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ORIGINAL

[Despatch Abstract.]

Building grants:

Stating that the building grant applied for by the authorities of St. Ebba's girls boarding school, Rayapettah, should not be paid unless they conform to the rules in regard to the provision of proper accommodation & ventilation & carry out the suggestions of the Sanitary Commissioner in regard to matters of sanitation.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

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Government {1904} of Madras.

EDUCATIONAL.

Recd. } 1904. *Enclosures*

Regd. *Spare copies*

ORIGINAL

G.O., No. 175, 12th March 1904.

N. F.

MARCH.

Building Grants.

Stating that the building grant applied for by the authorities of St. Ebba's Girls' Boarding School, Royapettah, should not be paid unless they conform to the rules in regard to the provision of proper accommodation and ventilation and carry out the suggestions of the Sanitary Commissioner in regard to matters of sanitation.

GOVERNMENT OF MADRAS.

EDUCATIONAL DEPARTMENT.

Read—again the following paper :—

G.O., No. 2, Educational, dated 5th January 1904.

Read—the following paper :—

From the Hon'ble Mr. A. G. BOURNE, D.Sc., F.R.S., Director of Public Instruction, to the Secretary to Government, Educational Department, dated Madras, 3rd December 1903, Ref. on Cur. No. 5237 of 1902.

I have the honour to submit the enclosed plans with estimates amounting to Rs. 32,611 for the construction of a new building for St. Ebba's Girls' school, Sullivan's Gardens, Royapettah, belonging to the Women's Mission Association, S.P.G., and to recommend that a third grant of Rs. 10,870 be sanctioned under rule 113 of the Grant-in-Aid Code.

2. The new building is a well-designed school and boarding house capable of accommodating about 100 boarders. From the plan it would, no doubt, appear that a considerable portion of the building is to be used for living purposes and that the portion to be devoted to school purposes is comparatively small.

3. I have ascertained, however, that the two dining rooms are to be regularly used as class rooms. This is practicable in this school, as the girls all being natives eat from leaves or plates on the floor and no dining room furniture will be required. The dormitories will be used on wet days for drill and calisthenics, there being no cots to take up the space, as the girls will sleep on mats which will be removed in the day-time. The bed rooms are to be used by two mistresses engaged solely in school work and the supervision of the boarders.

4. The school is open to girls of all castes, but on account of caste restrictions, only Native Christians are expected to enter as boarders. The boarders will pay boarding fees which will include a monthly charge for accommodation. Hindu and Muhammadan girls will be admitted as day scholars.

5. The plan and estimates have not been fully approved by the Consulting Architect, but his objections which are contained in the enclosed copy of his letter No. 2659, dated 15th October 1903, are not of a serious character.

6. The building has already been completed, the late Director having permitted the work to be begun in view of the urgent need for accommodation.

7. The site is part of the compound of the Sullivan's Gardens Theological school and belongs to the S.P.G. Mission.

8. The manager's application for a building grant is submitted herewith.

Enclosures.

From the Consulting Architect to Government, Madras, to the Director of Public Instruction, dated 15th October 1903, No. 2659.

In returning herewith the plans and estimate, which accompanied your Ref. on Cur. No. 5237, dated 12th December 1902, I have the honour to point out that, in calculating the scantlings of teak beams in this division the formula $bd^3 = W.L.^2/180$ is used (where W = total weight, L = length of beam between points of support, d = depth, b = breadth) which gives a result of 9″ × 15″ and 9″ × 15½″ for the beams in question placed 8½ feet and 9¾ feet, respectively, from centre to centre. However as the upper floor is to be used as bed rooms the scantlings allowed may stand.

Irrespective of what is laid down in standard works as regards the proper heights for rooms of boarding schools, I am of opinion that, in consideration of the climate of this place, high and well-ventilated rooms are necessary.

I do not at all approve of the arrangement of the beds especially in the main dormitory. It is not only objectionable on hygienic principles but there is hardly any walking room between the beds which is so very essential.

