and hay together with a considerable quantity of potatoes, corn, oats, and other grain, are produced upon it. It is also well planted with choice fruit trees, many of them now at the age of most prolific bearing.

Among the domestic animals are one yoke of oxen, eight cows, and five horses.

NOTE.—In the preparation of the foregoing account of the Bloomingtondale Asylum, the language of others has been used wherever it could be introduced consistently with the brevity of the article. The quotations are chiefly from two works; one of them an essay on the Statistics of the institution in question, written by James Macdonald, M. D., and published in the first volume of the "New York Journal of Medicine and Surgery," and the other a small book entitled "Charter of the New York Hospital, and the laws relating thereto, with the Bye-laws and Regulations of the institution, and those of the Bloomingtondale Asylum for the Insane."

ARTICLE II.

MODERN IMPROVEMENTS IN THE CONSTRUCTION, VENTILATION, AND WARMING OF BUILDINGS FOR THE INSANE.

With a Design for "the Butler Hospital for the Insane," at Providence, Rhode Island. By LUTHER V. BELL, Physician and Superintendent of the McLean Asylum for the Insane, Somerville, Mass.

[It is perhaps known to most of those interested in the insane asylums, and insane of this country, that an amount of funds exceeding one hundred and thirty thousand dollars was secured last season, for the purpose of establishing an institution at Providence, R. I. A portion of this \$30,000 was the legacy of a distinguished philanthropist Mr. Brown.—Cyrus Butler Esq. gave \$40,000, in view of which liberal contribution the institution was at once decided to bear his name, and the remaining portion was derived from smaller subscriptions of public bodies and private individuals. After the organization of a Board of Trustees, and under a very liberal and appropriate legislative charter, a tract of land consisting of about 120 acres, two or three miles from the city of Providence was purchased. This was formerly known as the "Grotto Farm," from a beautiful and romantic ravine which crosses it, and surpasses in capabilities of improvement as regards its landscape beauties, any similar position which the writer has seen. It comprises an elevated plain, covered with forest trees and flowering plants, pro-

jecting headlands into the Seekonk river, which is expanded into a wide frith or estuary opposite its whole eastern line. The Trustees, on commencing the usual examinations of other institutions with a view of determining the buildings which were required, were soon impressed with a doubt whether better plans, in some respect, might not exist in Europe, where it was well known great attention had been paid within the last few years to the subject. It was obvious to them, that the institutions with us had been copied, essentially one from the preceding, without important improvements, and it was not known that any individual, practically acquainted with the subject, had ever examined the institutions abroad, with this direct intention. With this feeling, and an honorable solicitude that, in applying the handsome amount of funds in their hands, the means of curing and relieving the insane should be advanced a step if possible, instead of remaining stationary, they resolved that the institutions abroad should be visited, during the winter, as their building operations could not be proceeded with before the spring, and applied to the Trustees of the Massachusetts General Hospital for permission to send Dr. Bell, the Physician of the McLean asylum, who was understood to have some architectural and mechanical taste, on this mission. Consent was most freely accorded and the voyage was immediately undertaken. Dr. B. sailed early in Jan. last for London; after examining the various public and private metropolitan asylums, and the larger public ones to the south, he passed over to the continent—remained a fortnight at Paris and its vicinity, and thence through Belgium, intending to visit the institutions on the Rhine. Receiving however such information as led him to the opinion that his short stay, would not be most profitably expended in that direction, he returned to England and visited a very considerable proportion of the most recent and best asylums in Great Britain. Amongst those, to which, as the most perfect and best designed, he gave the most particular attention, were the Surrey, Northampton, Leicester, Nottingham, Lincoln, Wakefield, the two at York, Glasgow, Edinburgh and Belfast. Many of the earlier, and unimproved asylums were visited during the first part of his absence, but so little was found to remunerate him for the loss of time, that he devoted more of his attention afterwards to the details of such recently constructed edifices as were acknowledged to contain the most recent improvements.

The results of his observation were communicated in a Report to the Trustees of the Butler Hospital, from which the following abstract has been drawn, omitting most of the matters of minute details. It is designed to offer only such points as may be of service as general principles; the application of which must of course depend on the circumstances, extent, means, &c. of the institution which is to be constructed. The plan proposed is now in the hands of a competent architect for estimates and other practical points, and has not yet been actually determined upon. The intention is to proceed at once to carry forward the buildings.

