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MADRAS RECORD OFFICE.

Government of Madras.

Public works DEPARTMENT.

G.O. No. 1437 Press ~~Mis.~~

399-401.

Dated 17-5- 1864

Not to be folded or roughly handled

Proceedings of the Madras Government, Public Works Department, 17th May 1864.

No. 399. Read the following letters :—

From Colonel R. STRACHEY, R. E., Secretary to the Government of India, Public Works Department, to the Secretary to the Government of Madras, in the Public Works Department, dated Fort William, 1st April 1864, No. 65M/1,570.

SIR,

I am directed to forward the accompanying Memoranda by Lieutenant-Colonel Crommelin, R. E., specially employed to consider matters relating to barrack construction, upon some of the principles which should be attended to in designing barracks for married and unmarried European Soldiers in India, and to request that the Government of India may be favoured at the earliest possible date with any remarks His Excellency the Governor in Council may have to offer on this important subject, the Government of India being anxious to come to a final conclusion on the matter as soon as possible.

No. 400. From Colonel R. STRACHEY, R. E., Secretary to the Government of India, Public Works Department, to the Secretary to the Government of Madras, in the Public Works Department, dated Fort William, 15th April 1864, No. 104M/1,780 :—

SIR,

In continuation of this Office No. 65M/1,570, dated 1st instant, forwarding Memoranda by Lieutenant-Colonel Crommelin, R. E., on some of the principles which should be attended to in designing barracks for European soldiers in India, I am directed to forward copies of two Minutes on the subject which have been recorded by Major-General the Honorable Sir R. Napier.

No. 401. ORDER THEREON, 17th May 1864, No. 1,437.

Ordered that the following letter be despatched to the Government of India :—

(Here enter, No. 1,438, dated 17th May 1864.)

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

Exd. S. T. Augustin.

PUBLIC WORKS DEPARTMENT.
Public.
FORT SAINT GEORGE,
17*th May* 1864.

No. 1,438.

No. 402.

From

COLONEL C. A. ORR, R. E.,
Secretary to the Government of Fort Saint George, P.W.D.

To

The Secretary to the Government of India, Department Public Works.

SIR,

In reply to your letter* of the 1st ultimo, I am directed to submit to the Government of India the accompanying papers, containing the remarks offered by His Excellency the Governor in Council upon the Memoranda drawn up by Lieutenant-Colonel Crommelin, R. E., on the principles to be attended to in designing Barracks for married and unmarried Soldiers in India.

* No. 65M-1,570.

I have the honor to be,
Sir,
Your most obedient servant,

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

Exd. S. T. Augustin.

Remarks upon LIEUTENANT-COLONEL CROMMELIN'S *Memorandum upon Barracks for Married European Soldiers in India.*

1. The remarks passed upon Colonel Crommelin's previous Memorandum apply also in part to this. The Governor in Council considers that it would be better to withdraw the Standard Plan.

2. Hundreds of circumstances may occur which may make it unadvisable to adopt the particular arrangement schemed out. Subject, however, to this, His Excellency does not see any thing to object to in the general scheme embodied in the recapitulation.

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

Remarks upon LIEUTENANT-COLONEL CROMMELIN'S *Memorandum upon Barracks for Unmarried European Soldiers in India.*

Taking, in their order, the points enumerated in the recapitulation at the close of Colonel Crommelin's paper, — with regard to No. 1, the Governor in Council approves of it, with the exception of the paragraph about Standard Plans. His Excellency agrees with Colonel Crommelin that the local Officers should be allowed a large discretion in the preparation of Plans for Barracks, and he is therefore disposed to question the policy of having Standard Plans at all. The only effect of these Plans will be to cripple the inventive faculties of the active and intelligent Officer, and to afford an excuse to the careless and indifferent for negligence and inattention in adapting the buildings to the ground. It must not be forgotten that sites for Barracks are not flat planes like a sheet of drawing paper, but ground of every variety of form; that while in some places a level expanse may enable the Officer to carry out the proposed scheme of half Company Barracks, the ground elsewhere may be undulating to an extent which would compel an Officer, who strictly adheres to a Standard Plan, to perch one block of buildings on a hill, and the next down in a valley. Again, it must be remembered that the Barracks are intended for the accommodation of the Soldier in a variety of climates; that which would suit the climate of the plains of this Presidency would be unfit for the Mysore Plateau, and still less suitable for the Neilgherries, where the Wellington Barracks are situated.

2. Without, however, going into details, His Excellency in Council is of opinion that it would not be advisable to tie the hands of Officers by insisting upon conformity with a Standard Plan, except under special circumstances; but that a set of general rules should be laid down, to which an Officer in preparing a Plan of a Barrack should be bound to conform, or to explain the reasons which have induced him to deviate from them.

3. No. 2. The Governor in Council does not object to this, although for the sake of discipline as well as of economy, His Excellency prefers the Company Barrack to that, for half a Company.

4. No. 3. Should be adopted.

5. No. 4. His Excellency would omit, as he considers that there are many advantages which attach to the two-storied Barrack besides that of economy. His Excellency is not disposed to admit the difficulty of ventilating thoroughly the lower rooms of a two-storied Barrack; neither does he see any reason why the upper story of a Barrack of this kind should be 21 feet high to the wall plates, with the whole space within the roof to assist the ventilation, while the lower rooms are to have a minimum height of 16 feet.

6. No. 5. Should be adopted, with the exception of the rules for height, and with a provision as to alterations in size when the Barrack is situated in a climate like that of the Neilgherries, where fires are necessary.

7. No. 6. Should be adopted.

8. No. 7. Should be omitted.

(Signed) CHARLES A. ORR, Colonel, R. E.,
Secretary to Government.

No. 65M. / 1570.

FROM

COLONEL R. STRACHEY, R. E.,
SECY. TO THE GOVT. OF INDIA,

TO

THE SECY. TO THE GOVT. OF MADRAS,
IN THE PUBLIC WORKS DEPARTMENT.

PUBLIC WORKS DEPARTMENT.
Fort William, 1*st April*, 1864.

Military Works.

SIR,

I am directed to forward the accompanying Memoranda by Lieutenant Colonel Crommelin, R. E., specially employed to consider matters relating to barrack construction, upon some of the principles which should be attended to in designing barracks for married and unmarried European soldiers in India, and to request that the Government of India may be favoured at the earliest possible date with any remarks His Excellency the Governor in Council may have to offer on this important subject, the Government of India being anxious to come to a final conclusion on the matter as soon as possible.

I have the honour to be,
SIR,
Your most obedient Servant,

Colonel, R. E.,
Secy. to the Govt. of India.

Documents to accompany.
Lieut. Col. Crommelin, two Memoranda regarding barracks.

ciples which should be attended Europeon Soldiers in India, by Engineers.

MARKS

ions furnished for my guidance d been specially attached to the I was directed to take was, "to llowed, under the regulations of vice for all purposes." This has hich have been authorized from regiment of cavalry, a regiment ade of artillery, a light field of artillery, have been prepared rnment in the Military Depart-, when forwarding these lists, ns relating to such modifications order to meet not only present mmodation that should be pro- been made in the constitution

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Military Works.

To

SECY. TO GOVT. OF MADRAS,
IN THE PUBLIC WORKS DEPT.,

FROM

SECY. TO GOVT. OF INDIA,
IN THE PUBLIC WORKS DEPT.

No. 65M. / 1570.

Dated 1st *April*, 1864.

Received 22 "

Forwards for early report, Lieut. Col. Crommelin's Memoranda upon some of the principles which should be attended to in designing barracks for married and unmarried European soldiers in India.

No 7867

Memorandum
For
The Deputy Secretary
to Government
P. W. Deptt.

Returned to the
Dy. Secretary to Govt.
P. W. Departt, as
requested in Memo.
of the 1st Instant

2 Deputy's Office
Fort St George
26th August 1863

Lieut Colo
Offg 2 Engineer

principles which should be attended
rried European Soldiers in India, by
oyal Engineers.