As regards the mortar to be used, two of sand to one of lime is generally adopted in this division—please see appendix A to F of the Public Works Department Standard Specification, page 6, paragraph 12.

The plans and estimates in other respects are approved.

From W. N. POGSON, to the Secretary, M.D.C.S.P.G., dated Madras, 15th November 1903.

I am in receipt of your letter enclosing the objections made by the Acting Consulting Architect to Government through the Director of Public Instruction, regarding my plans and estimates for the Women's Mission Association school buildings at Sullivan's gardens, and beg to offer the following explanations :—

(1) "*No detail estimate accompanies the plans, etc.*"—I was not aware that the Government Architect would require all the pages of measurements from which the quantities have been abstrated, as I was under the impression that such estimates would be checked by the less laborious method of estimating by cubical capacity, at so much per foot cube for schools built of this description. However, I now forward the "Dimension sheets" and "Abstracts" for perusal (attached to estimates returned).

(2) "*The Foundations, Nature of soil, etc.*"—The foundations are loaded up to half a ton on the superficial foot. The surface is sandy clay, and the subsoil of a harder clay overlying a very deep stratum of fine sand. I sank a well when building the adjoining Church of the Good Shepherd, and found the soil to be most satisfactory.

(3) "*Scantlings of Timber.*"—All the timber scantlings have been calculated by myself. I fail to see how the Consulting Architect arrives at a scantling of 16″ × 9″ for a 16 foot span beam at 8′ 6″ interval, loaded up to 150 lbs. per superficial foot of floor. I think some clerical error must have occurred, as the Public Works department tables give for a similar beam 13″ × 9″. However I will give the details of my calculations for the perusal of the Consulting Architect, as follows :—

Preliminaries—

Interval of beams 8′ 6″
Span 16′ 0″
Load taken at 150 lbs. per superficial foot.
Length of beam 16′ × 12 = 192 inches.
W = 8½′ × 16′ × 150 lbs. = 20,400 lbs.
$w = \frac{W}{L}$ = 106 lbs. per square inch.
F = factor of safety = 6.
f^o = for teak, modulus of rupture = 13,000 lbs.
E = Modulus of elasticity of teak = 1,900,000 lbs.
$n = \frac{5}{384}$ Coefficient of the load.
d = Maximum deflection allowed, one-thirtieth of an inch to every foot length of span.
b = required breadth of beam.

By the strength formula—

$$\text{depth} = \sqrt[2]{\frac{6\,(F.w.)\,l^2}{8\,f^o\,b}} = \sqrt[2]{\frac{6.\,6.\,106.\,192^2}{8.\,13{,}000.\,9}} = \sqrt[2]{\log\ 2{\cdot}17694} = \log\ 1{\cdot}08847 = 12{\cdot}3$$

inches.

By stiffness formula—(Maximum deflection 16/30ths of an inch.)

$$d = \tfrac{1}{30}'' \times \tfrac{16}{1} = \tfrac{16}{30}'', \text{ and } d = \frac{12n\ W l^3}{Ebd^3} \text{ then } d^3 = \frac{12n\ W l^3 \times 30}{Eb \times 16} = \sqrt[3]{\frac{12n\ W l^3 \times 30}{Eb \times 16}}$$

$$= \sqrt[3]{\log 3{\cdot}39336} = \log 1{\cdot}13112 = 13{\cdot}5 \text{ inches.}$$

As the stiffness formula gives the higher result, I have adopted 13½ inches as the required depth, and made it 14″ by 9″. This agrees very accurately with the Public Works department tables 13″ × 9″, but is very different to the result obtained by the Consulting Architect *i.e.*, 16″ by 9″.

