

*A Public Asylum, Designed for 414 Beds, capable of Extension to 600.* By RICHARD GREENE, Medical Superintendent of the County Asylum, Berry Wood, Northampton.

*Preliminary.*—The greater part of the letterpress and accompanying plans were sent into the competition lately requested by the Borough Magistrates of Hull, and were awarded the third premium. The elevations and architectural details were designed with much care and success by Mr. B. S. Jacobs, of Hull; the sanitary and sewage works were prepared by Mr. George Bohn, C.E.; while the writer is responsible for the ground and first floor plans, and for the internal arrangements generally.

The architect's estimate of the cost, after taking out the quantities, was £46,000. The contractor's tender was £46,500. This sum included all engineering work, the chapel, Superintendent's house, airing court walls, two entrance lodges, sewage tanks and channels. The internal walls were to have been plastered throughout; the floors were of pitch pine, and a pine dado five feet high surrounded the principal rooms.

The accommodation was for 414 patients, and included first-class provision for private cases. The cost would have been a trifle over £112 per bed. The Italian style of architecture was adopted.

In publishing these designs in the "Journal of Mental Science," I do not wish it to be inferred that I consider the asylum ought to be accepted in all its parts as a model institution, but I am satisfied it possesses everything essential for carrying out the most advanced and successful treatment of the insane, and that there is as much decoration and embellishment as is consistent with the expenditure of public money. It should be stated, too, that the asylum was intended to meet the requirements of the class of patients found in Hull; and that the number of beds allotted to the different classes might not be in suitable proportion for another district.

Again, the instructions to architects issued by the Hull Magistrates made it imperative that the block principle of construction be adhered to. This system, although so much in vogue at the present day for infirmaries and hospitals, has not as yet met with the universal approval of Medical Superintendents of asylums; indeed, it is more than pro-

bable that the balance of opinion is against it. Certain it is that a block asylum is more expensive to build, more difficult to supervise, less imposing in appearance, and less cheerful for those confined in it than one constructed on the old plan. While, therefore, the instructions to architects were carefully attended to in the preparation of these designs, an attempt was made, with what amount of success the reader must judge, to reconcile the old and new systems, and to see whether it was not possible to join what had hitherto been regarded as too unlike to permit of union.

It is not allowed to many men in these days to produce anything purely original, and in arranging the component parts of this asylum ideas were often borrowed from other buildings, though in all cases the parts copied were subjected to great modifications. The double quadrangle was taken in great part from Berry Wood, and the position of No. 2 Blocks in relation to the main building from Haywards Heath; but the rest of the chief features and most of the minor details may fairly be claimed as our own.

*Description of the Asylum.*—The asylum is designed on the block system, each block being independent of the others, but connected with them by fireproof passages.

The whole of the elevations are of red stock bricks, as are also the cornices and mouldings. The window sills are of Idle or Bolton Wood stone. The fireproof corridors are carried out according to Homan and Roger's Patent, and the fact that many English asylums have within the last few years been wholly or partially destroyed by fire, renders it essential that every means should be taken to prevent or limit the destructive effects of such accidents.

The windows may be either the ordinary double hung sash window, or a modification of the French casement, with an oblong swivel fanlight, both of these being in harmony with the architectural design; but the latter are for many reasons preferable.

Projecting from the fireproof passages, but incorporated with them, and also fireproof, are the staircases, the brickwork of which, running above the height of the adjoining blocks, contains the tanks for the supply of water to the wards, and for feeding the internal hydrants. In the event of fire, therefore, not only would the patients be able to leave the block without risk, but those having charge of the fire hose would be protected from danger, and would have at im-

mediate command an unlimited supply of water. An additional advantage of placing the water tanks in this position is that day-rooms and dormitories are neither under nor near them; and should the tanks or pipes need repair, the asylum artizans can gain access to them without passing through any part of the asylum occupied by the patients. Water tanks are a source of much trouble when placed in the roof of an asylum, and in case of fire, would, if so situated, be quickly rendered useless. The hot water system for the supply of baths and sculleries is also placed over the staircases, and by warming the air will materially assist in making the ventilating shafts act. The heating apparatus for each block is in the basement of the staircase towers. A coal lift is provided in the well of each main staircase.

As the asylum must have staircases and high level water tanks, the towers surmounting them are obtained at a comparatively trifling extra cost, and they will have the effect of vastly improving the appearance of the pile of buildings. Moreover, the advantage of having the staircases and water supply separated from the blocks, and secure against all contingencies, is so manifest that it fully justifies a slight extra expenditure.