It will be a gratification to those interested in the insane personally, as well as the science, to know that the Trustees have appointed Dr. Ray, for some years the head of the Maine Insane Hospital, and author of the work, (as well known

and appreciated in Great Britain as at home,) on the "Medical Jurisprudence of Insanity," to the duties of Physician and Superintendant. Dr. R. has resigned his charge in Maine, and has seized the vacation occurring before the new institution can be completed to make a short visit to Europe, with a view to professional improvement.

Dr. Bell is full in his expressions of gratification at the truly fraternal manner in which he was every where received by the heads of the British institutions. It was the same in degree and warmth as that which, thus far, the heads of our asylums have shown towards each other. No formal introduction was any where needed; a mere statement of his pursuits and objects placed him at once on a footing of an old and intimate associate, and every kindness and facility was extended to him. His gratitude is due to so many, that space will not here permit his indulging in its expression.]

To the Trustees of the Butler Hospital for the Insane :

GENTLEMEN—A detailed account of the various institutions in Europe, visited by me in your behalf, with the hope of adding the most recent improvements to the construction of the "Butler Hospital for the Insane," might be of adequate interest to those, who, like yourselves, have a direct and immediate concern in this class of charities. I feel however that I can better present the practical results of my observations by generalizing the facts acquired, with perhaps an occasional reference to particular institutions, to illustrate specific points.

Most of my available information has been drawn from the English and Scotch hospitals. Those on the continent, as far as I saw or could learn from reliable sources, however recent, costly, or well designed as regards their own citizens, had few points of a general kind, capable of being transferred to communities differing so entirely in social habits and ideas of comfort and convenience as ours.

The British institutions as respects architectural construction may fairly be divided into two classes, as built within the last ten or a dozen years, or previous to that date. The older ones have often, indeed generally, felt the influence of that intense interest and impetus, which has existed in England for the few last years as regards provision for the insane, and

have been modified and improved as far as the original faults of construction would permit. Many have been recently abandoned for the insane, by being disposed of for almshouses and other purposes, and if there should be no abatement of the present discriminating and effective zeal, it is probable many others will meet the same fate.

The older class of institutions usually had their location within the limits of a populous town or city, and were surrounded by a high fence, which did not prevent the grounds from being overlooked by houses. The land consisted at most of a few acres; the airing courts were necessarily small and dark, and little free exercise in a pure atmosphere attainable to the great body of inmates. The buildings from the same paucity of land were thrown into four stories, considering the high basement as one, and of these the common mode of internal division was not unlike that in most common use with us. A central house contains the departments for the officers, business offices, more or less of the kitchen and laundry and other domestic conveniences, and the like. A wing proceeds from each end of the house, often overlapping, so as to admit light and air to the long corridor which extends between two ranges of rooms on either side to the distant extremity, where another window is placed. This corridor rarely exceeds 10 or 12 feet in width, and when the wing is so long as to be incapable of being lighted from the ends, this defect is remedied in part by omitting one or more rooms towards the centre. The window towards the house at the end of the long corridor is usually of little service; and to prevent communication from the opposite wing, occupied by the other sex, it is necessary that it should be kept shut and made opaque. The day-rooms are usually two of the common sleeping apartments made into one, by omitting a partition; another room is divided into halves for the bathing room, and the water closet. Not unfrequently the corridor is the only day-room or place for the usual residence of the patients by day. The attendant's room is any one of the common sleeping rooms, which may be selected, having no

advantages as respects inspection by day or night. The corridor has never less than eight, and from this up to five and twenty, rooms on each side, and of course its length is very great as compared with its width. The usual sleeping rooms contain not over 75 superficial feet of floor, and the height varies from 8 to 10 feet.

The general aspect of buildings so constructed, it need not be said to any one who has ever visited them, is exceedingly dark, gloomy, monotonous and barrack-like.

The heating is effected by some variety of furnace in the cellar, which receives its air from outside, and delivers it, when warmed, into the galleries by flues in the brick wall. The ventilation is made by flues opening from the rooms into the attic, from which it escapes by some form of cap or cowl, and whatever change of air occurs, is the result of the difference of gravity between the external and the internal air.

The exterior of most of these edifices has a plain factory like elevation, the cupola and portico alone having any attempts at ornament, or giving them a public character.

In contrasting these with a later era of insane hospitals in Great Britain, and the same thing is true under a different form of change on the continent, the first great difference which strikes the eye, is the much greater spaciousness of the recent edifices, and the higher degree of external and interior finish and completeness.

This illustrates strongly the prevalence of a principle, which I found every where recognized, and declared as the practical fruit of much of the experience of the institutions, which were brought into existence during the interest following the Parliamentary enquiry thirty years since.