(4) "*Girders cheaper than teak beams.*"—Taking into account the delay in procuring these from Europe, and the very erratic safe loads given by various manufacturers, I do not consider them preferable to teak. These lists differ so much that they cannot be relied on at all. Thus Messrs. Dorman & Long quote a girder of 16′ 0″ span 12″ × 5″ at 32 lbs. per foot

to carry 9 tons. The Carnegie Company quote the same section to bear 11·9 tons, whilst the following recognized and accepted formula gives for the same section a safe load of 7·035 tons. Thus:—

$$0{\cdot}67\ (w - 0{\cdot}3\ bd)\ \frac{d}{L} = 7{\cdot}035 \text{ tons}; \quad w = 32 \text{ lbs. or section weight.}$$

d = depth. inch.
L = length, feet.

This section is therefore perfectly useless for the girder and load of 9 tons required. The next manufactured section is 13″ × 5″ at 41·5 lbs. per foot run, which gives by calculation as follows:—

$0{\cdot}67\ (w-0{\cdot}3\ bd)\ \frac{d}{L} = 11{\cdot}97$ tons safe load and as the deflection $\frac{5\ W\ l}{384\ E\ I} = 0{\cdot}3$ inches, or less than 16/30ths of an inch, this is the section required, and not 12″ × 5″ at 32 lbs. as quoted in the manufacturers' erroneous lists. Some of these lists put the modulus of elasticity down as "12,000 tons for our steel", whilst others quote their steel at 12,900 tons, but most manufacturers' lists have the usual note thus: "we do not guarantee, etc., etc." Whilst such differences exist, I prefer to adhere to the recognized formula. Thus the necessary strength would be 41½ lb, which for a length of 18 feet at Rs. 8–8–0 per cwt. would cost Rs. 65, whereas the same 18 feet of teak beam of 14″ × 9″ at Rs. 3–8–0 would only cost Rs. 55–2–0. Doubtless, larger sections of R.S.Gs. may come cheaper than teak for wider spans than ordinary buildings, but this does not concern the present case. The "raking" timbers of this building such as rafters, etc., have all been calculated by myself at a vertical component load of 24 lbs. per square foot, and a horizontal component wind stress of 50 lbs. per square foot, resolved normally to roof on the latest "Perry-Fuller" method.

The rooms are very low, 13 feet is insufficient.—The accepted cubic capacity for each scholar is 117 to 130 cubic feet, as given by such eminent authorities as deChamont, Wilson, Parkes, Robson, Pettenhofer Snell, etc. Parkes in his celebrated work on hygiene also gives 130 cubic feet. Now as the Grant-in-Aid Code gives a maximum superficial area of 10 square feet per each scholar, then $\frac{130}{10}$ gives a height of 13 feet.

If this is sufficient in a climate where all doors and windows have to be kept closed, surely it is sufficient in India where all doors and windows are kept constantly open. Looking over a series of schools built in India, I find 13 feet is seldom exceeded.

Dormitory.—I submit a plan showing the way of arranging the regulation school mats of 5′ 0″ × 2′ 6″, which drawn to a scale of $\frac{1}{8}$th inch shows the gangways between the rows. The Grant-in-Aid Code allows the verandahs to be included in the area of all rooms, but this I have not taken advantage of at all, although doubtless many would sleep out in these verandahs. These mats are rolled up, and taken down to the box-rooms by each scholar during the day. Cots are never used in native school dormitories.

Rates.—The rates I priced the quantities at are the rates supplied to me by the Consulting Architect in the year 1895, and I was not aware that they had been reduced, in some cases actually below prime cost, although labour and materials have increased in price since 1895.

Mortar.—Mortar of 1 to 3 is advocated in Nicholson's exhaustive and elaborate tensile and adhesive tests published in "Appendix A to F, Standard Specifications of the Public Works department" and chemically forms a better double silicate of calcium than 1 to 2 will do.

In conclusion I beg to note that the building is at present built up to the first floor level, and all the beams and joists have been cut and partly fixed. In submitting the calculations of the scantlings, may I call the attention of the Consulting Architect to the fact that all the teak used for beams, etc., is of the L. R. Brand, whereas it is usual to use the inferior W. D. Brand of teak. Also that I have used the minimum modulus of elasticity 1,900,000, whilst Rankine gives 2,400,000 lbs. per square inch. Also in using the modulus of rupture I have used the minimum 13,000 lbs., whereas Rankine gives 15,000 lbs. per square inch. In using the maximum deflection of one-thirtieth of an inch per foot span of beam, I see that the Public Works department orders allow a maximum deflection of one-twentieth of an inch to every foot span.