The ground floor of the centre block to the south contains dining halls for both sexes, in conformity with the instructions. Each hall will accommodate 180 patients; and should it at any time be considered advisable to dine both sexes in one room, the removal of the central partition would effect this without in any way endangering the safety of the recreation hall above, or interfering with the design of the block. At the end of each dining hall is a dais, three feet above the level of the floor. This allows of the most perfect supervision at meal times, and affords a convenient place from which Morning Prayer or Grace may be said.

The carving rooms and dining hall sculleries are between the dining halls and kitchen, so that no time will be lost in serving the food; and to avoid confusion these rooms are of ample size.

The quarters of the assistant medical officer are to the east of the hall; and those of the head nurse are placed in a corresponding position at the west side. Consequently these offices occupy a very convenient position in relation to the infirmaries and dining halls, where their services are most frequently required, and that on the shortest notice.

As already stated, the kitchen adjoins the carving rooms;

and the dairy, larder, vegetable room, bread room, kitchen sculleries, servants' hall, attendants' and nurses' mess rooms, and all other usual offices are grouped around it.

The recreation hall occupies the second story of the centre block. This plan entails but little expense in construction, and it has been found to answer well in several asylums—the Woodilee Asylum, near Glasgow, amongst others. The size of the recreation hall is 70 feet by 45 feet. The entrances to the room are wide, and permit of easy ingress and egress. The doors open outwards, and in addition to the main entrances there is a smaller staircase leading from the dining halls, which could also be used in case of emergency. There is a fixed stage for theatricals, with dressing-rooms on each side. No mention is made of a recreation hall in the instructions to architects, but experience in other asylums shows that one is essential to the satisfactory working of a first-rate asylum. Should, however, the Visiting Justices consider it unnecessary to provide a recreation hall, the first floor may be omitted without any detriment to the general elevation or plan. The use of one hall for the purpose both of dining and recreation has, however, been found to be extremely inconvenient, indeed almost impossible in practice.

No. 1 block on the female side faces due south, and is connected with the centre or dining-hall block by one of the fireproof passages. On the ground floor there is ample space for 40 patients. This ward is intended for sick and infirm, and consequently all the patients occupying it sleep on the same floor. The cubic space allowed here is slightly in excess of that found in most asylum infirmaries; but in view of the high proportion of general paralytics, and other feeble cases in the present Borough Asylum, it is believed that the excess of space will prove advantageous. The large and small dormitories have windows on both sides, permitting of easy ventilation, and the latter, being intended for bed-ridden cases, have a southern exposure. The gallery is 12 feet wide, and is well lighted. At each end is a large bay window, affording extra means of ventilation. The day room projects to the south, and is easily separated from the gallery by a partition having folding glass doors; and thus, if thought advisable, the gallery, being empty (as the infirmary patients would be in their day-room), would serve as a corridor for those few patients in No. 2 block, who might be considered fit to use the general dining hall. Those objectionable corridors under the sills, which are found in most asylums, are thus avoided.

A verandah, into which the airing court doors open, runs along nearly the whole length of the ward; and the airing court is greatly protected from the east and west winds by the dining-hall block on one side, and No. 2 block on the other.

The water-closets are placed at the end of the gallery, and project from the main block. A ventilating passage separates them from the ward, and a ventilating pipe is carried up from each trap above the eaves. This plan is adopted in all the w.c.'s throughout the Asylum. It may be confidently asserted that no bad smell can ever find its way into the wards. The bath room and lavatory project in like manner from the other end of the gallery.

On the first floor are the convalescent cases and the private patients. The small rooms used as four-bedded dormitories on the ground-floor become day rooms on the first floor, and the entire day room space is sufficient for 60 patients. This ward is so arranged that it may either be treated as one large day room or as several small ones, allowing classification of the patients. Thirty-four of these cases also sleep on this floor, the remainder occupying the second floor. This is the only block provided with a third story, and here it is limited to the space over the gallery; the projecting day room and the large dormitory not being carried up. The necessity for extra blocks is thus avoided. It will be seen that all the patients occupying this block by day sleep in it by night, and the same arrangement is carried out in all the other blocks, so that each block may be looked on as a distinct asylum.

It may here be stated that the fire-proof passages are two stories high, and permit of direct communication between the upper floors of the several blocks. Thus is obviated one fatal objection to the block principle as hitherto carried out, and supervision is made as easy as in the old system of asylum construction. The inconvenience of having always to descend from the upper floor of one block, and ascend the staircase of another block to reach its first floor, is so great that it can hardly be exaggerated, and militates greatly against proper supervision.

