



and Christian Commissions and by private contributions. 4. Kitchen, 150 × 30 × 13 feet. 5. General dining-room, 175 × 30 feet, two stories, the first 13, the second 10 feet high. 6. Commissary store-room, 175 × 20 × 13 feet. 7. Knapsack-room, guard-room and prison, 175 × 20 × 13 feet; the knapsack-room contains 2,240 suitable pigeon-holes and racks for as many guns. 8. Special-diet kitchen, 160 × 35 × 13. 9. Bakery, 40 × 34 × 12. 10. Sutler's store, 100 × 20 × 13. 11. Reservoirs, 56 × 56 feet, two stories, the first 35, the second 19 feet. 12. Laundry and engine-house,—the former 130 × 46 feet, two stories, 13 and 11 feet respectively, divided into eight rooms above and nine below; the latter one story, 60 × 20 × 13. 13. Barracks for guard, 172 × 24 × 10. 14. Officers' quarters, Veteran Reserve Corps, 36 × 31 × 10. 15. Ice-house; 16, Carpenters' shop; 17, Chicken-house; 18, Stables; 19, Hog-pens; 20, Twenty-four wards.

The administration building contains the offices, dispensary, store-rooms for medical supplies, mess-hall for officers, and 24 small rooms for quarters for officers and non-commissioned officers. The closed corridor from which the wards radiate is 16 feet wide and about 2,000 feet long; it has many large windows which admit of free ventilation. The enclosed circular area measures 600 feet in diameter and contains the administration building, officers' quarters, chapel, sutler's store, kitchen, etc. The kitchens are more complete than those of any hospital I have inspected. The general-diet kitchen is furnished with three ranges made by A. Litze of Cincinnati; eight eighty-five gallon caldrons, arranged for both steam and hot water; one hashing-machine with six cutters and revolving block, worked by steam; six coffee-boilers, copper, and six tea-cans of tin. The extra-diet kitchen has five forty-eight gallon caldrons, one range and one furnace for boiling. The arrangements for making coffee and tea are superior. The coffee-boilers are side by side on a stand and above them are two pipes, one for steam, the other for boiling water. The roasted and ground coffee is put into a covered percolator attached to the movable top of each boiler, the boiling water is poured on the coffee through a funnel and then steam is admitted from below; coffee for two thousand men can be made in a few minutes. Connected with this kitchen is a small steam-engine and two large boilers which supply the steam and hot water used in the kitchen and throughout the hospital. The laundry is situated nearer the river than the hospital. It is well furnished with washing-machines, wringers, drying-rooms for soiled and clean linen, and for mess-room and quarters for the laundresses and men employed. The washing-machines are worked by a small steam-engine, which also forces water from the river to the large tank-house, from which all parts of the hospital are supplied with cold water by pipes. The pavilions, arranged in radii, are 46 feet apart at the corridor and 80 feet at the distant extremities. The buildings used as general dining-room, subsistence store-room and knapsack-room, etc., also radiate from the corridor. Each pavilion is 175 × 20 feet, exclusive of the water-closet, bath-room and scullery, which project from the pavilion at each end; the height to the eaves is 13 feet and to the ridge 18 feet. Each ward is 150 feet long, the remaining 25 feet of the length of the pavilion being occupied at the end near the corridor by a room for nurses and a pantry; and at the other end by a wardmaster's room, a lavatory, a water-closet and a bath-room. The water-closets are cut off from the wards by cross-ventilated passageways.

The sides of the wards are plastered. Ventilation is by the ridge in summer and by ventilating shafts in winter. Seven of these shafts are arranged on either side of each ward, extending from the floor to the eaves, and thence transversely to the ridge, where the two shafts from opposite sides unite in a central vertical shaft which passes through the ridge and is properly capped; the only opening into these shafts is near the floor. Each ward is heated by four coal-stoves surrounded by an iron jacket. Fresh air is supplied by a transverse shaft running under the floor and opening near the stove. The wards are well lighted by windows on either side and by gas at night; the windows are fitted with brown linen shades. Each ward is furnished with iron bedsteads, besides tables and chairs.

The hospital is drained by two sewers, one of terra-cotta, running along the inner circle formed by the corridor, the other of brick, extending around the hospital on a line with the outer extremities of the wards; this system discharges into the river.

In the construction of this hospital the following defects may be noted: The ridge is too high and does not extend far enough laterally; the shutters have to be closed in rain or snow-storms. The roof has too great a pitch for a tarred cloth and a sand and gravel covering; shingles could have been supplied for about the same cost. The iron jackets surround the stoves so that the men cannot warm their feet, and the lower stratum of air fails to be heated; the jackets should only partly surround the stoves. There is no opening in the ventilating shafts save at the floor, so that in winter the ventilation must be imperfect unless portions of the ridge are left open. The stove-pipes do not connect with the ventilating shafts.

This hospital was commenced in September, 1863, and first occupied in February, 1864, though not then completed; indeed it is not yet finished. Its cost is computed at \$250,000.

