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ART. I.—*A Brief Account of the Pennsylvania Hospital for the Insane, at Philadelphia; with a Description of its New Buildings.* By THOMAS S. KIRKBRIDE, M. D., Physician to the Institution. (With two plates.)

AN entirely new building containing, with the conveniences and comforts which have been tested by experience, much that is novel in character, having been completed during the past year, and added to the accommodations previously possessed by the Pennsylvania Hospital for the Insane, a brief sketch of its history and of its present condition and arrangements can hardly fail to be interesting, not only to those who have so generously contributed to the work, but especially to the medical profession and all others who feel an interest in public institutions devoted to the relief of human suffering.

The original Pennsylvania Hospital, of which this is a branch, was established as early as the year 1751, and was the first institution in America in which special provision was made for the care and treatment of the insane. Although in its early days it received some assistance from the colonial and State governments towards the erection of the original buildings, its main dependence has always been upon the contributions of benevolent individuals. It has always had two departments, one for the sick and cases of accidental injury, and the other for the insane. That for the sick continues to occupy the original site, on the square between Spruce and Pine and Eighth and Ninth streets, in the city of Philadelphia, and is every year widely diffusing its benefits throughout the community. Into this building the insane, too, were received till the first day of the year 1841, at which date an entirely new structure, called the "Pennsylvania Hospital for the Insane," was opened for the reception of patients, and

since that period no cases of insanity have been admitted into the building first referred to. This new hospital was located on a fine farm of 113 acres of land, two miles west of the river Schuylkill, between the West Chester and Haverford roads (now Market and Haverford streets), on the latter of which is its gate of entrance. The new establishment and the land on which it stands was provided entirely from the proceeds of sales of certain vacant lots surrounding the old building which had never yielded any revenue to the hospital, and which originally had cost the institution but about \$10,000. Beginning with 93 patients, received from the parent institution, the number gradually increased, till, by the year 1853, every room was occupied, and from that time forward, even with almost constantly crowded wards, it became necessary to decline many cases that sought admission to the hospital. Under these circumstances, it was obvious that new accommodations must be provided, or the institution could not maintain its high character, nor our own citizens find, within the commonwealth, adequate means for the treatment of the cases of insanity which were of such frequent occurrence. Believing that this institution possessed peculiar advantages for providing these additional accommodations, and that the experience which had here been derived from a careful study of the disease and a familiarity with the requirements of establishments for its treatment, could be made available in the erection of a new structure, it was suggested in the annual report for the year 1853, "that a new hospital, replete with every modern discovery and all the improvements suggested by a large experience, and capable of accommodating 200 male patients, should be erected on the 70 acres of land now comprising the farm of the institution, and directly west of its present inclosed pleasure grounds; while the present buildings, with everything included within its external wall, should be given up for the exclusive use of a similar number of females." These suggestions were at once approved by the Board of Managers, and subsequently with entire unanimity by the contributors at their annual meeting in the year 1854. An appeal to the public for contributions to this object was soon after issued, a collecting committee appointed, and the result of their labours has been the erection, from this source alone, of an entirely new edifice, capable of accommodating in a very superior manner 250 patients, with ample apartments for officers, attendants, and others employed, and with every arrangement which seemed likely to promote the comfort and restoration of the sick, and the efficiency, usefulness, and economical management of the institution.

The Pennsylvania Hospital for the Insane, therefore, as now constituted, consists of two distinct buildings, each complete in itself, having separate pleasure grounds and inclosures, both situated, however, on the same tract of 113 acres of land originally purchased by the institution. The hospital just completed is styled "the department for males," and that which has been in use during the last nineteen years "the department for females."

Both departments remain as heretofore under the charge of a physician in chief, having as associate officers one or more assistant physicians, a steward, and a matron in each building.

The building now known as "the department for females," and the various improvements which from year to year have been added to the original structure, have been fully described in the eighteen annual reports which have been published. The character of the repairs and alterations now in progress, and which will tend to add greatly to the cheerfulness and completeness of its arrangements and the comfort of the patients, may be referred to in detail on some future occasion. It is intended to facilitate communication between the two buildings by means of the telegraph, and one of our citizens has offered a liberal contribution towards putting a wire suspension bridge over the meadow which separates the two pleasure grounds.

From the opening of the Pennsylvania Hospital to the year 1841, when it ceased to receive cases of insanity (a period of 89 years), 4366 insane patients were admitted. Of these 1493 were cured, 913 discharged improved, 955 were removed by their friends without material improvement, 246 eloped, 610 died, 93 were transferred to the new building, and 16 retained at the date referred to.

In the nineteen years that the "Pennsylvania Hospital for the Insane" has been in operation, 3360 patients have been admitted, and of these 1656 have been discharged cured, 766 in various states of improvement, 312 as stationary, 363 died, and 254 remain under care.

The first stone of the new hospital, "the department for males," was laid on the 7th of July, 1856, and it was opened for the reception of patients on the 27th of October, 1859. It is situated in full view, and on the western side of the building previously in use, at a distance in a right line of 648 yards, and in the midst of fifty acres of pleasure grounds and gardens, the whole of which are surrounded by a substantial stone wall, covered with flogging, and of no average height of ten and a half feet. The gate of entrance is on Forty-ninth Street (an avenue intended to be 100 feet wide), between Market and Haverford streets, and by each of which, by means of horse railroads, easy access to Forty-ninth Street can be had at all seasons.

This new hospital faces the west, and consists of a centre building, with wings running north and south, making a front of 512 feet—of other wings, connected with each of those just referred to, running east a distance of 167 feet, all three stories high, and these last having at their extreme ends communications with extensive one storied buildings. All the exterior walls are of stone, stacked, and the interior of brick.