This principle is, *that there is no such thing as a just and proper curative or ameliorating treatment of the insane in cheaply constructed and cheaply managed institutions ; that the measure of expense of common paupers never should be regarded in providing for the insane ; that a better class of almshouses may be carried on for receiving lunatics, and*

dignified with the name of asylums or hospitals, with some degree of apparent success, but to do the greatest amount of good to the insane the mind of the tax-paying community must be trained to understand and admit the necessity of expensive arrangements, and that if it is worth while to have any institutions beyond these receptacles in which the most patients, or rather the most sufferers, can be crowded together at the least charge, it is worth while to establish such as will accomplish all of cure or relief which is practicable.

It is true that there are many places, public and private, in England, where the only question asked before a patient is sent, is, is the weekly rate lower than any where else? At two private establishments in London, Bethnal Green, and Hoxton, a thousand patients are crowded together into what appears a collection of buildings in the rear or backyard of a crowded street, without classification, ventilation, employment, or other means of comfort, to say nothing of cure. The general tone of feeling and action in England, was such as to render it certain that the days of *cheap* provision for the insane had passed away, after an experience of thirty years since hospitals were generally established.

This greater degree of spaciousness prevails throughout; in the quantity of land expanded to fifty or a hundred acres, instead of a town lot; in the area of ground plan of the buildings, rarely being run up to three stories, as far as the common apartments of the inmates are concerned; in the galleries, which in no recent instance have rooms on more than one side, and are from 12 to 15 feet wide, and as many high, presenting thus a light, airy, and cheerful aspect, giving a window to many groups of patients; the attendants' rooms, large and commodious, enabling this essential and all-important class of assistants to enjoy their limited intervals of sleep and relaxation in comfortable quarters, which at the same time are so arranged as to allow something to be known of the patients, even when the attendant is in his own room, the stair cases, so numerous as to allow the classification to be unbroken; the bathing-rooms, not in the galleries as was

the former very uncomfortable practice, but near them, and of very ample dimensions.

It is obvious that to have things on this enlarged scale of spaciousness must require much more extent of building, for the same number of patients, than in the old mode of cutting an edifice into as small cells, or bed-rooms, as were endurable. This is in part obviated by having a large share of the patients lodge in very spacious "associated dormitories" where a number, often as great as 20 to 30, are accommodated in beds ranged side by side, with an attendant's bed or room, so arranged, as to permit a constant inspection; the water closets, &c., being so placed, as to prevent any annoyance to each other.

It will be manifest that an immense economy of space and first cost will be saved by this system, unless there are objections to it which should prevent its adoption. A reference to the Report of the Metropolitan Commissioners on Lunacy, (a work of wonderful sagacity and practical wisdom, on all points touching the practical treatment of the insane,) and the various Asylum Reports, which I communicate to you, will show that this system has been most generally adopted and approved of in Great Britain, as a mode of accommodating a large proportion of patients, advantageous on many accounts, of vastly higher importance than mere economy. I beg leave to call your attention to the abundant testimony on this point, contained in the documents referred to.

In examining this really most important point in construction, with the heads of all the institutions I visited, I was surprised to find an almost entire concurrence of opinion, that in the best plan for an institution, whether for rich or poor, old or recent, males or females, it was expedient to have a large part accommodated in associated dormitories. Most of these gentlemen were familiar with both systems, as the idea formerly was in England, as it has been with us, that an institution should have a room for each inmate.

With respect to the exact proportion between the numbers

to be placed in associated, or in single dormitories there was some diversity of judgment. While some would have no single rooms, except for such as we term *lodge* patients, others would prefer to have one-half, or one-third of the beds in single rooms. In a single instance only, was a larger proportion of single rooms recommended. At the new and splendid Morningside Asylum, near Edinburgh, it will be seen by the plan that there are but six single rooms for 350 pauper patients. At Leicester and the York Asylums, I found common dormitories just made by removing partitions of small rooms; at Lincoln the upper galleries had been discontinued as such, and were used as common dormitories.

The difficulties which will perhaps at once suggest themselves, that patients in this proximity to each other would prevent sleep or otherwise annoy each other, were not found to exist in practice, the care taken in selecting subjects, and in means for a pure air and thorough inspection, appeared to overcome any trouble from such sources. I was further informed that it was deemed a great privation to sleep in a solitary room by those who had been inmates of the associated dormitory; that suicidal cases were much more easily and safely managed; that the presence of others had a happy effect in curbing and controlling those propensities to maniacal habits, tearing clothes, breaking glass, filthiness, and especially masturbation, which it is well known patients often govern during the day, when others are about them, but give an unrestrained vent to during the solitary hours of the night. It was also represented as peculiarly favorable to the timid and apprehensive, who were quiet and contented when in society, but sleepless and wretched when left alone in darkness and solitude.