The improvements made in each succeeding hospital erected during the war had reference to the character of the construction of the wards, their lighting and ventilation, the attachment of their bath-rooms and water-closets and their arrangement as a whole, including their communication one with another and with the administration and executive departments of the hospital. Lining, lathing and plastering, flooring with close-set tongued and grooved boards, weather-boarding externally and shingled roofs gradually supplanted the coarsely joined and rudely finished paper-covered huts, which, at the McDougall Hospital, required external props to prevent their prostration by the wind. The pavilions suffered a reduction in length, as from 248 feet, with transverse partitions giving four wards at the De Camp Hospital, or 208 feet divided into two wards at the Stanton Hospital, to

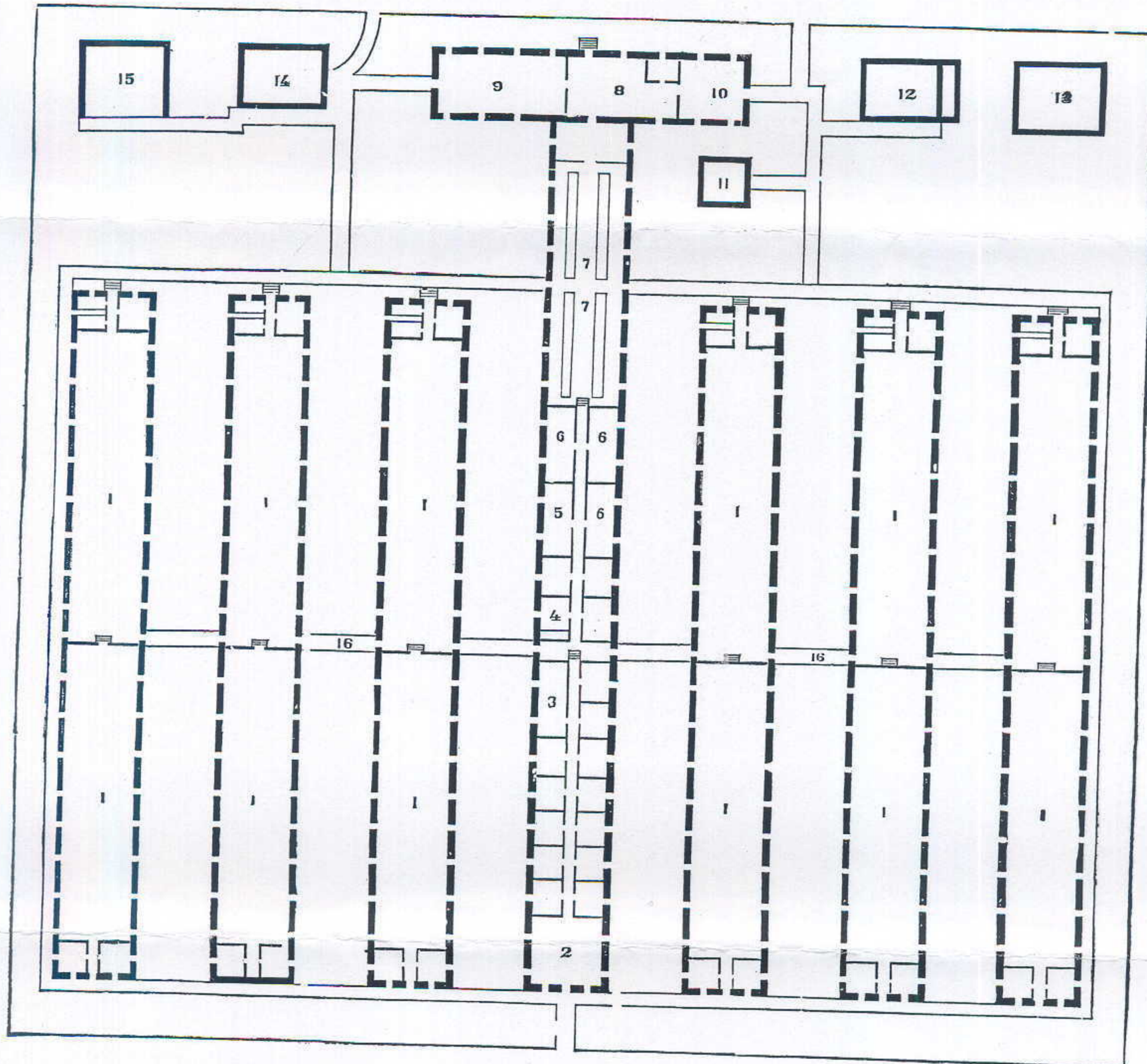
a clear ward length of about 150 feet in each building. The width and height of the wards became increased from $17\frac{1}{2}$ and 8 feet, as at the MCDUGALL HOSPITAL to 24 or 25 and 12 or 14 feet respectively. The improvement in lighting may be seen by comparing the side elevation of the huts at Clarysville, Maryland, page 908, with that shown on page 944. The open ridge, which admitted driving rains and snows, received protection, and other means of ventilation connected with the heating of the wards were introduced. Lastly, faults of aggregation were recognized and avoided. The plans of the CHESTER HOSPITAL, which set all considerations of fresh air at naught, were not duplicated. On the contrary, the narrow interspaces which at many hospitals besides the SATTERLEE were regarded as a source of danger in case of fire, had a tendency to become enlarged until, at the JEFFERSON HOSPITAL each hut, as has been seen, radiating from a circular enclosure, was at its free end separated from its neighbor by a space equal to four times its width and at its attachment to the corridor by a space more than twice its width.