This arrangement gives provision for the accommodation of sixteen distinct classes of male patients in the new building, as the same number of classes of females are now provided for in that previously in use. Each

one of these sixteen wards has connected with it, besides the corridors for promenading and the chambers of the patients and attendants, a parlor, a dining-room, a bath-room, a water-closet, a urinal, a sink-room, a wash-room, a drying-closet, a storeroom for brushes and buckets, a clothes-room, a dumb-waiter, a dust-flue, and a stairway passing out of doors, if desired, without communication with the other wards; and every room in the building, almost without exception, has a flue communicating with the fresh air-duct, for warm or cool air, according to the season (and hereafter to be referred to), and with the main ventilating trunks which terminate in the various ventilators on the roof of the building.

The centre building is 115 by 73 feet. It has a handsome Doric portico of granite, in front, and is surmounted by a dome of good proportions, in which are placed the iron tanks from which the whole building is supplied with water. The lantern on the dome is 119 feet from the pavement, and from it is a beautiful panoramic view of the fertile and highly improved surrounding country, the Delaware and Schuylkill rivers, and the city of Philadelphia, with its many prominent objects of interest. In the basement or first story of the centre building is the main kitchen, 42 by 24 feet, in which are improved arrangements for cooking: a scullery, 24 by 11; two storerooms, each about 20 by 22 feet; a trunk-room, 24 by 11 feet; a general clothes-room, a bread-room, a dining-room for the officers, another for the domestics, a lodging-room for the seamstress, another for the supervisor of the basement, a stairway to the main story, and a dumb-waiter leading from the kitchen to the cellar, and another to the upper rooms of the centre building. The cellars under the centre building, besides containing the hot air-chambers for that division of the house, have three distinct rooms for storage, which are ventilated by means of flues leading out through the roof of the house. In front of the basement, and under the steps and adjoining roadway, are the vaults for coal for the kitchen and bake-room, and the ice-house, the latter being ventilated as mentioned for the cellars, and carts unload into both, through openings in the blue stone flagging, which forms the roadway upon the arches below. Adjoining the ice-house is a small apartment, with stone shelves for keeping food coal in summer; and along side of the coal-vault is a space for the offal from the kitchen. There is also a small kitchen near the scullery, and intended for the superintendent's family, whenever it is required for the purpose. In one of the storerooms is a dark apartment, and in another the tanks for the oxygen and hydrogen gases used for the dissolving apparatus.

On the second or principal story is the lecture-room, 42 by 24 feet, in the lecturer's table of which, water, steam, and gas, for experimental purposes, have been introduced. It also contains commodious cases for apparatus, a black board running on a track behind the cases, and a smooth surface, 24 by 18 feet, at its eastern end, on which the dissolving views are shown. On the opposite side of the main corridor is a reception room for

visitors, and a room for visits to patients by their friends, each being 24 by 23 feet. There are also on this floor two small rooms for more private visits, the medical office and library, which is also the assistant physician's office, 24 by 14 feet, with a small storeroom, containing a sink, &c., adjoining; the lodging-room for the assistant physician having charge of the medical office, with which it communicates; a general business office, which is also that of the steward, 24 by 20 feet; a manager's room, 24 by 19 feet, which is also the principal physician's private office; a parlor, 24 by 19 feet, for the use of the officers of the house; and a fire-proof, 11 by 9 feet, in connection with the general business office. In the third story front are four line rooms, each 24 by 21 feet; a corridor, 42 by 16 feet, shut off from the adjoining portion by a ground glass partition; a bath-room, water-closet, and clothes-closets, intended at some future day for the use of the family of the superintending physician, whenever such an officer may be specially connected with that department. There are also on this floor chambers for the steward and matron, for the senior assistant physician, three others that may be used as deemed expedient, and a room, 24 by 11 feet, lighted from the roof, and intended for a general storeroom for the bedding and other dry goods not actually in use.

The corridors of the centre building, running east and west, are sixteen feet wide; those running north and south, in which are the stairways, lighted from the roof, are twelve feet wide.

The height of the ceiling of the basement in the centre building and of all parts of the wings and one storied buildings, except the upper story of the wings, which is one foot more, is twelve feet. The ceilings in the second or principal, and in the third story of the centre, are eighteen feet high.

The wings on each side of the centre building are almost exactly alike, except that on the south side in front, in the basement immediately adjoining the centre, is the ironing-room, 28 by 11 feet, with a drying-closet, 11 by 11 feet, attached, and in the rear the small kitchen already referred to, and the lodging-rooms of the female domestics; while on the north side, in corresponding positions, are the bake-room, the baker's store and lodging-rooms, and the lodging-rooms of the hired men, not employed in the wards. On this floor, on each side of the centre, is also a museum and reading-room, 42 by 14 feet, and accessible either from the grounds or from the inside of the building, two work-rooms for the patients, two lodging-rooms for persons employed in the work-rooms, a bath-room for the officers and another for the domestics, two water-closets, &c. The portion of the wing just described is shut off from the adjoining part (which constitutes the fifth ward) by a thick ground glass partition; this ward having in it a large room, 29 by 24 feet, with a bath-tub and water-closet in a recess; another, 24 by 14 feet; a third, 23 by 11 feet; and five rooms, 11 by 9 feet; a bath-room, drying-closet, and all the other conveniences already mentioned as forming a part of each ward. These apartments and arrangements are

intended for patients who are particularly ill, and who require special quiet and seclusion, where they may be visited, if deemed expedient, by their friends, without annoyance to others, or interfering with the discipline of the house.