The greater facility of a perfect ventilation in those large dormitories, as compared with small cells, was obvious, and under the modern or exhaustive system of ventilation, hereafter to be described, I believe it practicable to maintain a pure atmosphere with any number of sleepers.

I am able to see nothing in the social habits or customs of

the English, which would render any conclusions drawn from their experience inapplicable with us.

The entire experience of these institutions, corroborated by a trial of a year's duration at the McLean Asylum, commenced from necessity not choice, have convinced me that it is the true system, when carried to a proper extent, and that one-half of the patients may be as well or better provided for in associated dormitories, well arranged as to light, inspection and ventilation, as in any other way.

* * * * *

The next great improvement in the recent institutions is in the heating and ventilation. The original mode of heating was by common fire-grates, protected by a frame and net work, and locked. In fact, this mode is still collaterally used in day rooms, patients' rooms paying high prices, &c. in many of the English Asylums, not as I was informed, from any inadequacy in the other heating means, but from the idea that it is essential to an Englishman's comfort, that he should be able to see the fire.

The hot-air furnace was next universally introduced, under some of its thousand modifications, none of which met certain great and obvious objections, which render its employment inexpedient where an atmosphere of a high hygienic quality is as essential, as it is in an insane asylum.

It is a method at the present time universally in use with us, and as universally abandoned in Great Britain, in this class of institutions. I did not meet with it, in my visit, although it had just been superseded at several places by more approved methods.

When the flues for the admission and egress of air are very large, so that the hot air, when thrown into the rooms, is not much above the boiling point, the *cockle* or iron cover, so extensive as to be far removed from contact with the flame, and the apartments to be warmed, are directly above the furnace, its performance is tolerably satisfactory. It is however very difficult to obtain even this moderately satisfactory result; the air is in part *scorched* by contact with

hot iron, a circumstance, whether to be explained or not on chemical theory, attended with a most decidedly prejudicial effect upon the health and feelings of perhaps a majority of those in health; the hot-air, if delivered by flues near the floor is liable to be contaminated by patients spitting into the register, or placing their feet against it, so that the whole air admitted is thus rendered offensive; a more mischievous or demented class will subject the flue to more offensive annoyances or injure themselves by placing their backs or heads against its outlet. If on the other hand, the register opens high enough to avoid these difficulties it will be found that the hot-air will be not well disseminated, that the hottest portion will constitute a stratum next the ceiling, while that at the floor will be sour and carbonic.

It is undoubtedly these and other objections which have occasioned the entire abandonment of the modes of heating by bringing air in contact with heated metal at a high temperature. My own experience with, and observation of, this mode of heating asylums in our climate, leave no doubts on my mind, that it will be a happy day for our institutions, when the last piece of the thousand inventions and improvements for keeping air in contact with hot iron shall be turned into the old junk shop.

Whoever has experienced the pure, bracing, tropical breeze of tepid air flowing in general diffusion over a building warmed by steam or hot water, and changed by a reliable process of ventilation, will be scarcely satisfied with any atmosphere he will find in our institutions, which nevertheless may be called pure, and is so perhaps, as far as the mere olfactories are concerned. Indeed, it has been scarcely my luck to find in any building for any purpose, a hot-air furnace which does not occasionally deliver more or less impalpable dust and ashes, or smoke, as well as the empyreumatic odor of burnt particles.

The value of such an atmosphere as that derived from steam and hot water apparatus, and an exhaustive system of ventilation, was wonderfully demonstrated to me in comparing

the intellectually active and cheerful countenances, the vigorous circulation, the aspect of good condition of inmates of a modern asylum, with the listless, apathetic, irritable indolence of those within the older places of detention. Although long impressed with the general hygienic importance of a pure atmosphere at a proper temperature, upon the general health and prospects of life of the insane, I never before fully realized its connection with their mental and moral condition. In melancholy, despondent subjects, it will be found, I think, that such an atmosphere is almost essential, in the winter, when the open air must be more or less denied to them.