The closed corridor, however, continued for a long time in every hospital plan to block up one end of the buildings and their interspaces, although the ARMORY and STANTON hospitals of Washington, D. C., built during the summer of 1862, showed that a covered pathway answered all the purposes for which a closed corridor was intended. It was, perhaps, the conversion of the corridor into a general dining-room at so many of the hospitals that ultimately caused its modification into a structure insusceptible of adaptation to undesirable uses. At all events, the covered walk, open at the sides, gradually displaced the enclosed corridor, thus giving better ventilation between the wards and a purer air in their interior from the side of the former corridor or mess-hall. At the STANTON and ARMORY hospitals the pavilions projected from one side of the covered walk. Economy of space and centralization of labor were obtained at these establishments at the expense of ventilation and with increased risks from fire; the buildings were too close together, considering their great length and inflammable material, particularly that of their roofing. At the NELSON HOSPITAL, Camp Nelson, Ky., built at a later date on a similar plan, the adjacent pavilions, although not so long as those of the Washington hospitals, were separated by a space of 35 feet.

At the HAMPTON HOSPITAL, Fort Monroe, Va., the pavilions were arranged *en echelon* in the form of a **V**, with the administration buildings, quarters and store-rooms closing in the triangle and the kitchen and dining-room in the enclosed space. As each pavilion in receding from the angle was disposed lengthwise behind and external to that in front of it, the length of the diverging series of wards was found to be an inconvenience. A similar inconvenience was experienced at the LOVELL HOSPITAL, Portsmouth Grove, R. I., where, on account of the nature of the ground, the pavilions were arranged in two lines, with a covered pathway along the middle of the wide avenue between them. At the HAREWOOD and LINCOLN hospitals, Washington, D. C., where the **V**-shaped plan obtained, the distance of each diverging line of wards from the administration building at the apex was reduced by making one pavilion overlap the other. The circular plan, with an open corridor, was used in the construction of the HAMMOND HOSPITAL at Point Lookout, Md.

STANTON HOSPITAL, WASHINGTON, D. C., occupied the square bounded by H and I, 2d and 3d streets. It consisted of seven long one-story pavilions placed parallel to each other and 24 feet apart, their northern ends, on I street, forming the front of the establishment. They were built of rough boards, lined with strong paper of a yellow color, well lighted by numerous windows, floored with white pine smoothly planed and well tongued and grooved, roofed with tarred roofing-felt, and ventilated by the ridge in summer and in winter by outlet shafts extending from near the floor to beyond the ridge, with inlets connected with the jacketing of the stoves. The central building, longer

than the others, was used for administration purposes. The three pavilions on each side were each 208×24 feet, with an average height of about $14\frac{1}{2}$ feet. They were each divided at the middle of their length by a partition, with communicating doors, into two wards of 36 beds each. At the free end of each ward two spaces 10 feet square were partitioned off, one used as a nurses' room, the other divided into bath-room and water-closets. The dining-room was in the rear portion of the administration building and had the kitchen and laundry at right angles to it posteriorly. A covered way surrounded the wards as a whole, extending continuously across the front and rear ends to the pavilions and on either side along the outer side of the building. A similarly protected pathway connected the pavilions in a transverse direction at the middle of their length where the division of each into two wards was effected. Water and gas were derived from the city mains. The water-closets were supplied with a stream of running water connecting with the general sewerage system.



STANTON HOSPITAL, WASHINGTON, D. C.—1, Wards; 2, Administration; 3, Dispensary; 4, Bath-room; 5, Officers' mess; 6, Store-rooms; 7, Dining-room; 8, Kitchen; 9, Laundry; 10, Store-room; 11, Ice-house; 12, Stable; 13, Dead-house and knapsack-room; 14, Coal-house; 15, Guard-house; 16, Covered ways.

ARMORY SQUARE HOSPITAL, WASHINGTON, D. C., was constructed during the summer of 1862, after plans furnished by Ass't Surgeon J. J. WOODWARD, U. S. Army. It was situated on Seventh street opposite the grounds of the Smithsonian Institution, and just beyond the canal which, at that time, as an open sewer reeking with the filth of the city, rendered the location unwholesome. This site was selected on account of its proximity to the great thoroughfares parallel to each other, with their gables facing the front and rear of the grounds. The hospital consisted of eleven long pavilions placed by a space no wider than the width of one of the buildings. The central pavilion constituted the administration building, the others, five on each side, were used as wards. The central building contained a reception room, from which a passage continued through the centre of the length of the building, with small rooms on either side used as the office of the surgeon in charge, the dispensary, general office, linen-room, post-office, store-room and officers' quarters and mess-room. In rear of the central building and connected with it by a covered way was the general kitchen,