This difference would materially lessen the scantlings, which the Consulting Architect even now condemns as "not strong enough".

Order—No. 2, Educational, dated 5th January 1904.

The Director's letter with its enclosures will be forwarded to the Sanitary Commissioner with the request that he will be good enough to inspect the new building constructed for St. Ebba's Girls' school and report as to the sufficiency of the ventilation of the dormitories which are intended to provide sleeping accommodation for 102 girls—72 in the larger one and 30 in the smaller one.

2. The Director of Public Instruction is requested not in future to permit works to be begun in anticipation of approval of the plans and estimates.

(True Extract.)

A. G. CARDEW,
Ag. Secretary to Government.

To the Sanitary Commissioner.
„ Director of Public Instruction.

Read—also the following paper:—

From Lieutenant-Colonel W. G. KING, C.I.E., I.M.S., Sanitary Commissioner, Madras, to the Secretary to Government, Educational Department, dated 29th February 1904, No. 860-S.

With reference to G.O., No. 2, Educational, dated 5th January 1904, I have the honour to forward, herewith, a note by me on the subject therein referred to.

Enclosures.

Note by the Sanitary Commissioner for Madras, dated 26th February 1904, No. 860/S.

[*Reference.*—Order No. 2/D., dated 5th January 1904, from the Secretary to Government, Educational Department.]

So far as the dormitories are concerned, I inspected the St. Ebba's school on the night of the 19th instant and, on the 22nd instant, the remainder of the building. My visit at night was intentionally of a surprise nature, so as to secure an accurate idea of the methods of ventilation and air purity in the dormitories. For the latter purpose, I requested Lieut.-Colonel Bannerman, Superintendent of the King Institute, to accompany me with the object of his effecting air analysis. This he was enabled to do in a complete manner on the spot by the use of Haldane's apparatus which has been recently imported. The results he secured are, I think, of utility; as they demonstrate the error of believing that in a tropical climate certain of the principles which have hitherto guided European practice can be safely disregarded.

2. The plan shows two dormitories. One of which, No. 1, is intended by the architect to accommodate 72 children, and the other, No. 2, 30. There would thus normally be afforded in room No. 1, 13·3 square feet and 173 cubic feet for each child, and in No. 2 dormitory 17 square feet and 221 cubic feet. On the night in question, there were in room No. 1 only 33 children of from 9 to 16 years of age and, in No. 2, 21 of from 6 to 14 years of age; so that the superficial space in the former was 29 square feet and 378 cubic feet, and, in the latter, 24·2 square feet and 315 cubic feet, per head. In room No. 1, two windows and the door were shut; but the venetians were completely open in the case of two windows, and the upper halves of the remaining windows were also open. The total outlets and inlets were therefore equal to about 480 square inches per head against 48 square inches considered essential in European countries. In this room, the windows and doors are placed opposite each other, so that perflation is trusted to. In room No. 2, the door was found shut, but the five windows were found to be uniformly open in the upper half; so that there was available about 374 square inches per head for inlet and outlet purposes. In the case of both rooms, the venetians not actually open necessarily also allowed a certain amount of air change.

3. To the sense of smell, on entry from the outside, both rooms had an organic odour, which was particularly marked in room No. 2. The short time spent in this air devoid of freshness produced a distinct feeling of fatigue, irrespective of the haunting odour which remained with one for a considerable time after removal into the fresh air. I selected for analysis of air in room No. 1, a point where a current was perceptibly passing to its outlet on the opposite side. In this stream of air on a

table 3′ 6″ from the ground, Lieutenant-Colonel Bannerman, in the centre of the room found 7 volumes of carbonic acid per 10,000 and at the ground level immediately below the window—on the side to which the current was passing—8 volumes per 10,000. In another corner of the room, at the ground level, where the children were less crowded, but where the organic odour was marked, 7·5 volumes per 10,000 were found. The less volume of carbonic acid found at the table height as compared with that on the ground level is what might be expected; but there was also illustrated the fact that where narrow rooms are concerned, as in this case, perflation is placed at a disadvantage, in that the current passes direct from the inlet to the outlet and fails to secure that general dispersion which occurs where a reasonably large cubic space is available.