The modes of heating buildings by steam and hot water, although known under many names and complications, patented and unpatented, are comprised under three principles: 1st, Heating by steam under pressure, so that a heat far beyond the boiling point of water (212 degrees) is obtained, approaching even 5 and 600 degrees—the apparatus containing the water, thus sustaining a pressure of 11 to 1200 lbs. to the square inch. The intense heat of the water is shown by the fact, that if a space on the tube is filed bright, it assumes the straw and then the blue tinge, indicating that degree of heat. This is the invention of Mr. Perkins, and I investigated its working at the asylums at Northampton and at Belfast, in Ireland, and was satisfied that it was not a safe and advisable mode of heating an asylum for the insane. In view of the well known loss of tenacity of iron, long maintained at a high temperature and the immense pressure upon the tube, it cannot be deemed permanently safe; it violates the essential principle in healthy warming, that is, that large quantities of air should be introduced in a moderately warm state, instead of small quantities intensely heated. In fact the peculiar changes wrought upon the air by high heat are identical, whether the metal be raised to the heat by contact with burning fuel or water raised to the same degree.

The apparatus is quite expensive, as every part must be made very perfectly and strongly to sustain the test to which it is subjected. It consists simply of a tube of wrought iron

an inch in diameter, with an internal calibre of about half an inch; this is coiled up so as to form an ordinary coal grate in which the fuel is placed. The tube is continued from the ends of this grate until a circuit is formed, running into every part to be warmed, along the side of the walls, or in a groove in the floor, as most convenient. At the most elevated portion is an expanded portion containing about $\frac{1}{12}$ of the whole water, and hermetically sealed. The water pure by distillation at first, never requires to be changed. It circulates with a rapidity determined by its change of specific gravity from heat and its friction on the sides and curves of the tube. In practice the temperature at different points is found to vary so much as to defy all calculation. The heat is radiated into the apartment, and whatever air is necessary to ventilation, is admitted from the outside in a cold state, in which state it is well known a ready admixture with the warm air is not effected.

I conceive that an essential improvement in this apparatus would be made, by carrying the tubes in a large flue below the rooms, into which the external air should be admitted, and the hot air drawn from this flue by the usual flues in the walls. A proper commingling of heated and cold air, would be thus effected, and the hazards of explosion and of patients burning themselves prevented. I saw, however, little or nothing in this apparatus which would lead me to recommend its use in hospitals for the insane.

2d. The mild hot-water apparatus, or where the temperature does not exceed 212 degrees, has had a great variety of forms. It may be so arranged as to radiate its heat directly into the apartment, by continuous tubes, or coils and ranges, in the form of sideboards, or filling any vacant recesses, as fancy may dictate, or the tubes may be arranged in a hot-air chamber in the cellar to which the external air is admitted and drawn off whenever required. It is hardly necessary to say that for an insane asylum where the cold air should be mixed with the heated, before it is admitted, this last is the best method and the mode of doing this in large horizontal

flues in the cellar the most convenient, as the air may thus be carried to any distance horizontally—a very necessary circumstance in an asylum, unattainable equally in any other mode, as far I have seen.

The tubes are, in some new methods of warming a range of rooms gradually augmented in size as they go more distant from the boiler. The increased quantity of water and radiating surface are thus made to compensate for the heat which has been parted with, and an equal portion reaches the nearest and most distant rooms.

Plates, wrought iron, cast iron, and copper tubes of various dimensions are employed to retain the heated water and to constitute a radiating surface. I believe that tubes of cast iron from 3 to 7 inches in diameter, as at once cheap, presenting a good surface, easily connected and durable, are the best modes of using hot water for heating, and that they are best distributed in large plank or brick flues in the cellar, which may admit the external air in large openings or in smaller holes, if the *diffused* method is judged more eligible.

The practical objection to heating by this form of apparatus, as compared with steam, is the slow manner in which the heating up must be effected, almost necessarily involving the necessity of a fire being maintained during the night.

3d. The modes of distributing steam to obtain its heating power, are essentially those of hot water. As its temperature is higher than hot water can be maintained in any apparatus, less radiating surface is requisite. The extent of tubular surface could not probably be determined by any previous calculations as it would be materially influenced by the quantity of air that would be drawn from any particular gallery to keep a perfectly pure atmosphere. If the generating boiler was of due size, the repeated additions of separate ranges of iron pipe within the air flue would enable the maximum supply to be experimentally reached, and as these ranges would be connected only by receiving at one extremity the branches of a common steam pipe, the admission of

steam into more or less of them could be regulated in accordance with the temperature, and the ventilation required.

My own convictions are altogether in favor of steam managed in this manner, as a means of warming an insane asylum. Generated and applied solely to this end, it might not be so economical as the hot air furnace, but as forming one of the uses of a boiler designed also to furnish steam, for lifting water, cooking, washing, drying clothes, as I shall explain hereafter, I am inclined to believe it would be found not objectionable even in point of economy. Regarding the much higher hygienic quality of the air thus produced, I confess I regard some such mode as indispensable.

