, one upon the disposal of strawboard wastes and the other upon the disposal of tannery wastes, have been similarly prepared. Four sets of examination papers have been corrected for the United States Civil Service Commission, a list of laboratory equipment prepared for the ordnance base of the Army in France, an examination and report made upon an aluminum canteen for the Quartermaster Department, United States Army, and routine samples of Potomac River water examined for the engineer of sewers, District of Columbia. Special examinations have been made for the supervising engineer at Camp Meade and for other divisions of the laboratory.

**Viruses, Serums, Toxins, and Analogous Products.**

**Enforcement of Law.**

In the enforcement of the law of July 1, 1902, regulating the sale of viruses, serums, etc., regular inspections of all establishments were made. One establishment was granted license for the first time. In five cases licenses were refused. Seven licenses were suspended. At the termination of the fiscal year 29 establishments (22 American and 7 foreign) were holding licenses. The complete list has been published in the Public Health Reports of May 31, 1918, and also issued as Reprint No. 469.

A total of 9,344 samples of products were examined at the Hygienic Laboratory during the past fiscal year, as against 5,506 samples in 1917, 5,187 in 1916, 3,102 in 1915, and 1,113 in 1914. Following is a detailed statement of tests made in the past fiscal year:

<table>
<thead>
<tr>
<th>Products</th>
<th>Samples examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterility tests</td>
<td></td>
</tr>
<tr>
<td>Diphtheria antitoxin</td>
<td>106</td>
</tr>
<tr>
<td>Tetanus antitoxin</td>
<td>53</td>
</tr>
<tr>
<td>Other sera</td>
<td>697</td>
</tr>
<tr>
<td>Vaccine virus</td>
<td>572</td>
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<tr>
<td>Rabies vaccine</td>
<td>567</td>
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<tr>
<td>Tuberculinis</td>
<td>96</td>
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<tr>
<td>Bacterial vaccines</td>
<td>6,182</td>
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<tr>
<td>Sensitized bacterial vaccines</td>
<td>15,700</td>
</tr>
<tr>
<td>Miscellaneous products</td>
<td>106</td>
</tr>
</tbody>
</table>

| Potency tests                 |                  |
| Diphtheria antitoxin          | 43               |
| Tetanus antitoxin             | 77               |
| Antidysenteric sera           | 49               |
| Antimeningococcic sera        | 95               |
| Antipneumococcic sera         | 1,092            |
| Vaccine virus, on monkeys     | 46               |
| Vaccine virus, on rabbits     | 50               |
| Typhoid vaccine               | 23               |
|                              | **Total** 87012-18-5 |