REMARKS

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on for stations where entirely new sets of lines have to be constructed, as
Allahabad, Futtehghur, and Jullundur; and the decisions upon the various
estions which have been referred, will apply sometimes to one class only, and
metimes to the other, but generally to both. No replies whatever have as
been received to any of the above references.

No 879.

Forwards for early report, Lieut. Col. Crommelin's Memoranda upon some of the principles which should be attended to in designing barracks for married and unmarried European soldiers in India.

MEMORANDUM upon some of the principles which should be attended to in designing Barracks for unmarried European Soldiers in India, by LIEUT. COL. W. A. CROMMELIN, *Royal Engineers.*

PRELIMINARY REMARKS

In the letter which conveyed the instructions furnished for my guidance when I entered upon the duties for which I had been specially attached to the Public Works Secretariat, the first step that I was directed to take was, "to "revise the scale of general accommodation allowed, under the regulations of "Government, for the several arms of the service for all purposes." This has been done and complete lists of buildings which have been authorized from time to time to meet the requirements of a regiment of cavalry, a regiment of infantry, the head quarters of a brigade of artillery, a light field battery of artillery, and a garrison battery of artillery, have been prepared by me, and forwarded to the Secretary to Government in the Military Department for scrutiny. The opportunity was taken, when forwarding these lists, of referring, for orders, various general questions relating to such modifications of the existing scale as must now be made, in order to meet not only present views regarding the nature of barrack accommodation that should be provided, but also the changes which have lately been made in the constitution of the several arms of the service.

2. As regards my general instructions,—I have assisted in carrying on the routine duties of the Military Branch of the Secretary's Office; I have also visited the barracks at the hill stations of Dugshai, Kussowlie, and Subathoo, and, as the result of my examination of them, have recommended the general style of building which should be adopted for the new barracks that are to be constructed at the last mentioned station, and at the proposed new convalescent depôt at Nynee Tal. I have, further, made numerous special references both to the Military Department, and to the Quarter Master General of the Army, in regard to particular auxiliary buildings, such as canteens, store-rooms, staff sergeants' quarters, gun-sheds, &c., &c., &c., in view to obtaining data for the improvement of existing standard plans, and for the preparation of designs of buildings of which no standard plans have yet been issued by the Government of India.

3. It must be remembered that our future operations in regard to construction of barrack buildings will relate to two different classes of works, viz., 1st, to such as may be required for the completion of sets of lines which have already been commenced, and are in various stages of progress at different cantonments throughout India; and 2ndly, to such as may be decided upon for stations where entirely new sets of lines have to be constructed, as at Allahabad, Futtehghur, and Jullundur; and the decisions upon the various questions which have been referred, will apply sometimes to one class only, and sometimes to the other, but generally to both. No replies whatever have as yet been received to any of the above references.

No 899.

Forwards for early report, Lieut. Col. Crommelin's Memoranda upon some of the principles which should be attended to in designing barracks for married and unmarried European soldiers in India.

4. I now purpose, n this memorandum, to report upon some of the leading points which should be attended to in the designs of "barracks" to be hereafter constructed or the accommodation of "unmarried" soldiers, and upon which it is necesary that I should be favoured with the views of Government, before I cn proceed to make any specific recommendations in regard to detailed plans. These points constitute the second subject which has been proposed for conideration in my letter of instructions. It would have been more satisfactor to me to have deferred my report upon them until after receipt of replie to such of the above-mentioned references as relate particularly to them, nd, indeed, until after the conclusion of my approaching visits to some of our rincipal cantonments, where I shall have an opportunity of collecting further nformation; but several pressing calls have already been made by Local Govenments for instructions regarding new works which have been provisionally anctioned in the current year's budgets, and further calls may be expected; itseems, therefore, desirable that some general conclusions should be arrived a, as soon as possible, upon the all-important subject to which I have now rawn attention. When once these main points have been decided, it will be omparatively an easy matter to settle details.

5. It will le convenient to consider the points in question in the following order:—

1.—Geneal remarks on standard plans.
2.—Limi :o be put to the magnitude of barrack buildings.
3.—Proer size for barrack rooms.
4.—Reltive merits of double-storied barracks, and barracks on one loor only.
5.—Th space which should be allowed per man in barrack rooms.
6.—Proper unit of barrack room construction.
7.—Specimens of barracks suitable for different localities.

I.—OBSERVATIONS REGARDING STANDARD PLANS.

6. Hitherto the Government of India have only issued, for guidance, two or three standard plans of barracks, and these only suitable for the plains of Upper India; but although there are certain general principles which should be followed in arranging the details of all barrack buildings intended for occupation by the men, I think it will generally be conceded that one or nore standard plans of barrack cannot be arranged so as to meet every requirement over all parts of our Indian possessions. For instance, special arrangements are required to suit each of the different climates of Bengal Proper, the North-Western Provinces, and the Hill Stations. Barracks within fortified enclosures, where space is invariably restricted, and where defensive measures have to be provided for, must be of special construction. Again, the arrangements of details must be made to suit the peculiarities of the features of the ground upon which the barracks are to be built; in many stations especially in those situated in the hills, the available sites will sometimes be large and sometimes limited in extent, thus necessitating the construction of buildings of various sizes. There are other circumstances which

will tend to determine the size and arrangements of barracks, but those already mentioned are the principal ones; and it is not necessary to quote more in order to show that there must be a considerable variety in our plans of barracks.

7. Specimens of barracks suitable for different localities will be proposed in a subsequent part of this report; if these, together with the general principles which must be followed in all barrack designs, be published for information and guidance, I think it may be left to local officers to prepare and submit special plans for all barracks that they may be required to construct. Such an arrangement would, I am sure, meet the wishes of all Executive Engineers, who, naturally, would not take much interest in constructing buildings in the designing of which they had been in no way concerned. The duties of mere barrack building will never be popular, and, therefore, every proper encouragement should be held out to make them as palatable as possible.

II.—LIMIT TO BE PUT TO THE MAGNITUDE OF BARRACK BUILDINGS.

8. The Commissioners appointed to enquire into the sanitary state of the Army in India have recommended that all new barracks be constructed to hold no more than a quarter company in each building, or at most half a company in one building, in two separate rooms having no direct communication with each other. For many years past, only a very few barracks have been built (in the Bengal Presidency, at any rate,) capable of containing more than one whole company; and for the last six years, the majority of barracks have been constructed for half a company only, the men being accommodated, as now recommended by the Sanitary Commission, in two rooms, entirely separated from each other by a spacious dining hall or mess room, in which they not only take their meals, but which they also make use of generally as a day room. Lieutenant Colonel Maclagan, the Chief Engineer of the Punjab, has, in a very able paper, strongly advocated a still further sub-division, and has recommended that separate buildings be constructed, containing four small rooms and a dining hall, for only 12 men and one non-commissioned officer, 4 being the greatest number of men to be placed in each room.

9. I believe that the idea of these small buildings was originated by myself, when, as Chief Engineer in Oudh, I caused to be constructed a number of small huts for the temporary shelter of the force which was located at the several stations of that province immediately after its re-occupation in 1858; each hut being capable of accommodating only 10 men. My chief object in adopting these small huts was to ensure their stability, for, owing to various circumstances, we were only able to make them of the most temporary materials, and consequently of but fragile construction; and I had ascertained, from experience during the previous year, that long huts of a like kind were very liable to be blown down by gales of wind. The men enjoyed very good health in these huts; I believe, also, from several enquiries that I made, that they generally preferred them to the larger half-company barracks; and until I began to enter into the details of the enquiry upon which I am now

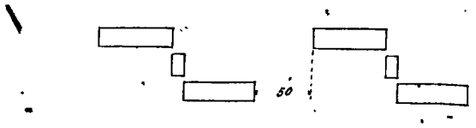
20. There will be much difference of opinion in regard to the question of "moral tendency;" my own impression is, that these proposed nests of small buildings will not lead to improvement in this respect, but rather to the reverse,—at any rate, I think there can be no doubt that the discipline of the men will assuredly suffer for want of that necessary control and supervision which cannot be efficiently maintained under a system of such extreme sub-division; indeed, if there were no other objections to the system, I believe it would fail in every one of the points now claimed as advantages, from the mere impracticability of ensuring this proper supervision without which no sanitary or ventilation arrangements, however well devised, will be satisfactorily carried out.