I have referred to the mode of ventilation common, indeed the only one used as far as I know in our institutions. Flues of a size inadequately small, being usually some 8 by 4 inches, carried up in a 12 inch brick wall, proceed from the bottom or top, or both of the apartments to the attic, where they open and foul air finds its escape by some form of cap or cowl. In a few instances and certainly with the utmost advantage another flue descends from near the floor to the cellar, to admit air to replace that which diminished gravity from its expansion has induced to escape. Generally, however, the only air which can supply the place of that which escapes (and none can escape unless its place is thus filled,) must enter at cracks and accidental openings.

When a large body of heated air is admitted and the wind is favorable, there are periods when these flues *draw* with sufficient activity, but generally their performance is very uncertain and inadequate, especially at those seasons when their use is most essential, as in the weather of our late spring and early fall, when a fire is not needed, nor is the openings of windows admissible. The internal heat of the building as compared with the external, the state of the currents of air and various other circumstances, in fact all the curious causes, apparent and latent, which affect the draft of smoke flues, produce an endless variety of cross currents, counter drafts, regurgitations from the attic, which defy all

remedy. Any valvular arrangements to meet these difficulties virtually effect a stoppage of the flues in calm weather when no great amount of heated air is admitted. In the same manner, any upward or extractive force expected from cowls or caps turning to leeward will be dependent entirely on the force of the wind. When this is trifling, the obstruction from any apparatus of this kind, producing at least one right angle and more or less friction in the ascending current will actually obstruct the object.

Again, in a day room or single sleeping room, the little elevation of temperature resulting from animal heat, will not induce an upward ascent in a cold and rough flue, which instantly reduces the ascending air to a lower level than the room from which it ascended. Indeed any one who has attended carefully to the operation of these flues will readily admit that they draw any way and no way, beyond the reach of explanation. I believe that no institution can be found dependant on the natural ascent of air for ventilation, in which a pure atmosphere can be relied upon, or even generally experienced.

There is also this important objection to a natural ventilation in our hot, but uncertain, summer nights, that no sufficient change of atmosphere can be effected except through an open window. Enough air will not be carried upward through the flues to meet the want. The animal heat will not raise hot air enough to induce its ascent in contact with cool bricks.

To counteract these palpable and undeniable difficulties, (more urgent in our climate of sudden changes and wide extremes, than in almost any other,) a system of forcible extraction of the foul air of inhabited rooms has become universal, and it is deemed indispensable in the public institutions of Great Britain, from the Houses of Parliament, in arranging which the distinguished Dr. Reid has been engaged for years, down to prisons and houses of correction. This extraction is in all cases maintained by some more or less direct connection of the flues leading from the inhabited apartment with an ascending current of heated air artificially produced.

The modes of carrying this into effect must depend upon the circumstances of the building to be ventilated, a chimney with a powerful draft is essential. The flues are led into a common flue of large size; the current in this sometimes passes down to the ground where it turns its columns of foul air under a grate in a tall smoke flue. Or it may be turned directly into the ash-pit of the same fire which heats the building, or enter a smoke flue and receive its suction or extractive force from that source. A flue from the attic, having a fire at its lower end, occasionally is used to produce the upward current where the original foul air flues ran upward into the attic.

I cannot explain better my views as to the most effectual mode of ventilating an asylum for the insane, than by describing the system I saw at the Kent Lunatic Asylum at Maidstone. It has been in operation since the original buildings were constructed in 1833 and Mr. Poynder, the most intelligent medical head of the establishment who has had much practical experience, having formerly held the same station at the Gloucester Asylum, assured me that it had always been satisfactory in its working, and that it was equal to any mode he was acquainted with. I would premise that I do not think, that the mode of generating the hot air by hot water is sufficiently active for our climate. I believe steam the more eligible mode.