In the fire-proof passage at the end of the block is the main staircase, and over it is placed one of the main cold water tanks, containing about 10,000 gallons of water, from which the external hydrants and service tanks are supplied.

No. 2 block stands out at right angles to No. 1. The

ground floor gives day-room space for 35 patients, and has been designed for the acute cases. This ward is in the form of a parallelogram (with bays looking south and east on the females' side, and south and west on the males' side), so that every part of it will be under the eye of the attendant. The bath-rooms and water-closets project from the east and west corners respectively, and, like those in the other blocks, are cut off from the ward by passages having thorough cross ventilation. There are five single rooms on the ground floor, besides the attendant's room, scullery and storeroom. There are two ways of reaching this ward from the centre block. The first, as already stated, through No. 1 gallery, the second by the north corridor without passing through any other ward or gallery. The second way is longer than the first; but it is shorter than the patients in many asylums have to walk to their meals, and it is not nearly so far as it would be supposing the blocks were placed in line. It must, moreover, be borne in mind that most of the patients in this block will dine in their wards.

The first floor of this block is devoted to the epileptics, suicidal cases, and other cases which may require constant watching by night. The doors of the seven single rooms have open panels for the better inspection of suicidal patients,—a strong glass pane is inserted over the door, with a gas jet near it to light up the room; the upper part of the wall is left open, and all other requirements of the Lunacy Commissioners have been attended to, so that no subsequent alterations will be needed. One of the attendant's rooms is so placed that it commands every bed in the dormitory; another attendant's room in like manner commands the single rooms, so that a special night attendant would be almost unnecessary for such cases.

No. 3 block on the female side contains the working patients. There is day room space on the ground floor for 65 patients, and sleeping accommodation for 16. The remainder sleep on the first floor. This ward is conveniently placed for those who work in the laundry and sewing rooms on the female side, and the corresponding block on the male side is close to the shops. The farm patients walk straight out of it on to the farm. A lavatory and shoeroom are provided for the farm patients.

At the end of the fireproof passage at the north-west corner, and facing the north, is the boiler and engine house. It will contain two boilers, a 12-horse engine and sufficient



space for a duplicate engine. There will be storage room for about 100 tons of steam coal. The main flue passes under the drying closets, and it is believed that this will be a material help in heating these closets, and thus save fuel. The chimney stack rises at the end of the bath room of No. 3 block, and, from the style of architecture employed, will prove an ornament to, rather than a disfigurement of, the building. In this block are placed the forge, engineer's shop, room for fire engine, mortuary, and *post mortem* room for females.

As steam machinery is now invariably used in asylum laundries, the washhouses, etc., are placed near the engine-room. The drying ground occupies the greater part of the west quadrangle, and is thus placed entirely out of sight of all the roads, walks, and approaches. An underground tank is provided for the storage of rain water for laundry purposes. The laundries, workshops, and airing courts have separate and distinct w.c.'s.

Next to the laundry block are the needle room, house-keeper's room, and the visiting rooms for friends of female patients.

The first floor contains the housekeeper's bedroom, and accommodation for the domestic servants, and for ten female patients employed at domestic work.

The stores for household coal branch off from the central corridors. Each store will contain about 100 tons of coal.

In the centre of the north façade is the block containing the committee rooms, superintendent's office, clerk's sitting-room and office, chaplain's office, clerk's bedroom, porter's room, etc. A fireproof room is attached to the clerk's office.

In the basement, which is on a level with the ground floor of the main blocks, are the surgery, office for medical assistant, pathological room, and porter's bedroom.

Passing east of the administrative block are the visiting room for male patients, the storekeeper's room, and the general stores. The latter have been so arranged that all stores, of whatever description, pass straight into the store-room, and the disadvantage and danger of opening gates and dragging heavy packages across corridors and passages is entirely avoided. The store-room is also conveniently near the kitchen, and has separate hatches for delivery of stores to the male and female departments. The meat-safe adjoins the central corridor, close to the kitchen.