21. There is another point which must not be lost sight of in dealing with this question of extreme sub-division, and that is, the departure it would entail from the custom which prevails throughout the English Army, both at Home and in the Colonies. I believe it to be an accepted maxim that uniformity in the details of our military system should be maintained in all countries as far as may be practicable. Now, in the 5,339 barrack rooms of Great Britain, the average number of beds per room is 14, and the unit proposed for future adoption is from 20 to 30 beds per room. If, therefore, we place only 4 men in a room in this country, we shall establish a difference in a very essential particular; and the soldier, after having for years lived in a room with only 2 or 3 others, will, on his return to England, again find himself associated in a ward with from 12 to 30 of his comrades. Of course even radical differences must be allowed when necessitated by peculiarities of climate, or by any other sufficient cause, but it does not appear that, in the present instance, a case for such necessity can be made out.

22. The principle of sub-dividing large bodies of people, to a very considerable extent, amongst a number of separate dwellings, is generally admitted to be sound, and the attention of the Military Authorities in England has lately been drawn to the subject by the Commissioners appointed to improve the sanitary condition of barracks and hospitals in that country, and who, considering this sub-division a fundamental law, to be observed *as far as practicable*, have strongly condemned the objectionable practice which prevails throughout nearly all the military stations in the United Kingdom, "of agglomerating too large a number of men under one roof." The report and recommendations of the Commissioners appointed to inquire into the sanitary state of the Army in India, convey the impression that the same objectionable practice is common in this country; but the instances which they have cited are exceptional, for, as I have already pointed out, the standard size of barrack, for many years past, has been regulated for one company, and of late years, for half a company only. The Commissioners on English Barracks do not specify the extent to which the sub-division of barrack buildings should be carried; but, as already stated, the Indian Commissioners give a quarter-company barrack as the lowest limit, whilst, at the same time, they approve of the half-company barrack.

The quarter-company barrack would, I think, be open to the objections I have enumerated with reference to Colonel Maclagan's small buildings;

and it appears to me that the lowest limit should be such as will admit of thorough regimental supervision, and will not lead to the occupation of an undue extent of ground. I believe that these conditions are fully met by our half-company buildings; the four sergeants attached to each company can be conveniently accommodated in them, so as to ensure their exercising proper supervision; and if the two barracks for each company are placed according to the convenient arrangement shown in the annexed sketch, with the ablution rooms between them, they will not occupy much more frontage than the whole company barracks.



23. The frontage occupied by a range of barracks for a whole regiment will of course depend upon the distances between the pairs of barracks, the section of the barracks being the same in all cases; if arranged as above, this distance need not exceed 50 or 100 feet, and if the barracks are laid out in two rows, and have one story only, the frontage will be about 2,500 feet, or only about 600 feet more than would be taken up by two unbroken lines of barracks. The frontage will of course be reduced if double-storied buildings are used; but it must be remembered that oblique echellon, which (owing, apparently, to some misconception) is generally recommended, will increase the extent of front, unless the Barracks are allowed to overlap, and does not admit of such free circulation of air when the wind blows from certain quarters, as the direct echellon arrangement shown in the foregoing sketch. Objections have been raised to the great extent of front taken up by full and half-company barracks at many of our stations; but this is invariably owing to the buildings having been placed in one row, or unnecessarily far apart.

24. The proportion of unmarried men per company, troop, and battery, for which accommodation is to be provided in barracks, after making allowance for men in hospital, and probable number of married men, forms one of the questions which have been referred to the Military Department; but the following number may be considered as being nearly correct:—

Company of Infantry	80
Troop of Cavalry	64
Battery of Field Artillery	126
Garrison Battery	64

25. The half-company barracks for infantry, then, must be arranged to hold 40 men, and for cavalry 32 men; a light field battery, which is composed of three divisions, will require three barracks, each to hold 42 men; and a garrison battery, two barracks, each to hold 32 men.

III.—PROPER SIZE FOR BARRACK ROOMS.

26. The limit which should be put to the magnitude of barracks, or, in other words, to the number of men to be placed under one roof, being fixed, the next question to determine is, whether the barracks shall be sub-divided into a number of small rooms, or into a few rooms of considerable size. Upon this point the recommendations of the Indian Commissioners and our present practice also agree, for the Commissioners recommend that half a company should be placed in two rooms, or, in other words, from 20 to 25 men in a room, and this is exactly our half-company barrack arrangement. The standard plan of a full company barrack, moreover, which is designed for 100 men, is sub-divided into five wards, each containing space for 24 beds—again, the unit of number recommended for English barrack rooms is nearly the same, viz., from 20 to 30 beds.

27. From my own experience, I am of opinion that sub-division should not be carried any further, and, in support of this opinion, I would cite the two following cases:—(1.) In the Anarkaullee Cantonment at Lahore, some of the barracks were sub-divided, under my superintendence, in the year 1847, for small sections of men; the rooms were found close and unwholesome, and the partition walls were taken down. The result was a decided improvement in the condition of the wards. (2.) I have lately carefully examined the wards of the barracks at Subathoo and Kussowlie, and have found that those occupied by 20 men were purer than those occupied by 10 men, the proportion of space per man being the same. I inferred from my observations that ventilation must be more sluggish in small than in large rooms, and this impression has been confirmed by a statement that I subsequently read in the Report of the Commissioners on English barracks, to the effect "that it has been proved, by experiments made in the wards of the Lariboissiere Hospital at Paris, that the aerial movement is from two to three times greater in the middle of a ward than it is at its angles, from which experience it follows that, other conditions being the same, the more you sub-divide a space, the more angles you produce, and the greater is the obstruction offered to ventilation."

28. Another objection to a great number of small rooms would be, as already observed in the case of small barracks, the impossibility of affording that amount of careful supervision which would be required to ensure their being kept clean and in proper order. A single person, occupying a room containing many times the amount of space considered necessary per man in barracks, will soon render the room unwholesome, unless he pays due attention to keeping it ventilated; and it is only necessary to visit a range of married soldiers' barracks to obtain convincing proof how difficult it is to ensure small rooms being kept properly ventilated, although ample means of ventilation may have been provided. Our half-company barrack arrangement with its two rooms admits of each room having its own supervising sergeant.

29. The smaller barracks for cavalry and garrison battery of artillery should also be divided into two rooms, although the number of men to be housed in each will be somewhat less than the limit suggested, viz., 16 instead

of 20. But a single room for 32 men would be too large. If, however, it be decided that the number of men per troop of cavalry and garrison battery to be provided for need not exceed 64, it would not, I think, be objectionable to place the whole number in a single barrack having three wards, each to hold 20 or 22 men; the wards being divided by two mess rooms.

IV.—RELATIVE MERITS OF DOUBLE-STORIED BARRACKS, AND BARRACKS ON ONE FLOOR ONLY.

30. The Indian Commissioners make no recommendation upon this point, which must be considered, first, on the supposition as regards the double-storied buildings, that both floors are to be occupied by the men as dormitories, and then on the understanding that the upper floors only are to be used as sleeping apartments, the lower floors being set apart for mess rooms, day rooms, libraries, school rooms, and other auxiliary purposes; and here it is necessary to explain that, in speaking of double-storied barracks, I do not mean barracks that may be raised high from the ground on arcaded basements merely for sanitary reasons (which will apply equally in all cases,) but barracks in which both stories are to be usefully occupied.

31. The advantages of the double-storied barracks, in which both stories are used as dormitories, may be briefly summed up thus: they admit of more compact arrangement than barracks on one floor only, and afford more airy accommodation to the men who occupy the upper floor; on the other hand, the men in the lower floor would be far more unfavourably situated than if placed in single-storied buildings, as I do not believe that these lower apartments admit of being thoroughly ventilated, particularly during the most unhealthy season of the year, when there is almost a perfect stagnation of the atmosphere.