The external air is admitted to the hot air chamber in the cellar, through a flue under ground 4 or 5 feet high; this terminates at a distance of a hundred feet in rear of the building, in a tower of moderate elevation crowned with a revolving cowl or cap 5 feet in diameter, having its open side kept to the wind by means of a large vane. The air thus received passes amongst a series of triangular iron pipes connected at the ends, so as to permit the hot water from a neighboring boiler, to circulate through them, and disposed in layers at right angles to each other, from which disposition it was supposed that little air would pass upwards without impin-

ging against a heated surface. The heated air escaped in a large sized flue, at least three feet square, opening separately in each gallery by a still larger aperture at the ceiling, where it was protected by a coarse wire netting. A pretty large sized opening was over every room door and from near the floor in each room, and at various places in the larger rooms and dormitories, flues about two feet in length and six inches wide, protected by a cast iron net work, were carried down in the partition, the angular corners of the room being cut off where necessary, to give space to so large a flue, into a large brick flue in the bottom of the cellar which delivered the foul air under the fire grate, where it supplied the fire. A strong active current was thus produced which had the effect of drawing the warm air into the apartments in addition to its natural ascensive power, distributes it over the whole house and towards the lower parts of the rooms, and extracts the foul air with so much activity, that even if foetid substances were placed in, or at the opening of the flue, no odor would be delivered into the rooms.

Under this exhaustive system, a water closet has a draft directly down, through its seat. Dampers are inserted in the main flues to regulate the admission and exit of air, and the calibres of different smaller flues are filled up experimentally until an equal, or desired draft is left to each.

I found this system to be, under all its modifications, simple, reliable, and effective, and such as must eventually be introduced in all constructions on land or water, designed to accommodate many persons in a small space.

In digesting a plan for the "Butler Hospital" from my somewhat copious supply of materials, (having been so fortunate as to obtain copies of the unpublished plans of a number of the best and most recent institutions,) I have been compelled to adopt the conclusion that for our country and climate, a right line, with projections at right angles and at the centre, is the most convenient form. My opinion formerly was much in favor of separate buildings for the different sexes, and for the officers and offices of the household. There

are certainly advantages in such a separation, but overruled by reasons of convenience and economy ; particularly where it is designed to introduce the modern system of heating and ventilation. A most serious objection to the common quadrangular form, that patients from different sides are placed opposite and in view of each other, is obviated by the plan of having the kitchen and its appendages and the chapel over it, project between the two wings.

Both of the plans I offer, are based on this outline, and are intended to have two stories only, except at the centre house, and at the enlarged extremities, which are carried up another story to constitute large and airy "associated dormitories." In each, the accommodations for the worst class of patients are in the rear of the return wings, separated by doors and a gallery, from the others, but not detached from them.—The expediency of having this class of inmates thus provided for, or placed in buildings entirely detached, has been a point much discussed by practical men. The better opinion appears to me to be, that *in a small institution*, the occasional disturbance to others from this class properly separated in the building is a less evil than their removal from the immediate observation of the head of an institution, as they beyond any other class require the most direct surveillance.

In both these plans, I have calculated for about one hundred and thirty patients, equally of both sexes ; about one sixth are intended to be provided with apartments larger and more elegant than are required for those who do not pay a remunerating price.

When the institution is filled, about one half would be lodged in the "associated dormitories," which with the galleries are to be inspected from the attendants' rooms. There are to be six classes of each sex ; a first and second class of high paying patients, divided according to the manifestations of disease ; two galleries of common quiet cases, with associated dormitories attached for a part ; a gallery for troublesome and demented, the latter having an associated dormitory, and one for the vociferous and furious. An en-

tire separation in going out and coming in and at all times, is provided for these respective divisions by separate stair cases. No. I of these designs will be found to be compounded essentially of the plans of the Northampton and Maidstone Asylums.

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No. II is the ground floor of an edifice, the elevation of which is intended to be in the Elizabethian or Tudor Gothic style of architecture. The general idea of the exterior is taken from one of the buildings of the Royal Glasgow Lunatic Asylum, a tracing from the architect's plan of which will be found amongst the papers in your possession. It is a very favorite taste in England during the last few years, and there are many reasons for its peculiar adaptation to hospitals for the insane and analogous purposes. It is not a classical order, and has no proportions or decorations which can not be made to meet the purposes and funds of the institution. Its general character and contour can be produced with comparatively little expensive work. It admits of a union of stone and brick work with neither anachronism nor incompatibility. At the Surrey Asylum, the buildings are of brick with Portland stone facings, at Liverpool, Belfast and other places red sandstone was used for this purpose. The extent of stone necessary to produce a proper effect in this style is not great; the bands between the stories, the recessed door, the labels above the windows and perhaps a shield or two appear to be all. The ornamental chimnies, the bevelled sides to the windows, the embattled parapet, except the coping course to the latter, are all formed of brick moulded to that end.

Among the reasons which have induced me to think this style would be admirably suited to your construction, are the following. Its absolute or intrinsic beauty; its adaptedness to the beautiful site you have secured, as it would harmonize so happily with the forest, headland and water view of your location, while no other buildings would be in sight to break the unity of the scene; the two other public build-

ings between it and the city, the Dexter Asylum and Friends' College being constructed with a centre and wings in a plain style, it is peculiarly undesirable to add to the monotony by a third building in the same taste.