Besides the fifth ward, just described, and which is on the first floor, there are on each side of the centre two other stories, each of which constitutes a ward, and with all the conveniences already referred to. The rooms are arranged on both sides of the corridors, which are twelve feet wide, and have their extreme ends mostly filled with glass; while, wherever one wing joins another, there is entirely across it an open space for light and air, eight feet wide, glazed with small sash from near the floor to the ceiling; and in the middle of each ward, on one side, is a similar open space, all of which may be used for keeping flowering plants, birds, &c., for having small jets of water or any other object of interest, and which, in excited wards, may be guarded by ornamental wire-work. Each story of the return wing makes a ward, similar to those just described.

Passing from the return wings into the supervisor's office, the one storied buildings are reached. Each of these has provision for 26 patients and six attendants, and every arrangement for their comfort. The rooms are here on one side of a corridor ten feet wide, and at the end of each of these running towards the east is a cross hall, in which are three rooms intended particularly for patients who from any cause may require special seclusion. One of the main halls is used for dining, and the other as a sitting-room. Between the dining halls of these two wards (the seventh and eighth), and made private by sliding doors, are four rooms intended for excited patients, who have special attendants. Opposite these last is a room, 110 by 14 feet, with an arched ceiling 15 feet high, with skylights and windows out of reach, intended to be used as a kind of gymnasium, and accessible either from the adjacent garden and yards, or directly from the wards; and in the story below this is a room of the same size, in which are two fine bowling alleys, with reading tables, &c. Both these rooms may be well lighted with gas, and warmed by steam-pipe, so that they can be comfortably used in the evening as well as by day, and in all kinds of weather.

The arrangement of these one storied buildings makes for each two very pleasant yards, in size 110 by 54 feet, surrounded by broad brick pavements, and having grass in the centre, with an open iron palisade in front, giving a distinct though sufficiently distant view of two of the most travelled roads in the vicinity. There is also a yard, 343 by 72 feet, adjoining each sixth ward, fitted up as the others, and planted with shade trees. Brick pavements also surround the entire building, making, with those just referred to, and those in front, a continuous walk of 6,152 feet.

Entrance.—The entrance to "the department for males," as before mentioned, is from Forty-ninth Street, between Market and Haverford streets. The gatekeeper's lodge has two comfortable rooms on the north,

while on the opposite side of the gateway is a dead-room, and another for tools used about the grounds. Brick paths on either side of the main roadway lead to the centre building, and the space in front, planted with evergreen and ornamental trees, and having a fountain in the central grass-plot, is 325 by 175 feet. From the front platform eight steps lead up to the vestibule, and seven steps inside of the building, to the level of the principal floor. Visitors passing into the centre building may go out upon a pleasant balcony on its eastern side, and overlook the improvements in that direction, but they cannot pass through the grounds.

Ten steps descend from the roadway to the pavement around the basement, which, except immediately at the front of the centre, where it is surrounded by a wide area, with sodded banks, is everywhere above ground.

There is also a gate on Market Street, near the engine-house, used for bringing in coal or other heavy articles, and another on the eastern side of the grounds, for the use of the officers of the hospital only.

Engine-House and Laundry.—The engine-house, 71 feet from the nearest point of the hospital building, is a substantial stone structure, 70 by 64 feet, and two stories in height. The character of the ground is such that carts drive into the second story to discharge the coal directly into the vaults below, and the level of the railroad in the cellar of the hospital brings it upon the second floor of the engine-house.

The first story, on the level of the ground on its southern and eastern side, contains vaults capable of containing near 500 tons of coal. Adjoining these vaults is the boiler-room, 30 by 17 feet, and opening into the engineer's work-room, in which will be placed latbes, grindstones, pipe cutting machines, &c., driven by the engines which are in the engine-room, 23 by 19 feet in size, and separated from the last by a glass partition; while farther west, also separated by glazed windows and doors, is the fan-room and the tower for supplying fresh air to the main duct, which leads from it, through the entire building. The height of ceiling in this story is 17 feet, and it is arched over the engine-room and the engineer's work-room, so as to give a proper support to the stone floor of the room above. In the second story of this building, into which the railroad passes, is the wash-room, 27 by 24 feet; the room for assorting and folding clothes, 24 by 14 feet; the mangle-room, 43 by 2½ feet; the drying-closet, occupying a space 26 by 13 feet; a water closet; and a large room over the coal-vaults and boilers, surrounded by movable blinds, and intended for drying clothes without the use of artificial heat, for making soap, &c.

The Carpenter Shop, 36 by 20 feet, is of frame, two stories high, and 45 feet from the engine-house, from which steam may be taken for warming it in winter. It has two rooms below, and a single large one above.

The Carriage-House and Stables make a neat stone structure, 57 by 36 feet, and two stories high. It has accommodations for six horses and as many cows, and the carriages required for the different purposes of the

institution. The lower floor is of cement, brick, or blue stone. The pig-gery is in the yard in the rear of the stables, and there is a carriage-yard in front, both being surrounded by a stone wall.

Size of Rooms.—The height of the ceilings throughout the building, and the size of the parlors and of all the rooms in the centre building, have been already given. The ordinary size of patients' lodging-rooms is 9 by 11 feet, while there are some in each ward of a much larger size, many of which have communicating doors, and are intended for patients who desire a parlor as well as a chamber, or for those having special attendants. The parlors in the first and third wards are 33 by 24 feet, and in the second, fourth, and sixth they are 23 by 30 feet. The dining-rooms are generally 23 by 17 feet. The bath-rooms are mostly 9 by 11 feet. Sixteen rooms in each one storied building have water-closets in them, firmly secured, and with a strong downward draught. The sides of doors and windows in patients' rooms are generally rounded, by being built of brick made expressly for the purpose, and smoothly plastered.