32. On the score of expense, I have not sufficient data to enable me to report with any degree of certainty, as no upper-storied barracks have been constructed of late years, and reliable rates can only be obtained from actual expenditure. Judging, however, from estimates prepared for double and single-storied buildings of similar design in Kussowlie, and in which like rates are employed, I should say that double-storied buildings would be the most expensive; but probably the difference of cost of the two descriptions of buildings would not be sufficient to affect the question at issue.

33. In certain localities, such as in Forts, and where the nature of the foundations is particularly bad, or where ground is restricted, it may be necessary to adopt the double-storied barracks; but, on the whole, where there are not particular reasons in their favour, I think it would be better to place the whole of the men in single-storied buildings, which can be thoroughly well ventilated, than half in insufficiently ventilated apartments, and half in a somewhat improved condition, in upper stories. In fact, I am of opinion that, in a sanitary point of view, the very worst method of accommodating a number of men under one roof, is to pack them in a series of tiers, one above another. In coming to the above conclusion, I have not lost sight of the fact that the use of these double-storied barracks would enable us greatly to contract the size of our Cantonments, and so to facilitate all drainage

arrangements and defensive measures; but although I am fully alive to the importance of these advantages, still I think that, as a rule, the main thing to be attended to in this country is to house the troops in the way that is likely to prove most conducive to their good health, and that contraction of cantonment space gained by packing men in double-storied buildings, is not desirable, and would not be attended with satisfactory results.

34. In the case of upper-storied barracks, in which only the upper floors are to be used as dormitories, and the lower as mess rooms, libraries, &c., &c., it will be necessary to compare, in the first place, the extent of accommodation required for the sleeping apartments, with that authorized for all auxiliary purposes.

35. For a regiment of infantry, sleeping space at about 90 superficial feet per man will be required for 850 men, exclusive of the company sergeants, who will be accommodated in end rooms of verandahs. Total space, then, will be 76,500. The auxiliary accommodation (on a liberal scale) which could be arranged on the lower floor, would be as follows:—

		Square feet.
Messing Rooms	20 × 40′ × 24′ =	19,200
5 Staff Sergeants', Class B ...	at 480 s. feet =	2,400
3 „ „ „ A ...	at 800 „ =	2,400
Quarter Guard	94′ × 18′ =	1,692
Library, Orderly Room, Sergeants' Mess	20′ × 150′ =	3,000
Regimental Store Room ...	20′ × 130′ =	2,600
Canteen	168′ × 24′ =	2,352
School	224′ × 24′ =	5,376
		39,020

Say that additional space may be allowed hereafter for reading rooms, and for such workshops as could be placed under the barrack rooms, so as to bring the total up to 50,000 square feet, still one-third of the dormitory space would remain unutilised in the lower floor.

36. One of the half-company barracks at Lucknow gives about 5,000 square feet of interior or dwelling space, and its estimated cost is Rs. 20,000; these data give a rate of Rs. 4 per superficial foot, and at this rate the cost of the above unutilised space would be Rs. 1,06,000.

37. It is necessary, in the next place, to consider whether these two descriptions of accommodation can be satisfactorily arranged in the two stories, as proposed. I find that the combination can be effected with the least amount of inconvenience in half-company barracks, except in the cases of the school and canteen, for which full company barracks must be arranged, as they require more space than is afforded by the smaller barracks.

38. Each of the two dormitories of a half-company barrack will, (as explained in the next section,) be 75 feet long and 24 feet wide, and they should be separated from each other in wings by a broad, well ventilated stair-case

(see fig. 8). A mess room must be provided for in each barrack in the lower floor, and will occupy a length of 40 feet of one of the wings. The whole of the company sergeants will be provided for in end verandah rooms on the upper floor, the corresponding lower apartments, when not required for auxiliary purposes, being set apart for a portion of the married men. The above preliminaries being understood, the arrangement of the auxiliary accommodation in the lower floors will be as follows:—

FIRST BARRACK (HALF-COMPANY).

Left Wing.—Mess Room, 1 Staff Sergeant, Class A, 1 Staff Sergeant, Class B.
Right ditto.—5 Staff Sergeants, Class B.

SECOND BARRACK (HALF-COMPANY).

Left Wing.—Mess Room, portion of Regimental Store-room.
Right ditto.—Regimental Store-room.

THIRD BARRACK (HALF-COMPANY).

Left Wing.—Mess Room and Orderly Room.
Right ditto.—Quarter Guard (cells to be separated).

FOURTH BARRACK (HALF-COMPANY).

Left Wing.—Mess Room and Library.
Right ditto.—Sergeants' Mess.

FIFTH BARRACK (FULL COMPANY).

Left Room.—Mess Room and Sergeants' Canteen Room.
2 *Centre Rooms.*—Canteen Sergeants' Quarter, Canteen Guard, Tap, and Privates' Sitting Room.
Right Room.—Mess Room and an unoccupied space of 35 × 24 feet, which will probably be required as a Store Room for beer.

SIXTH BARRACK (FULL COMPANY).

2 Mess Rooms and Regimental School.

39. The above arrangements are the best, I think, that can be made; but they involve a waste of space to the extent of 1,600 square feet, or rather, the extent of total space they provide is in excess of that allowed by present Standard Plans by 1,600 square feet. The money value of this excess at Rs. 4 per square foot is Rs. 6,400, but this is hardly a sufficient Estimate, for it must be remembered that the style of accommodation is generally more expensive than is necessary, or than is provided for in the buildings specially designed for the several purposes above detailed.

40. The whole of the auxiliary accommodation, then, "according to present authorized scale, can be provided for in four half-company and two full company barracks, with exception of that required for two staff sergeants, class A; and considering that there are thirteen more half-company barracks to complete the complement for a regiment of infantry, my calculation, that, even after making liberal allowance for any additional accommodation which may be allowed, one-third of the dormitory space will remain unutilized

in the lower floor, may be considered as being well under the mark; even if a whole wing in each half-company barrack be given over for use as day rooms, thus allowing two more rooms, 40 × 24 feet, and two other rooms, 33½ × 24 feet to each company, still the combined arrangement will only utilize two more barracks.

41. I calculate the extra cost, then, of housing a Regiment of Infantry in the way described, at about 1¼ lakhs of Rupees, which sum is about one-seventh the average cost of providing full accommodation of every description for a Regiment.

42. The arrangement could be carried out at much less cost for a Cavalry Regiment, because the half-troop barracks are smaller and fewer in number than the Infantry ones, whilst the amount of auxiliary accommodation is nearly the same. But the cavalry force in India is small, and but little remains to be done for it in the way of barrack accommodation; its requirements, therefore, will not affect a decision upon the present question.

43. For a Light Field Battery the comparison will be as follows:—

Sleeping space required for 126 men, at 90 square feet per man = 11,340 square feet.

The staff sergeants, sergeants' mess, orderly room, and library, can all be accommodated in end rooms of Barracks in addition to the battery sergeants. So there will only remain for auxiliary accommodation—

		Square Feet.
Mess Rooms	3 × 40′ × 24′ =	2,880
Quarter Guard	30′ × 18′ =	540
Regimental Store Room ...	60′ × 20′ =	1,200
Canteen	60′ × 24′ =	1,440
School	100′ × 24′ =	2,400
		8,460

here there is a large excess again on the side of the sleeping space, viz., 2,880 square feet, which would be represented by a money value of about Rs. 11,520.

44. No doubt this arrangement of placing the men in the upper and the auxiliary accommodation in the lower floors would prove of some advantage in a sanitary point of view; but this result would be gained, as I have shown, at a very considerable cost; the arrangement, moreover, would be attended with other drawbacks, for the auxiliary accommodation could not be so conveniently arranged, or so centrically placed as in buildings specially constructed for it; and it seems matter for question whether a combination is desirable, which would keep men constantly awed by the close proximity of the guard, or orderly room, or bring home to their very doors the noise and temptations of the canteen.

45. In damp climates like Bengal, the expense of raising the sleeping apartments of the men well above the ground must be incurred, and here it may be advisable to carry out the arrangement; but even then, the lower

floors must be well raised for the auxiliary accommodation, although not so much as would be necessary if they were to be occupied as dormitories.