But its peculiar advantages are its fitness as regards internal structure and convenience. The windows will admit of being made of such sizes and at such intervals as internal arrangements may require. The sizes of the lights, whether rectangular or not, can be of the small size essential, without the prison-like aspect which small panes in large sashes usually produce. The roof, ordinarily so prominent a deformity, is concealed by the parapet. Neither dome, portico or cupola will be required to give a public character to the edifice. Its aspect will be that of a villa of ancient date. This style admits of projections for stairs or other purposes which convenience may require which add to its character, instead of detracting from it as in ordinary modes.

The parapet walls around the centre house and the enlarged ends, will permit different sections to be guarded from probability of destruction by fire, better than any other mode.

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By a reference to the ground plan, it will be perceived that the chimney of the kitchen, laundry and other offices is situated towards the centre of the whole establishment. It is intended that this should be the point from which all the heating and ventilating operations should be carried on. Directly beneath the drying closet and kitchen, in the cellar, are the oven for baking and the steam boiler, having their flues entering the central massive chimney. The steam is conveyed by pipes to a small engine to pump water, to cook, to heat water for washing and by a pipe in a covered drain to the return and rear wings, where it is to be transmitted into cast iron pipes, running within a long flue in which the external air is admitted, heated, and discharged into the rooms. The foul air descends by flues in the walls from all parts, passes through the covered drain and under the boiler

furnace into the chimney. The same arrangement through the cellar, instead of a covered drain, is applied to the house and wings.

The drying-closet is directly over the steam boiler receiving its waste heat ; this has a communication with the central chimney to occasion a very rapid circulation of air through it.

In the plan, *a*, is the ordinary business and receiving room ;
b, the medical office,
aa, the visitors' and committee room,
bb, the steward's office,

c, room for allowing interviews of friends with patients,

d, common parlor of highest paying patients ;

ggggg, rooms for this class, designed to be used in pairs as a sitting and sleeping room, or as sleeping rooms, as circumstances may require.

h, a large dormitory for the timid, feeble, suicidal or other fitting subjects of this class.

i, attendant's room, for the two or three attendants on this floor. It has a glazed door to permit an inspection of each gallery and the dormitory.

k, dining room for patients of return wing ; *j*, dumb waiter ; next to this is a flight of stairs communicating with the large associated dormitory, which is in the third story over the whole end of the wings.

l, clothes room. The other rooms on this gallery, as well as the gallery rooms, stairs, bathing room, water closet &c. of the cross wing explain themselves without references.

The central projection contains *n*, dining room for domestics ; *o*, pantry ; *m* kitchen ; *s*, scullery ; *t*, drying closet ; *p*, ironing room ; *r*, laundry ; *u*, chimney. This is only one story high behind the chimney. Over the kitchen pantry and dining room the chapel is placed, having an entrance from the central house, and also from the vestibule below to admit patients without passing into other galleries or the house.

In the second story of the centre house are the apartments for the superintendent and steward, wholly distinct

from the business parts; above these their sleeping apartments at the one end and those for the domestics entirely separated, and approached by a separate staircase at the other.

The details for carrying out various parts of this plan will be communicated, as far as they may be within my knowledge, as they may be required in process of construction.

I am, gentlemen, very respectfully yours,

LUTHER V. BELL.

ARTICLE III.

EULOGY ON J. E. D. ESQUIROL, READ BEFORE THE ROYAL ACADEMY OF MEDICINE, PARIS DEC. 17, 1844, BY M. PARISET, PERPETUAL SECRETARY OF THE ACADEMY.

Translated from the French, for the Journal of Insanity, by HENRY J. TURNER, Professor of Languages, Utica, N. Y.

It is of a master, it is of a friend, it is of my dear Esquirol, that I have to day the painful honor to entertain you; and if, from the beginning of this discourse, I express my tender veneration for his memory, it is that a secret voice answers that I find an echo in your hearts, and that my words are only the expression of your sentiments. Who in fact, has known Esquirol without loving him? Who among you has not admired the delicacy and the solidity of his mind; the elevation and the loyalty of his character; the paternal care he took of his pupils; the art which he manifested in developing their talents; the pity which animated him for suffering humanity? And if you have been initiated in the secrets of his beneficence, tell us if in acts of such touching virtue, he displayed a shadow of ostentation, or if he prescribed to himself any limits? His generosity prompted him to give without