Windows and Window Guards.—The windows in patients' rooms are almost universally 6 feet by 2 feet 9 inches, having twenty lights of glass, 6 by 17 inches, in each sash. In the front wings adjoining the centre, and in the third story of the return wings, both sashes are of cast-iron, secured in wooden frames, so arranged as to balance each other, rising and falling only to the extent of five and a half inches, and doing away with the necessity for guards. In the other parts of the return wings, and in the one storied buildings, the windows are of the same size, have the upper sash of cast-iron, and immovable, the lower being of wood, rising to its full extent, and protected by an ornamental wrought-iron guard, securely fastened on the outside. A few rooms in each one story building have small windows out of reach of their occupants, and intended for the temporary seclusion of very violent or mischievous patients. In other parts, as well as in this, wire screens inside of the rooms are occasionally used to protect glass, and ornamental wire-work is adopted in some of the parlors, at the ends of corridors, and in other similar positions, as a guard outside of the windows.

Doors.—The doors throughout are made of the best white pine lumber. In the wards they are 1½ inches thick, 6 feet 8 inches high by 2 feet 7 inches wide. Each door has eight panels in it, one of which makes a hinged wicket, and what is commonly known as head and butt, very substantially put together, and wherever special strength is required it is obtained by transverse pieces of iron let into the wood, or by plates of boiler-iron screwed on, and painted so as to resemble an ordinary door. Each door has a good dead-lock to it, and occasionally a mortise-bolt is added. Over each door is an unglazed sash, 31 by 17 inches, covered with fine wire on the inside, or a space 31 by 5 inches, which can be filled up at pleasure by a tight board

or by wire. Lift hinges have been used for all these doors, which for patients' lodging-rooms always open into the corridors.

Floors.—The floors throughout are of the best yellow pine, cut to order in Florida, and piled up on the grounds two years before it was used. The boards are one inch and a quarter thick, varying in width from two and a quarter to four inches, and put down with secret nailing. Counter-ceiling is everywhere used. The only exception to this kind of flooring is in the two kitchens, the scullery, a space in the basement hall in front, the bake-room, at the sink, water-closet, and wash-rooms, the line between different wards, the entrance to the stairways, and the main wash-room in the engine-house, which are of brown German flagstones, laid on brick arches; the engineer's work-room, which is paved with brick; the front of the boiler-room, which is of iron and blue stone flagging; and the engine-room, one sink-room, and all the ward stairways, which are of slate, admirably adapted to such a purpose, and from the quarries of Eleazer, Jones & Co., at East Granville, N. Y., and which has also been used extensively for window-sills, stairways, and other purposes.

Stairways.—All the stairways in those parts of the building occupied by patients are fire-proof. The framework is of cast-iron, built into the brickwork on each side, and covered with slate, which has many advantages. The rise of these steps is only seven inches; there are platforms every five or six steps, with convenient handrails on both sides, from top to bottom. They are all well lighted by windows by day and by gas at night. The well around which the stairs wind is used for hat or coat-rooms, for the different stories.

Plastering.—The inside plastering is what is called hard finish, composed of lime and sand, without plaster of Paris, except for ceilings, and well trowelled. This finish admits of being scrubbed for years without injury, and is at all times ready for painting. The outside of the building is rough-cast, the material used being the pulverized stone of which the house is built and lime, to which an agreeable shade of colour is given by a sand obtained in Montgomery County. Hydraulic cement is used near the ground in certain positions, in many of the sink and wash-rooms, in the kitchen and scullery, in the main wash-room, and as a substitute for the ordinary wash-boards in many of the ward corridors and patients' chambers.

Roofing.—The roof is of Pennsylvania slate, fastened on lath, and plastered with hair mortar on the under and upper edges and on the joints of the slate. The pitch is one-fourth of the span. The water from the roof is carried off, through four inch cast-iron pipes inside of the building, and easily accessible, into large drains leading into the main culvert.

Sewerage.—The main culvert is 2,033 feet in length. It is 35 inches from top to bottom in the clear, built of brick laid in hydraulic cement, egg-shaped, the smaller part being at the bottom. Beginning near the intersec-

tian of the north return wing and one storied buildings, at which point it receives various pipes from the adjacent wards. It passes under the main chimney, by the engine-house and barn, and extends to Mill Creek, into which it discharges just before it reaches Market Street. Through this culvert all the drainage from the building and much of the grounds is carried off, being intersected by branch culverts at various points in its course.

Bath-rooms, Water-closets, &c.—There are twenty-one bath-rooms and as many water-closets in the building. Sixteen are in the wards. Each bath-room has in it a cast-iron bath-tub, covered with zinc paint, and with improved arrangements for the admission and discharge of water through the bottom. In addition to the ordinary hot air flue, there is a coil of steam-pipe for direct radiation in each, so that when hot baths are used the temperature of the room may be made so high as to prevent the sensation of chilliness, when coming from the water. The water-pipes in these rooms are generally of galvanized iron, left exposed so as to be readily accessible, and passing from story to story, through castings made for the purpose, so that in case of leakage the ceilings may not be injured.

The water-closets are of cast-iron enamelled, have no traps, but are open so as to have a constant downward draft of air through them into the main chimney, as have all the sinks, bath-tubs, &c., in the whole establishment. The water is let on by the opening of the door.