46. On the score of health, there do not appear to be any manifest reasons why Government should be put to any great expense in placing men in upper stories in the North-West Provinces, or in the Punjab, or in other parts of India, where similar dry climates and soils exist. The average rates of sickness and mortality throughout all the Military Stations in the Bengal Presidency, shown in a table prepared in the office of the Principal Inspector General, Medical Department, for the year 1862, when there was fair accommodation for the men, are 7·27 sick to strength per cent., and 20·97 deaths from all causes to strength per thousand; and it must be remembered that the troops, with but few exceptions, were housed in barracks having ground floors only.

47. There is still one other plan which might be adopted, viz., to carry out the combined arrangement as far as the extent required for auxiliary accommodation will admit, and to arrange the remaining barracks so that a portion of the men may be placed in the lower floors with an extra share of space. It is impossible to give the details of this arrangement without knowing what additional auxiliary accommodation will be allowed, or what changes will be made in the present authorized accommodation; but, after a good deal of consideration, I am inclined to think that about five-sixths of the men can be placed in the upper, and one-sixth in the lower floors. This arrangement would entail some additional expense, but not to any considerable extent. In concluding this portion of my subject, I would point out that the combined arrangement could not be carried out in buildings smaller than half-company barracks.

V.—THE SPACE THAT SHOULD BE ALLOWED PER MAN IN BARRACK WARDS.

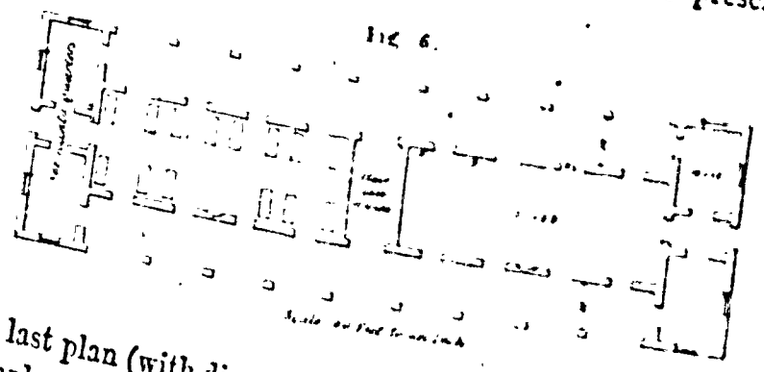
48. In treating upon this subject, it is not necessary to take cubical space into consideration; for, in order to keep dwelling rooms cool in India, and for other reasons connected with ventilation, &c. &c., it is expedient to make the rooms so lofty that, if sufficient wall space and floor space be provided for, the height will give far more cubical space than is considered necessary on sanitary grounds.

49. My remarks, therefore, will relate only to wall space and floor space. First, as regards wall space. I do not think we can adopt a better plan of arranging our beds than the one we have of late years followed, and which in fact is that recommended by the Commissioners so often alluded to in this report, viz., of placing two rows of beds only between opposite doors, with their heads to the walls, and two beds between every two doors. A bed is 2½ feet broad; it should not be placed within 9 inches of the door, and if we allow 3½ feet between the beds to admit of a table (a small luxury much prized by the soldier) being placed in the interval, we shall find that a wall space of 10 feet is required for the two beds; to this must be added the breadth of one door, or 5 feet, and the total running feet of length in the

the end windows ought not to exceed from 32 to 34 feet; 2nd, the wards and mess room must not be allowed to be in contact, and so make closed angles. The stair-cases in the above plans do not close the angles, but free circulation of air can go on under them.

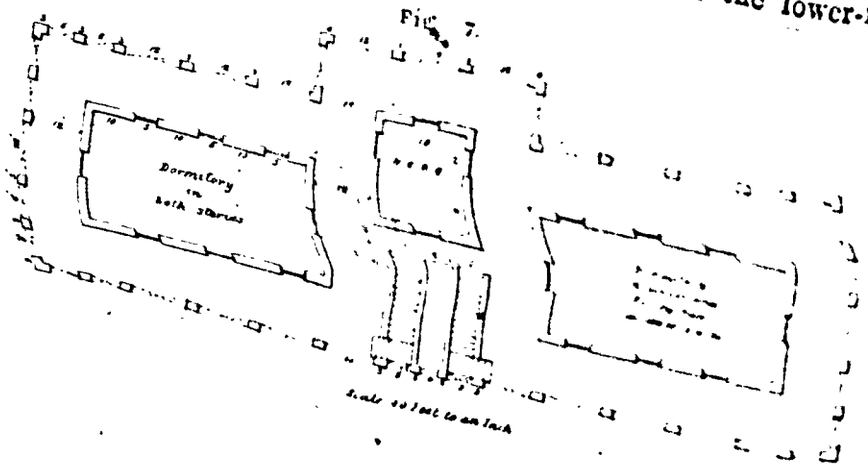
68. Where the ground is much contracted, there may not be room for a full-company arrangement of barracks, as shown in figures 4 and 5; a half-company upper-storied barrack, as shown in figure 6, may then prove convenient, both of the wards in the upper, and one in the lower, floor being occupied as dormitories, and the other ward in the lower floor being used as a mess room; it will in this case be necessary to place 14 men in a ward, and the mess room will give more space per man than above prescribed, viz., about 30 instead of 24 square feet.

Fig. 6.



69. This last plan (with dimensions as in Figure 1) would answer for completing the complement of upper-storied Barracks for a Regiment, after the "combined system" has been carried to its full extent; it has the advantage of keeping the unit of half a Company together in the same building; but the third Sleeping Ward is a disadvantage, inasmuch as there would be no Sergeant for its special supervision. This disadvantage, however, would be obviated by placing the Sergeants with the staircase in a transept in the centre of the barrack, as shown in figure 7, which is the plan recommended for Jullundhur. One Sergeant could easily supervise the two wards in the upper-floor, and the other the 3rd ward and dining-hall in the lower-floor.

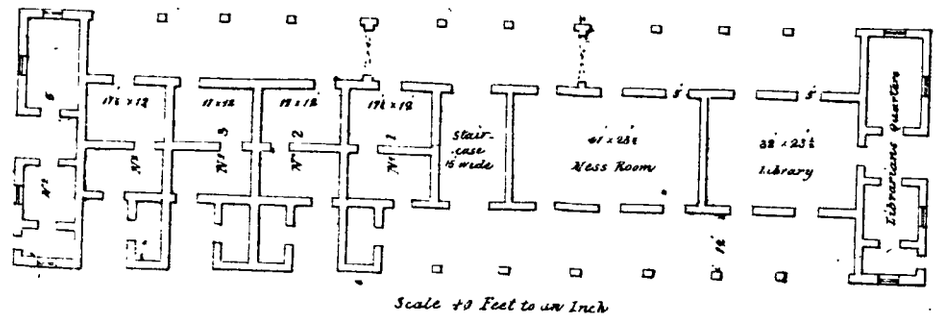
Fig. 7.



This latter plan also provides for the separation of the wards from the transept by verandahs; an arrangement which will doubtless add to the cost of the barrack, but which possesses great advantages in regard to ventilation, and architectural effect (a point not to be altogether lost sight of); and moreover does away with the roof valleys which would be necessitated by the junction of main wards and transept, and which are objectionable, inasmuch as it is extremely difficult to make them water-tight.

70. Figure 8 is an example of how the lower floor of a double-storied half-company barrack may be arranged for some of the subsidiary purposes. The left portion of the figure shows the quarters for five staff sergeants, class B, and the right portion shows the mess room of the men, and the library and librarian's quarters.

Fig. 8.



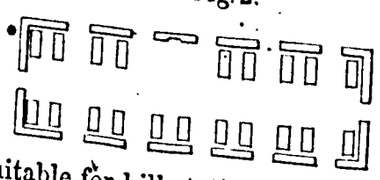
71. The above specimen plans, if approved, will, I think, suffice to guide Officers in designing barracks for any locality; it being understood that the height of rooms in the lower floor should not be less than 16 feet, if the rooms are intended for day purposes, nor than 18 feet if they are to be occupied as dormitories, and that 21 feet should also be the minimum height to wall-plate for rooms in upper floors, and for barracks of one floor only.