Advantage has been taken of the rise of the ground to

obtain archways under the north corridors as entrances to the quadrangles for coal waggon, fire engine, &c. By this plan the continuity of the corridors is not broken, and the ground, being terraced to the north, conceals the archways. Close to the archway on the male side is the entrance to the beer-cellar. The various workshops are in positions analogous to the laundries in the female divisions. The shoemakers', tailors', upholsterers', painters', plumbers', and carpenters' workshops are placed in line, and communicate with each other. The partitions dividing these shops are only six feet high, so that the artisans can readily call to one another for aid in case of emergency; and the shops having a thorough current, will not be liable to become close. At the east end of the shops is a small washhouse for the foul linen on the male side. The block containing the bakery, flour-store, and brewhouse correspond to the boiler-house at the west corner of the asylum. All these shops being *en suite*, the storekeeper can easily supervise them without neglecting the stores. The east quadrangle is taken up by an extra airing-court for acute cases, to be hereafter noticed, and by the workshop yards. The mortuary and *post-mortem* room for males exactly correspond to those already described for females.

The head-attendant's room will be found at the north-east corner of the quadrangle, and in the centre of his work.

Nos. 1, 2, and 3 blocks on the male side being exactly similar to those on the female side, need no description.

The following table shows the distribution of the beds in various blocks:—

No. 1 Blocks	.....	{	Single Rooms	.....42	in each Block—	84
			Dormitories	.....58	”	116
No. 2 Blocks	.....	{	Single Rooms	.....11	”	22
			Dormitories	.....24	”	48
No. 3 Blocks	.....	{	Single Rooms	..... 6	”	12
			Dormitories	.....61	”	122
Total .....						404

In all asylums the female population is in excess of the male, and ten beds are, therefore, provided in the house-keeper's department for such patients as are employed in the kitchens, raising the grand total to 414 beds.

The attendants' and nurses' rooms are so placed throughout the asylum that they overlook the wards and dormitories.



The airing-courts are to the south of their respective blocks, but there is space for two others in the quadrangles near the drying-ground on the female side and working court on the male side, should it be considered advisable to separate the acute cases entirely from the others.

The chapel is placed to the north, and exactly opposite to the administrative block. It would here give a very pleasing finish to the north façade, and form a prominent feature in the main approach to the asylum. It would not in this position interfere with the land to be appropriated for farming purposes, and it would be found more easy of access than if placed to the south. A campanile rises from the south-east corner of the chapel.

The most convenient site for the superintendent's residence seems to be at the north-west corner of the estate. It could either be connected to the main building near No. 3 block by a corridor or remain entirely detached, as might be preferred.

By adopting the quadrangular arrangement of the blocks the elevations to the south, east, and west fronts are equally good; and it is especially noticeable that by placing the laundries, workshops, drying-grounds, and working-courts to the inside of the quadrangles the north elevation is also uniform, and has not that unfinished, straggling look which is found in nearly all English County Asylums.

It is a matter of the utmost importance that the airing-courts and all parts of an asylum occupied by the patients should be as little as possible overlooked by strangers coming to the asylum, for which reason the chief entrance is placed to the north.

The main sewer passes from west to east, through the centres of the quadrangles, and the subsidiary sewers are connected with it in ventilated man-holes, there being a clear fall of six inches into the drain leaving the man-hole. Every sewer will be laid in a straight line, and with a gradient giving a velocity of at least  $2\frac{1}{4}$  feet per second, which will be sufficient to keep the sewers clean and sweep away any stones or other impediments which may accidentally find their way into them. Dirt-boxes will, however, be placed under the ventilating grates to intercept any rubbish. In case of necessity the man-holes will enable workmen to inspect the whole length of sewer, and remove any impediment. The engine chimney will also be utilised for the ventilation of the main sewer.

*No sewers pass under any part of the main buildings, and*

where the main sewer passes under the corridors it will be bedded in a mass of concrete, by which means any contamination of the interior atmosphere of the asylum will be rendered quite impossible.

After leaving the asylum the main sewer will pass direct to the settling tank. It should be noticed that this tank is so designed as to achieve the result usually attained by building tanks in duplicate, it being arranged so that one half of the tank can be cleaned out by opening the sludge-valve connecting it with the sludge-pit, whilst the whole of the sewage is for a short time passed through the other half.

From the tanks the effluent water will be conducted to the farm, and applied wherever irrigation may be required, by means of a simple system of pipes and earthen carriers. As, however, it frequently happens that no part of a farm requires sewage, the formation of beds on the principle of intermittent downward filtration is recommended. Vegetables and root crops can be grown on these beds, which will purify the whole of the sewage at any season of the year without inconvenience.

The soil pipes will be discharged into trapped and ventilated brick-pits, having a concrete bottom, in which a proper channel will be formed to prevent the lodgment of any solid matter. From the heads of the soil-pipes of w.c.'s and urinals a ventilating pipe of large area will be carried above the eaves of the buildings.