The wash-basins in the wash-rooms are of marble, with strong swing-cocks. The sinks are of cast-iron, and have hot and cold water at each. There is also an iron hopper to each, and into which the slaps, &c., are emptied. There are permanent fixtures for securing the towels in each wash-room. The drying-closets are sufficiently large to contain a bed, and, like the closets for buckets, &c., have flues leading into and from them, and thus secure a direct communication with the fan below and the ventilating ducts above. All these arrangements in each ward are clustered together, and have scarcely any wood in any part to absorb moisture or retain unpleasant odours.

Supply of Water.—The new hospital is supplied with water from a well 25 feet in diameter, containing 50,000 gallons, and into which, as measured at the driest period of the last year, is a daily flow of 30,000 gallons of excellent water. There is also a constant small stream of spring-water passing near the well, which can at any time be turned into it. By means of one of Worthington's combined direct acting steam-pumps, capable of raising 10,000 gallons per hour, this water is forced through 708 feet of six inch cast-iron pipe into the four boiler iron tanks in the dome, and from which it is distributed through the entire building. These tanks are 103 feet above the well, and contain 21,000 gallons. They are so arranged that one or all may be used at pleasure, have overflows, and pipes through which they may have the sediment washed out whenever dredged

desirable. The elevation of these tanks is sufficient to secure the feeding of the steam-boilers when carrying a pressure of forty pounds to the inch. These tanks were made at the works, and put in place before the roof was on the building. It is intended that they shall always be about full of water, and a small pipe leading from them to the engine-house tells the engineer on duty when that is the case. There is also in the engine-room a single Worthington steam-pump, capable of raising 5000 gallons per hour, and intended to prevent any possible deficiency of water, should an accident happen to the larger engine. The rule is that both should be used some part of every day, so that in case of emergency there may never be a doubt of their being in working order.

The tank for supplying the centre building with hot water is 12 feet in length and 23 inches in diameter, and is placed above the cooking-range, the heat being supplied through circulating pipe from a water back behind one of the range fires, and is abundant for all purposes. The supply of hot water for the wards is derived from six iron tanks, placed in the most convenient points in the cellar, in which situations they are easily accessible, and leakages can do little injury to the building. The heat is derived from steam coils coming from the summer pipe (as it is called) used for cooking and all other purposes, except warming the building. The large steam-boilers at the engine-house are supplied with hot water by the condensed steam used in heating, which ordinarily returns to them by gravity, but when it does not, is received into an iron tank and forced into them by a small steam-pump. The laundry has hot water from a large tank placed in the oven which covers the boilers, and through which the exhaust steam from the engines and pumps can be made to pass whenever desired, and which may also be used for feeding the large boilers. There are three wells of excellent water besides at convenient points near the building, and which supplied all the water required in its erection. A fourth is now being sunk near the stables.

Lighting.—The hospital is lighted by gas from the city works, on the eastern side of the river Schuylkill. The fine meter, from Code, Hopper & Gratz, is placed in the engine-room, and a record is made every morning of the consumption during the preceding night. Stopcocks are placed at convenient points for checking the flow of gas through the main pipes, and the ordinary kinds of fixtures have been adopted throughout the building. The gas is also used for experimental purposes in the lecture-room, and for boiling water, &c., in the medical office.

Furniture.—The furniture is intended to be neat and plain, but of a comfortable and substantial character, the amount in the various apartments being in a great measure dependent on the character of the patients occupying them. Carpets of some kind generally cover the parlors, and some portions of the corridors and chambers. Wardrobes, tables, mirrors, and other conveniences are frequently added to the bedsteads, which last are of

various kinds, mostly of wood, but many are of wrought or cast-iron, painted of a light colour, a few of which last are secured to the floor.

Heating and Ventilation.—There is no fire used in any part of the hospital for heating, although provision for open fires has been made in all the parlors and in many of the other large rooms, should such an arrangement ever be deemed desirable. The only fires kept up in the building are those in the kitchens, bake and ironing-rooms.

In the boiler-room at the engine-house there are three large tubular boilers. Each of these has a furnace 5 feet 3 inches wide by 5 feet 3 inches long, and 7 feet 4 inches high. The shell is 17 feet 8 inches long by 4 feet 6 inches in diameter. Combustion chamber 4 feet long, and 98 tubes $2\frac{1}{2}$ inches in diameter and 11 feet long. The total heating surface for each is 744 square feet. The grate surface is $20\frac{1}{4}$ square feet. The escaping gases enter a common flue, and the draft can be regulated by a damper at the back end of each boiler, or the supply of air graduated by a register in the ash-pit door.

These boilers furnish steam for warming the entire hospital, and for driving all the machinery, pumping water, for ventilation, washing, cooking, &c. They are so arranged that one or all may be used at pleasure, either for heating or driving the machinery. The steam is carried from them in a five inch welded iron pipe, and after reaching the hospital building, it is distributed in eighty-three air-chambers, placed in its cellar, with direct flues leading from them to the apartments above. The gases from the boiler fires pass through an underground flue, four feet wide and six feet high, a distance of 557 feet, rising 31 feet in its course, till it comes to the foot of the main chimney, which is 78 feet above the surface of the ground. The chimney is built double, the interior being round, formed of hard brick, without parging, six feet in diameter in the clear from bottom to top, the latter being formed of cast-iron, while the foundation is of pointed stonework to a height of eleven feet, and the remainder of pressed brick. The underground flue alluded to contains the main steam-pipe until it reaches the nearest point of the building, and also that portion of it which is carried to the north section of the hospital, and is immediately over the main culvert.