72. The designs for Bengal and the plains of the Upper Provinces need not differ in plan, but in elevation only; and this difference will be mainly owing to the greater height to which it is necessary to raise the buildings in Bengal. In like manner, in Burmah, or in other places where there may be peculiarities in constructive details, consequent either upon the mode of building which may be customary, or the material that may be available, the same general plans may be followed, although special design will be necessary.

the ward must be increased in length, and a portion near the mess room must be divided off for it, as shown by the dotted line.

61. In stations where it may be considered necessary to provide fire-places, the arrangement of the wards must be slightly altered, as shown in figure 2. This will add 5 feet to the length of the ward, and the general

Fig. 2.



plan will then also be suitable for hill stations.

62. It has been proposed, in order to keep the room clear of draughts, to make the opposite doors and wall spaces break-joint as it were, as shown in

Fig. 3.

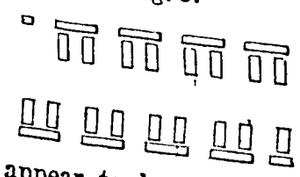
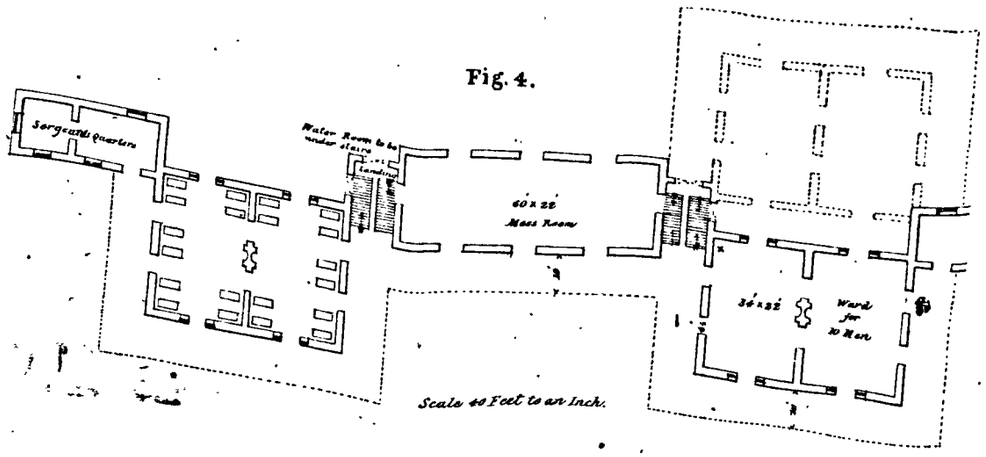


figure 3; but this does not appear to be a satisfactory arrangement, or one that will effect the desired object. It appears to me objectionable to place the beds exactly opposite to the doors.

63. A full-company barrack would consist of two barracks, as shown in figure 1, placed end to end; a decrease of frontage would thus be gained to the extent of the width occupied by two verandahs at the ends of the sergeants' quarters and the wash-house, or in all about 35 feet; but the convenient arrangement of disposing of the wash-house would be lost.

64. Figure 4 represents two double-storied half-company barracks, separated by a mess room on the ground floor only. This plan is suitable

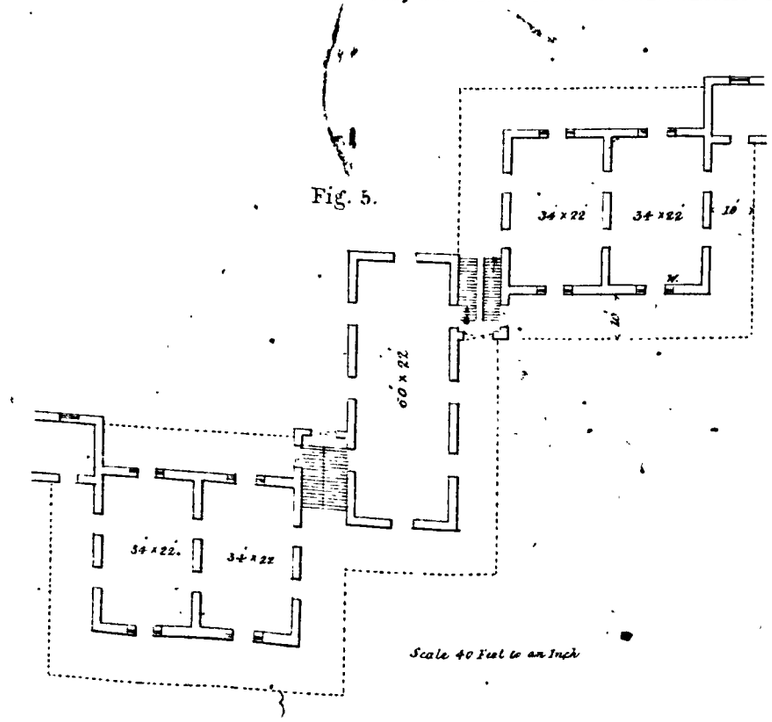
Fig. 4.



for hill stations, and it is intended that both floors of the wings shall be used as dormitories for a whole company. The dimensions of the several parts are smaller than those recommended for the plains. The wards are only 22 instead of 24 feet wide, and the verandahs, 10 instead of 12 feet. The floor space per man is 75 square feet only. The wards are arranged back to back, a plan which has been described as objectionable; but in this case they are small, and open on three sides to the external air, and are arranged to meet the variable winds of hills climates, and to economise space. If the ground will admit, it would be better to place one wing in front, and the other in rear of the mess room, as indicated by the left wing and the dotted portion of the right wing of the figure, as, by this arrangement, the wings would interfere less with each other's ventilation. This is the plan recommended for Subathoo and Nynee Tal.

65. Figure 5 is another arrangement of the same parts, and economises frontage; it may suit particular sites, but it is not a convenient arrangement.

Fig. 5.



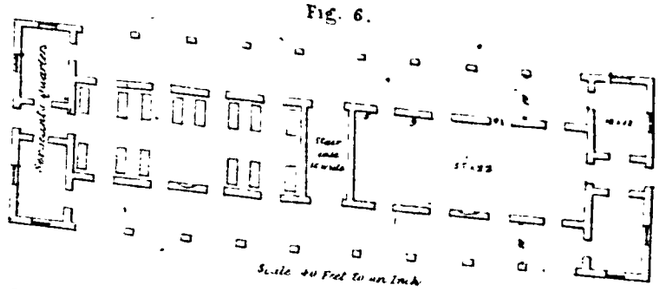
66. Other changes may be made in the arrangement of the same parts; for instance, figure 4 suggests a T arrangement, the wards being placed end to end; but to carry out this plan, the wall spaces at x must be considerably increased, so that the doors may be kept clear of the walls of the mess room; and, unless the wards are placed one to the front, and the other to the rear of the mess room, they will interfere with each other's ventilation.

67. Whatever arrangement is adopted, there are two points which must be strictly attended to; 1st, if the wards are placed side by side, they must not be larger than those shown in figures 4 and 5, in other words, the distance between

the end windows ought not to exceed from 32 to 34 feet; 2nd, the wards and mess room must not be allowed to be in contact, and so make closed angles. The stair-cases in the above plans do not close the angles, but free circulation of air can go on under them.

68. Where the ground is much contracted, there may not be room for a full-company arrangement of barracks, as shown in figures 4 and 5; a half-company upper-storied barrack, as shown in figure 6, may then prove convenient, both of the wards in the upper, and one in the lower, floor being occupied as dormitories, and the other ward in the lower floor being used as a mess room; it will in this case be necessary to place 14 men in a ward, and the mess room will give more space per man than above prescribed, viz., about 30 instead of 24 square feet.

Fig. 6.