All baths and rain-water pipes will discharge into trapped and ventilated gullies, and the water from the kitchen sinks will be discharged into double gullies of large size, also trapped and ventilated. The object of using a double gulley in this case is to intercept the fat, which is the most frequent cause of stoppage in small sewers.

The water-closets will be constructed on the self-acting principle, and will be of the form known as "hopper closets." The absence of a receiver renders the generation of foul gases impossible. The enclosed space underneath the seat will be efficiently ventilated, as experience of asylums teaches that it is very liable to become offensive. A permanent ventilator will also be placed at the top of each w.c., which will *not* be under the control of the attendants, and fresh air will be supplied by a Tobin's ventilator at a lower level.

The urinals will be ventilated in a similar manner. The floors will be formed of white glazed tiles, which will be carried up the side walls to a sufficient height. There will

be a proper receptacle in one corner for slop-water, and the urinals themselves will be of the form invented by Mr. Baldwin Latham, C.E.

Each block will be separately warmed by the high pressure system, the apparatus being fixed in the basement of the towers, and lighted from the outside of the buildings: there will thus be no danger from fire or explosion. This is the most economical and efficient system, and, moreover, the coils and tubes take up very little space in the day-rooms. Single rooms are heated by the same apparatus, but in accordance with the requirements of the Commissioners in Lunacy, fire-places are shown in the day-rooms, dormitories, and some of the single rooms, without which the plans would almost certainly be rejected.

Fresh air will be supplied to the wards on the Tobin principle; and in winter this air will be warmed before entering the wards by causing it to pass along the hot water pipes and coils. There will also be self-registering gratings (not under the control of the attendants), for the exit of vitiated air above every window. Special care has been given to the ventilation of the dining and recreation halls, for which purpose shafts are provided which can be heated in hot weather, or at will, by gas jets, to exhaust the foul air by causing an upward current. The impure air from the wards will also be drawn into shafts running close to the hot water cisterns. The kitchen, workshops, laundries, &c., are ventilated by opening louvres in the roof.

The main cold water tanks, each containing 10,000 gallons, are situated, as above mentioned, in the two principal towers, and these supply six service tanks, each containing 2,000 gallons, which are placed at the tops of the fireproof staircases for the reasons already stated. The aggregate storage of water will therefore be 32,000 gallons.

The water will be raised by a twelve-horse engine, which will also work the laundry machinery.

A large underground rain-water tank is placed near the laundry, and a similar one near the workshops, and suitable arrangements are made by intercepting chambers for the elimination of animal and vegetable matter. The water from these tanks is pumped by the steam machinery.

The laundry machinery consists of the usual washing, wringing, and mangling machines. A drying closet, heated by the waste steam from the engine, and by hot-air pipes from the ironing-stove, is also provided.

The hot water tanks will be heated by coils—the steam passing direct from the large boilers. The kitchen coppers will be heated by the same means, and a rain-water cistern will be placed near the kitchen for cooking purposes.

A second boiler has been provided, as it is absolutely essential ; and space has been left for a duplicate engine and pumps.

In view of the rapid increase in the numbers of the registered insane, it may be as well to state in what manner the Asylum could be enlarged at any future time.

The dormitories on the ground floor of No. 3 blocks on each side could be converted into day-rooms by simply removing the beds, and sleeping-rooms could be obtained by a second floor on the dormitory and day-room of No. 1 block. Accommodation would thus be provided for another 60 patients at a cost of not more than £800, or about £13 a bed. Further accommodation could also be obtained, but at greater expense, by building a fourth block in *echelon* from No. 3 corridor, without in any way marring the design of the asylum, or interfering with the system of management. The kitchen, laundry, and other offices are on a scale sufficient for 600 beds.

The advantages claimed for these plans are :—

1. Cheap construction.
2. Easy supervision, and consequently economical working.
3. Fireproof passages between the blocks, rendering the spread of fire from one block to another an impossibility.
4. Any particular ward may be reached without passing through any other ward.
5. The absence of long corridors which have no other use except that of merely connecting one part of the asylum with another.
6. The entire absence of covered ways under the sills.
7. The water tanks are placed over the staircases, thus avoiding the expense of separate water towers on the one hand, or placing the tanks under the roof on the other.
8. All the day-rooms face the south.
9. Perfect sanitary arrangements.
10. The entire circuit of the asylum can be made by the Medical Officers without their being under the necessity of retracing their steps.
11. Additions can be easily and cheaply made.