This chimney is made the ventilating power for securing a strong downward draft of air through all the water-closets, urinals, sinks, and bath-tubs in the entire establishment, and for this reason is placed in a central position on the eastern side of the building. The coils for heating are composed of welded iron pipes, three-quarters or one inch in diameter, and are in two sections in all the air-chambers, so that one or both may be used, according to the severity of the weather.

In the engine-room are two horizontal high pressure steam-engines, of fine finish, from the works of I. P. Morris & Co. They are exactly alike, each having a cylinder 10 inches in diameter, and a stroke of 24 inches. They are so arranged that either may be substituted for the other, and one

may be made to do the work of both in case of emergency. Ordinarily one drives the fan, and is therefore a part of the ventilating apparatus, while the second drives all the other machinery. The fan, made by Wm. Sellers & Co., is of cast-iron, its extreme diameter being 16 feet, and its greatest width 4 feet. It is driven directly from the shaft of the engine, and its revolutions vary from 30 to 60 per minute, according to the requirements of the house. The fresh air is received from a tower, 40 feet high, so that all surface exhalations are avoided, and is then driven through a duct, which at its commencement is $8\frac{1}{2}$ by $10\frac{1}{2}$ feet, into the extreme parts of the building. From the cold air-duct, openings lead into the different warm air-chambers, which in the one storied buildings are covered with slate; but in all other parts of the hospital these chambers and air-ducts are covered with brick, laid with smooth joints. The warm air in nearly all cases is admitted near the floor, and the ventilators open near the ceiling, always in the interior walls. The only exception to this arrangement is in the one storied buildings, in which, in the patients' rooms, the warm air is admitted above, and the ventilators are taken off near the floor. All the ventilating flues terminate in the attic in close ducts, either of brick or wood, smoothly plastered, increasing in size about thirty per cent. more rapidly than the capacity of the flues entering them, and by which, through the different belvederees on the roof, they communicate with the external atmosphere. In the centre building the ventilation is through the main dome.

All the pipe used for heating and water, the bath fixtures and water closets, were made at the works of Morris, Tasker & Co.—and the entire apparatus was arranged and put up by the institution, under the direction of its building superintendent. There is no leaden pipe used in the building.

Cooking and Distribution of Food.—All the cooking is done in the central kitchen, which has in it a large range, with two fires and three ovens, a rotary roaster, a double iron steamer containing ninety gallons, a smaller one, iron outside and copper-lined on the inside, containing forty-five gallons, and six of tin for vegetables, besides the vessels for tea and coffee. The food prepared in this room is put into closed tin boxes, which are lowered by a dumb-waiter to the car standing on the track of the railroad, where it passes under the kitchen, and is thus conveyed to the bottom of the various dumb-waiters, which lead directly to the different dining-rooms above, of which, as before remarked, there is one for each ward. Each dining-room has a steam-table, with carving dishes on it, and abundant provision for keeping meats and vegetables warm as long as may be desired. The dumb-waiters are all controlled by the person having charge of the railroad; they are moved by a crank and wheel, and wire-rope is substituted for that commonly adopted.

The railroad is an indispensable part of the arrangements for distributing food. By its use a meal may be delivered to all the ward dining-rooms (eight

in number) on one side—the extreme ones being 580 feet distant—in ten minutes after leaving the kitchen, or for the whole sixteen in twenty minutes. It also forms a very convenient mode of transporting articles from one section of the building to another, carrying clothing to and from the laundry, and gives a protected passage-way in going from the centre building to the engine-house, barn, and workshop, and for persons visiting their friends in the room set apart for the purpose between the sixth and seventh wards.

Provision against Fire.—As already mentioned, no fires are required in the building for warming it, and gas is used for lighting. Wherever one wing comes in contact with another, or with the centre building, all the openings in the walls, which extend up through the slate roof, have iron doors in addition to the ordinary wooden ones, and which may be closed at pleasure. The floors of the kitchens and bakerroom, in which alone fire is used, are of German flagstone laid on brick arches, and all the stairways in the wings are fire-proof. It is intended that there should always be about 20,000 gallons of water in the tanks in the dome of the centre building, and 15,000 gallons per hour may be placed there by the pumping-engines. A standpipe connected with this reservoir passes into every story and into every ward, in all of which it is intended to have a piece of hempen hose constantly attached, so that by simply turning a stopcock, water may be put on a fire almost as soon as discovered. A steam-pipe also passes up into the attic of each wing, and as one of the large boilers is constantly fired up, steam may at any moment be let into the building by simply turning a valve in the cellar. Hose is also kept near the steam-pumps, so that it may be promptly attached, and water thrown on the barn, carpenter shop, engine-house, and contiguous parts of the hospital. A watchman is constantly passing through the house at night, and by means of two of Harris' watch-clocks, as made by H. B. Ames, of New York, there is no difficulty in ascertaining, not only how often each ward is visited, but almost the moment the visit was made, and of course the time taken in passing from one ward to another.

Laundry Arrangements.—The clothing, bedding, &c., collected in the different wards, after being sent to the cellar, are conveyed from that point by the railroad to the room for assorting clothes in the engine-house, and thence into the large wash-room, in which, besides the usual washing, rinsing, and blue tubs and soap vat, is one of the valuable Shaker washing-machines, in which six different kinds of clothes can be washed at the same time, and a centrifugal wringer, both of which are driven by one of the steam-engines. From the wringer the washed articles are taken to the drying-closet, in which, by means of the heat derived from the exhaust steam from the engines passing through a large amount of cast-iron pipe, and fresh air from the fan, they are in a very few minutes made ready for the mangle (also driven by steam power), or folded and taken by the rail-

road to the ironing-room near the centre building, to which they are raised by the dumb-waiter already referred to, or are sent directly to the principal clothes-room, from which they are distributed by the same route, as they may be required in the wards. All the divisions of the washing-machine, of the rinsing and washing-tubs, have hot and cold water and steam introduced directly into them, and the water from them all is carried off under the stone floor of the room to one of the iron columns below, through which it passes into the culvert on the outside of the building.