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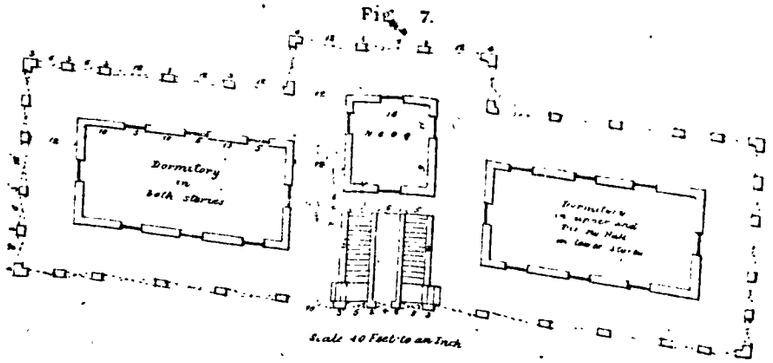

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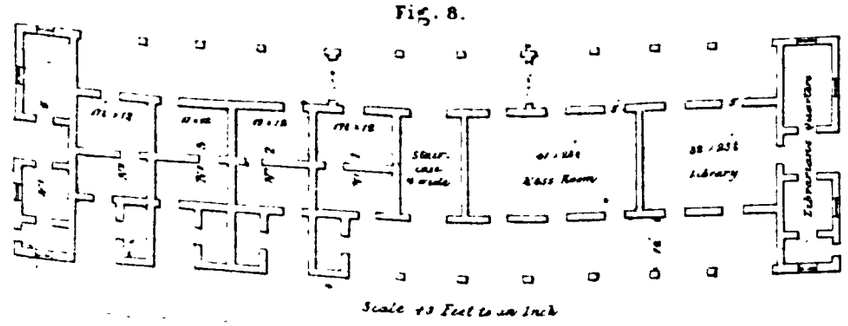

71. The above specimen plans, if approved, will, I think, suffice to guide Officers in designing barracks for any locality; it being understood that the height of rooms in the lower floor should not be less than 16 feet, if the rooms are intended for day purposes, nor than 18 feet if they are to be occupied as dormitories, and that 21 feet should also be the minimum height to wall-plate for rooms in upper floors, and for barracks of one floor only.

72. The designs for Bengal and the plains of the Upper Provinces need not differ in plan, but in elevation only; and this difference will be mainly owing to the greater height to which it is necessary to raise the buildings in Bengal. In like manner, in Burmah, or in other places where there may be peculiarities in constructive details, consequent either upon the mode of building which may be customary, or the material that may be available, the same general plans may be followed, although special design will be necessary.

VIII.—RECAPITULATION.

73. The following are the principal points and recommendations which I have brought forward in this Memorandum, and upon which the orders of the Supreme Government are solicited:—

1.—That the preparation of the detailed design for the barracks to be constructed at each station, be left to the local officers the several rules and principles of design being laid down for their guidance, and specimen plans of barracks suitable for different localities being furnished to them.

2.—That, save in exceptional instances, barracks be constructed to hold no more than half a company or troop, or, at most, a full company or troop, in each building, or, in other words that the number of men to be placed under one roof should be about 40 or 50, and should not exceed 100.

3.—That barrack rooms capable of accommodating from 16 to 20 men be adopted in preference to rooms of a smaller size; that, as a general rule, therefore, four rooms be provided for a company of infantry, three or four for a troop of cavalry, six for a light field battery, and three or four for a garrison company of artillery.

4.—That double-storied barracks, in which both floors are to be used as dormitories, be only constructed at hill stations, or at places where there may be special reasons for adopting them; that barracks on one floor only be considered generally preferable to the above; but that double-storied barracks, in which the upper floors only are used as dormitories, and the lower as day-rooms and for auxiliary purposes be adopted, if the expense is not considered too great, or the combined arrangement inconvenient.

5.—That the space per man in barrack rooms in the plains allowed by existing standard plans be maintained, viz., 7½ running feet of wall space, 90 superficial feet of floor space, and width of ward 24 feet; that for rooms in lower floors, 16 feet be the minimum height when they are to be used for daypurposes only, and 18 feet when they are to be occupied as dormitories; and that 21 feet to wall-plate be the minimum height for barrack wards in upper floors, or for Barracks on one floor only.

6.—That the Barrack rooms to be occupied by the men be kept free from any thing that is likely to affect injuriously the purity of the air, and that the barrack room unit comprise only—

1.—The Dormitory.
2.—Mess Room (or portion thereof).
3.—The Quarters of a Sergeant.
4.—The Water-room.
5.—Any other day-room which may hereafter be allowed.

That the minimum and maximum space per man in mess rooms be 20 and 30 square feet respectively.

7.—That the specimens of barrack plans proposed in this memorandum be approved.

73. It will be observed that, in this memorandum I have made several allusions to existing standard plans, and have compared some of their details with the recommendations of the Indian Sanitary Commissioners. My object in doing so has been to show that, in nearly all essential points these recommendations, as far as they relate to barracks, have long since been anticipated by the Government of India; and I think that this is a fitting opportunity to point out that, the defects in barrack construction so prominently brought to notice by the Commissioners, relate for the most part to buildings which were constructed many years ago, and that they have been fully acknowleged and in many instances already remedied by the authorities in this country. The improvements which have been carried out and the principles which have been followed, in the designs of barracks constructed since the year 1858, find no place in the Report of the Commissioners.

74. In concluding this Memorandum, I have only to add that "Barracks for Married Soldiers" and "Hospital accommodation" are the two subjects next in order upon which I purpose reporting; but my Reports will be deferred until after the completion of my approaching tour of inspection.

W. A. CROMMELIN, *Lieut. Col., R. E.*

October 29, 1863.

No. 1.

MEMORANDUM upon some of the principles which should be attended to in Designing Barracks for Unmarried European Soldiers in India, by LIEUT. COL. W. A. CROMMELIN, R. E.

Dated 29th October, 1863.

Lyf/p 1790/64.

John G. Hirons, P. W. Dept. Press,—1864.

Lyf/p 8572

From
The Secretary to the Govt of India
To
The Secretary to the Govt of Madras
in the Public Works Department

Public Works Department
Fort William, 15th April 1864

Military Works

Sir,

In continuation of this office No. 65 dated 1st instant forwarding memorandum by Lieutenant Colonel Crommelin R.E. on some of the principles which should be attended to in designing barracks for European Soldiers in India, I am directed to forward copies of two minutes on the subject which have been recorded by the Major general the Honble Sir H. Yule.

I have the honor to be,
Sir
Your most obedient servant,
W. Mackenzie Col R.E.
Secretary to the Govt of India

1864 Despatches
Govt. of Jamaica
No. 1936
From the Secretary to the
Govt. of India
Dated 13th Dec/64
Received 1st May "

2 Encl. to do Dr. Master Genl
Vide Bl. 3390/64 No. 114 dtd
Returned with the copy No. 1780.

Forwarding copies of two Minutes by Major Genl the Hon. Sir R. Napier on the subject of Barrack accommodation for European Soldiers in India.

No. 400

Secret 14 Dec 1438-17th Dec 1864

Q. 9th May 1865 R. 13th

(1)

The Sites are not thought advisable
I would therefore recommend an
Building for each Company
to be divided into two Rooms
with a Dining Room in the
Centre.-

In keeping with the
Principal Comment that
the adjacent Location is of
Advantage. The Huts should
be built to meet the Prevailing
Winds & each Hut should
exist of the Direct Radius
Viz.- "that it does not affect
by its free circulation of
when the Wind blows from
certain Quarters."- as in that
in Colonel Cornelius Memorandum
The Huts at Imbella are
constructed in this way
& any Repairs & Improvements
which are Granted Hereafter
for so many Years, and
always excellent Health.
All Huts they should
have free exposure to the
air.-

I do not think it is
advisable to have Standard
Plans.. The temperature

of the Country is very
different at different Stations
& the Buildings should
be adapted to the nature
of the Ground.-

Several rules for building
Houses should be laid down
to which Local Officers
should be obliged to conform
as far as possible in preparing
Plans.-

With regard to the
Memo upon Quarters
I think in the Same way
recommend an Appendix
B.- In other respects the
Scheme proposed by Colonel
Cornelius appears very good.-
I would however not recommend
Standard Plans to be adopted.-

Jno Grant

Londres 29th April
1864

• I concur in the remarks made by HEA
Lovoir 26 by HE A Cin C
29/4/64

Remarks upon Lt Col Crommelin's Memorandum upon Barracks.