Pleasure Grounds, Gardens, and Yards.—This new hospital is situated in the midst of its pleasure grounds, embracing about fifty acres, and from most parts of which are fine views of the surrounding country; the boundary wall being so arranged, from the natural character of the ground, or made so by excavations, that little of it can be seen from any part of the building that is occupied by patients. There are two pleasant groves of natural forest trees within the inclosure, and several hundred others, evergreen and deciduous, that have already been planted or collected for the purpose, will give an ample amount of shaded drives and walks. A carriage-road has already been made on the inside of the wall, throughout its extent, and winding by the gardens and terraces around the buildings, will ultimately be two miles long. The foot-walks are not to be less extensive, and the brick pavements about the building have been already mentioned. There are also, as may be remembered, three pleasant yards on each side of the building, and connected directly with the adjacent wards.

The vegetable garden will contain about eight acres, and is in full view from the north side of the building. Flower borders have been made near to and around the entire structure. The only fences inside of the inclosure are to give privacy to the patients in the yards, or to prevent those walking about the grounds from approaching certain parts of the building.

Means of Occupation and Amusement.—As the pecuniary means of an institution are enlarged, so, under a judicious administration, may be, almost indefinitely, the modes of giving patients useful employment, and ministering to their instruction and amusement. A brief recapitulation of what are here recognized and used, may not be inappropriate in this connection.

Beginning with moderate and regulated labour in the open air, in assisting to cultivate the farm and garden and to keep the grounds in order, may be added the cultivation of plants and flowers, employment in the work-shop, carpentering, joining, mattress-making, broom-making, or any other mechanical occupation to which the patients may be accustomed, and which is suitable for them. Walking in the open air, inside or outside of the inclosure, as all not too ill are expected to do at least twice every day of the week in all pleasant weather; the green-house; visits to objects of interest in the vicinity; riding in the neighbourhood in carriages kept for the purpose, or hired specially, or within the inclosure in the pokey phaeton, or wagons driven by the patients or attendants, and occasionally

on horseback; excursions through the city of Philadelphia or its vicinity on the numerous horse railroads, or extended to a much greater distance by cars or steamboats; the museums and reading-rooms (two for each building), with their collections of books, pictures, and curiosities; a general library, a small library in each ward, newspapers, and other periodicals; engravings, stereoscopic and other contrivances for showing pictures. The regular course of lectures and evening entertainments occupy three evenings of every week during nine months of the year at each building, and which are made up principally of lectures and readings on a great variety of subjects, of exhibitions of very superior dissolving views, magnified to eighteen feet in diameter, by using the hydro-oxygea light, music, and whatever else seems likely to give interest to the course; various social parties among the patients; all the ordinary games, ten-pins, billiards, bagatelle, chess, checkers, &c., in which patients are likely to be interested, and so arranged as to be used in the evening as well as during the day. Patients, too, are encouraged to engage in certain kinds of study, and in painting, drawing, fancy work, &c.; reading to the patients by teachers in the different wards, personal intercourse by the officers and others employed for the purpose.

When accustomed to such employment, patients often assist in keeping the house in order, and are urged to become interested in other patients, in the use of musical instruments, taking care of pet animals, and whatever else is suggested by individual peculiarities, and come within the resources of the institution. There is also a circular railroad, a gymnasium at one building and a calisthenium at the other, and the intention is to have a duplication of whatever is found desirable in connection with each department.

Medical Treatment.—Although detailed remarks on the medical treatment of insanity can scarcely be expected in an article like the present, still, if no mention of the subject was made, it might be regarded as a failure to recognize its importance. A very large proportion of all the cases received, when carefully examined, give evidence of impaired general health; and there are but a few who do not present indications, not only for a special regimen, and all the appliances for moral or mental treatment, but also for the use of medicines of some kind. While every case must be prescribed for from its own symptoms, it may safely be said that a great majority require a tonic and invigorating rather than a depleting course of treatment. Of all the cases that have been treated in the Pennsylvania Hospital for the Insane (three thousand three hundred and sixty in number), no one, after entering the institution, has seemed to require or had general bleeding performed, nor has a head ever been shaved, for the treatment of insanity. While cold and shower baths have been almost entirely abandoned, warm or hot baths have come to be regarded as among the most important means of treatment.

Cost.—Without a statement of the cost, no account of such a building

and such arrangements as have been described would be at all complete, and especially not of one like that under notice, which is entirely the offspring of the benevolence and liberality of a community, a result of practical Christianity, and a generous recognition of the paramount claims which such afflictions of our fellow men have at all times upon our interests and our sympathies. The style of architecture is plain, and all useless ornament has been studiously dispensed with; but wherever the comfort and welfare of the patients were concerned, everything has been done in a thorough manner.

The amount of money paid on account of the new building and its varied fixtures and arrangements, up to the present time, is \$322,542 86, and a further sum of about \$30,000 will be required to meet the other liabilities that have been incurred. Of this total sum, \$20,276 28 have been for the boundary wall and gate-house; \$2241 46 for the carriage-house and stabling; \$800 for the carpenter-shop; \$4456 03 for machinery of different kinds; \$23,612 37 for heating and ventilating apparatus; \$15,201 47 for grading for building, planting, and improving the grounds; and \$10,441 73 for furniture.

Organization.—As heretofore, the government of the Pennsylvania Hospital for the Insane is vested in a board of twelve managers, who are elected annually by the contributors, give their services gratuitously, and, like all the other officers, have no pecuniary interest in the institution. They visit by committees both departments on the 7th day (Saturday) of every week, to examine the accounts, receive reports from the physician, and visit the wards and patients as far as they may deem desirable. Since the opening of the hospital, nineteen years ago, these weekly visits have not been omitted in a single instance. The board of managers appoint the officers resident at the institution, and who are, as before mentioned, a physician in chief, having the general supervision and direction of both departments, and one or more assistant physicians, a steward, and a matron, at each building. In the immediate care of the insane, besides those already mentioned, are supervisors, teachers, or companions for the patients, and not less than two attendants for each ward, which, if the house was entirely full, and no special attendants for single patients (of which, however, there are always several), would give one attendant for every six or seven patients. At night the care of the patients is intrusted to watchmen or watchwomen, according to their sex, and these come on duty before the attendants retire, and do not leave the wards till they are up and engaged in their regular morning duties. The supervisors, teachers, and night watchers are expected to make written reports to the physician daily.

There are also employed for each department, a carpenter, three men connected with the boilers and machinery, a gardener and assistants, coachman, gatekeeper, &c.

Admission of Patients.—This hospital, having no connection with any sect, nor under any political influence, is resorted to by persons of all professions and callings, of every religious denomination, and when it has room receives all classes of insane patients, without regard to the form of the disease, its curability, or the place of residence of the applicant. Idiots, however, it may be mentioned, are not admitted, and cases of mania-a-potu are received only into the hospital at Pine and Eighth streets, in the city of Philadelphia. Some one member of the board of managers gives the order of admission; but before doing so, a certificate of insanity from some respectable graduate of medicine is always required, as well as a request for the reception of the patient, and security from a resident of Philadelphia, or its vicinity, for the payment of all expenses incurred at the institution.

The rates of board vary according to the pecuniary ability of the applicant, the character and extent of accommodation, and the amount of special attendance that is desired—the lowest price for paying patients being not any more than the actual cost of support. In addition to those who pay board, a limited number of recalcitrant and supposed curable cases, who are known as such only to the officers of the house, and who have no distinction made in their treatment, are admitted and cared for, without charge of any kind, so long as there seems to be a probability of their being restored. The number on this free list (now 46) is regulated entirely by the resources of the institution, which, as already stated, come entirely from private benevolence, as it receives no assistance of any kind from city or State.

Separation of the Sexes.—Before closing this notice of the Pennsylvania Hospital for the Insane, it may not be uninteresting to state that the completion of the new building allows this institution to carry out, under very favourable circumstances, what has for many years past been gradually gaining favour with some of the most experienced medical officers of American hospitals for the insane—a provision for the treatment of male and female patients in entirely separate buildings.

It is scarcely necessary to say that this arrangement in no way interferes with the humanizing influence, especially for men, of suitable associations between the sexes; but intimacies of this kind between patients ought always to be guarded against. It certainly will be as agreeable and as profitable to all, that these influences shall be exercised by those who are of sound mind and discreet demeanour, rather than those whose impaired intelligence or want of self-control had compelled them to claim the benefits resulting from a residence in the hospital. So far as I am aware, there is not a single advantage in having the two sexes in the same building, and it requires little observation to know that there are many and often not trifling disadvantages; while the separation will not only render the classification much more complete, but permit for both the removal of many restrictions that could not otherwise be dispensed with.

The new building was given to the male patients, because in its con-

struction and arrangements many things could be introduced that seemed specially desirable for men, particularly so in the work department, and because it could not be made to have quite as great a degree of privacy as the other, while there was a large amount of planting and improving about its grounds, which would give pleasant occupation to its inmates for a considerable time to come. On the other hand, the original building was selected for the female patients, among other reasons, because the proposed improvements would give it greatly increased cheerfulness and comfort; that it must always have more privacy; that its grounds were more highly improved; that the trees were more fully matured; and it was also felt that from the greater care, as well as more gentle use it would receive, no very long period would elapse before the two houses would appear as though they had been in use about the same length of time.

As soon as the repairs and improvements now in progress at the department for females are completed, it is believed the two will in most respects be about equal in comfort and efficiency; that nearly the same number of patients can be provided for in each (250 in that for males, and 225 in that for females); and that, with the many advantages not heretofore possessed, the institution will be able to do its full share in promoting a real advance in the treatment of insanity, and a general amelioration of the condition of the insane.

PHILADELPHIA, January, 1860.

ART. II.—*History, Medical Topography, Climatology, Hygiene, Diseases, &c., of Fort Bridger, Utah Territory.* By ROBERTS BARTHOLOW, A. M., M. D., Assistant Surgeon U. S. Army. (Extracted from Reports to Brevet Brigadier General Thomas Lawson, Surgeon General U. S. A.)

History.—For many years past, Fort Bridger, U. T., has had some celebrity as a trading station, occupied by James Bridger, a famous mountaineer—whence its name. The fort consisted of an irregular collection of log-houses, surrounded by a stockade; built in part for defence against the Indian tribes in the vicinity; in part for conveniences of Indian traffic. When the Mormons occupied the valley of Salt Lake, and grew into a formidable community, the fort came into their possession, and was further strengthened by the erection of a quadrangular wall. Upon the arrival of the "army of Utah," in the fall of 1857, nothing remained of Fort Bridger but this wall—the wooden structures having been burned by the Mormons, when they could no longer hold possession.

The erection of the necessary quarters for a garrison of five companies, commenced immediately after the advance of the main body of the army,