I agree with Lt Col Crommelin that the Local Officers should be allowed a large discretion in the preparation & plans for Barracks and I am therefore disposed to question the policy of having standard plans at all — The only effect where plans will be to suppress the invention faculties of the active & intelligent officers and to make every Barrack erected both different & indifferent for convenience & adaptation to the ground —

It must not be forgotten that plans for Barracks are not like drawing paper at 4d the sheet of every variety of form; that the whole is one plan & level in parts may enable the Officer charged with the proposed scheme for a Company Barracks

Elsewhere the ground
maybe undulating
to an extent which
would compel an officer
who strictly adhered to
a standard 8 feet to
perch on Blocks
Buildings or a Hill
and his rest down
in the valley —
against numbers =
= mentioned that in
Barracks are intended
for the accommodation
of the Soldier in a Country
of Mountains — But which
would suit the Climate
of the Plains of the Pe:
= ninsula would be
unfit for this Region
& Climate, and establish
unsuitable for the Hills
where the Wellington
Barracks are situated
I am not disposed to
admit the difficulty
of reconciling thoroughly
the lower rooms of a two
storied Barrack.
neither do I see any
reason why the officer

the room should be 21
feet high to the wall plate
which when the roof is
span would form the ceiling
apart the ventilators
while the lower room as
where a maximum
height of 15 feet —
I do not however wish
to enter details — my
opinion is that it would
not be advisable to tie
the hands of officer by
insisting upon conformity
= ming with a standard
& plan except under
special circumstances
but that a set of general
rules should be laid down
to which an officer in
preparing a plan for
Barrack should be bound
to conform, & explain
the reason which should
induced him to deviate
from them — and with
reference to the respective
Letters at the end of the
Paper I should say
that no I might stand
with the exception of the
Paragraph about standard
Plan. No 2 I do not object to
Strength for purposes of
discipline as well as

Economy & prefer the
Company Barrack to
that for behalf Company -
No 3 I adopt
No 4 I should endorse
as I hold that there are
many advantages which
attach to the two storied
Barrack besides that
Economy. ~~I am to~~
~~Provide detailed to the~~
No 5 I should adopt with
the exception of the rule
for height. and with a
proviso as to alterations
as may appear when the Barrack
is studied in all its
bearings that of the Bathrooms
Therefore as necessary -
No 6 I should adopt
No 7 I should endorse

JPD

Remarks upon Col Crompton's
Memorandum upon
Barrack accommodation
for Married Soldiers

I should make the same
remark as I have done
in my minute upon
the Memo as to -
= married soldiers
that I would be better
to withdraw the standard
of 600 - hundreds of
cases - circumstances may
occur which may make
it undesirable to
adopt the particular
arrangement - scheme
out -
Subject however to this
I do not see anything
to object to in the general
scheme embodied in this
respective letter -

JPD

Remarks upon Lt. Col. Crommelin's Memorandum upon Barracks for Enlisted European Soldiers &c. India.

Agreeing in their order, the points enumerated in the recapitulation at the close of Colonel Crommelin's Report, — with regard to No. 1, the Governor in Council approves of it, with the exception of the paragraph about Standard Plans. H.E. agrees with Colonel Crommelin that the local Officers should be allowed a large discretion in the preparation of Plans for Barracks, and he is therefore disposed to question the policy of having Standard Plans at all. The only effect of these plans will be to cripple the inventive faculties of the active and intelligent Officer, and to afford an excuse to the careless and indifferent for negligence & inattention in adapting the buildings to the ground. It must not be forgotten that sites for Barracks are not flat planes like a sheet of drawing paper, but ground of every variety of form; —

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that while in some places a local expanse may enable the Officer to carry out the proposed scheme of half-Company Barracks, the ground elsewhere may be undulating to an extent which would compel an Officer, who strictly adheres to a standard Plan, to perch one block of buildings on a hill, and the next down in a valley. Again, it must be remembered that the Barracks are intended for the accommodation of the Soldier in a variety of climates; — that which would suit the climate of the plains of this Presidency would be unfit for the Mysore Plateau, and still less suitable for the Neilgherries, where the Wellington Barracks are situated.

Without, however, going into details, His Excellency in Council is of opinion that it would not be advisable to tie the hands of Officers by insisting upon conformity with a standard Plan, except under special circumstances; but that a set of general rules

should be laid down, to which an Officer in preparing a Plan of a Barrack should be bound to conform, or to explain the reasons which have induced him to deviate from them.

~~[illegible]~~

No 2 - His Excellency in Council does not object to this, — although for the sake of discipline as well as of economy, H. E. prefers the Company Barrack to that for half a Company.

No. 3 - Should be adopted.

No. 4 - ~~omit~~ H. E. would as he considers that there are many advantages which attach to the two-storied Barrack besides that of economy. H. E. is not disposed to admit the difficulty of ventilating thoroughly the lower rooms of a two-storied Barrack; — neither does he see any reason why the upper

story of a Barrack of this kind should be 21 feet high to the wall plates, with the whole space within the roof to assist the ventilation, while the lower rooms are to have a ~~minimum~~ height of 16 feet.

minimum?

W.5. ~~should be~~ adopted, with the exception of the rules for height, and with a proviso as to alterations as to height when the Barrack is situated in a climate like that of the Neilgherries where fires are necessary.

W.6. should be adopted.

W.7. should be omitted.

Remarks upon Lt. Col. Cromelin's Memorandum upon Barracks for married European Soldiers in India -

The remarks passed upon Colonel Cromelin's previous Memorandum apply also in part to this. The Governor in Council considers that it would be better to withdraw the Standard Plans. Hundreds of Circumstances may occur which may render it inadvisable to adopt the particular arrangement planned out. Subject, however to this, H.E. does not see anything to object to in the general scheme embodied in the recapitulation.

No 1437 Public Work Dept

Proceedings of the Madras Government dated the 7th January 1864

Read the following papers.

From the Secy to the Govt of India — Forwards for early report, Lt Col Commelin's Memo: upon some of the principles which should be attended to in designing barracks for married & unmarried European Soldiers in India ——	M. G. 1st April 1864 No 65 M / 1570	
Do — Do — Do — Forwarding copies of two Minutes by Major Genl the Hon: Sir R Napier on the subject of Barrack Accommodation for European Soldiers in India	M. G. 16th April 64 No 104 M / 1780	Ordered

Jan 1864 R. 13th

Ordered that
the following letter
be despatched to the
Government of India

N. B. No. dated

Feb.

21

Recd 1864 Despatch
from Govt. of India

No. 1437

From the Abd Govt
Dated 17 May 1864

Letters from the Government
of India on the principles to be
attended to, in designing Barracks
for married and Unmarried
Soldiers in India.

No. 399 to 401

17 May 1864 No. 73

No. 1438

Lee. to Govt. of India
P.W. Dept.

W. 65 M.
1570.

Sir,

In reply to your letter
of the 1st Ultimo, I am
directed to submit to
the Govt. of India the
accompanying papers
containing the remarks
offered by H. E. the
Governor in Council
upon the Memorandum
drawn up by Lieut.
Colonel Cromwelin, R.E.
on the principles to be
attended to in designing
barracks for married
& unmarried Soldiers
in India. —

I have &c.

Chepauk
17th May 1864

Desp. 18th May.

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2

qr W 1864 Depart
Pro: of Govt Jan 1865

No. 1438

Fo. Secretary to the Govt.
of India P.W.D.

Dated 17 May 1865

Papers containing the remarks of His Excellency the Governor of Madras upon the Memoranda drawn by Lieutenant Colonel Crommelin R.E. on the principles to be attended to in designing Barracks for married and unmarried Soldiers in India

Forwarded to the Government of India

No. 402.