4. In the case of room No. 2, a specimen of air was taken also immediately below a window, when it was found that 11 volumes of carbonic acid per 10,000 were present, and this notwithstanding that a door which had been shut when the room was first entered had been opened for about 15 minutes before the analysis was completed. Here it may be remarked that, although the cubic space available is greater than in room No. 1, the absence of windows opposite each other to secure perflation obviously resulted in the marked difference in analyses in the two rooms. In the case of No. 2 room, however, diagonal currents were at least possible, in that windows in the end walls existed. Having regard to the larger area of inlets and outlets as compared with European practice, I think there was afforded excellent illustration of the simple fact that one of the great factors in securing currents in a European climate is frequently absent in the tropics, namely, the difference between the inside and outside temperatures. In any case the fact that insufficient air change had occurred is self-evident. The children had gone to bed at 8-30 P.M., and analyses were taken between 10 and 10-30 P.M., so that, if it be assumed that the carbonic acid exhaled per hour in children of from 9 to 16 is ·339 (a low estimate) cubic foot, against ·6 assumed for a mixed population, it is found that in room No. 2, during the period of occupation, the total fresh air entering the room could have been only 484 and in room No. 1, 968·6 cubic feet. That a worse analysis was not obtained was due to the comparatively recent occupation, and the primary consumption of air present in the first hour. In this connection, I would state that Lieutenant-Colonel Bannerman has found that the air of Madras affords less than 3 volumes per 10,000 against 4 per 10,000 of European countries. This may represent want of correction for volume of air but as the error is on both sides, the fact points to the probability of air impurity, as judged by the analyses given in this case being one volume of carbonic acid greater than stated.

5. The standard accepted by sanitarians of permissible impurity of air in habitations is 6 volumes per 10,000, and allowing for the age of children, theoretically they would therefore, at the very low estimate of ·339 cubic foot exhaled per hour, require not less than 1,695 cubic feet of fresh air per head per hour to maintain the air at this standard permissible impurity. As shown above, however, the replacement of air fell far short of requirements. Regarding this matter in another way, as each child requires, 1,695 cubic feet per hour to maintain the air at the necessary standard of impurity, in the cubic space actually available, it would have been necessary to have changed the air 4·5 times in room No. 1, and, in room No. 2, 5·3 times, against three times per hour aimed at in European practice for reasons that do not apply so urgently to the tropics. Obviously, then, notwithstanding the comparatively large inlets and outlets, no such change did occur in these cases as shown by the analyses. If room No. 1 had been filled to the strength allowed by the architect, the rate of air change would require to be 10·2 times to maintain the standard of permissible impurity. If the rate of entry of fresh air as calculated above (only 968 cubic feet per hour) be allowed, the limit of permissible impurity would, with the full population of 72 intended, be reached in 6 minutes after occupation.

6. I perceive that the architect quotes for his authority for allowing but 173 cubic feet per head various well-known sanitarians. But, as a fact, my reading has never taught me anything but that these sanitarians deprecate the economy which has

allowed so small a space as 130 cubic feet for children and, at the present moment, in England, a strong agitation against this is being developed: but, putting this aside, the architect is radically wrong in quoting these authorities, because he has mistaken the allowance for school rooms used for study as contrasted with rooms used as dormitories. The two subjects are absolutely different, and have to be approached both by the sanitarian and the architect from other standpoints. The best authorities demand between 800 and 1,000 cubic feet per head, whilst even the economically disposed Local Government Board of England demands a minimum of 360 cubic feet for dormitories. Even when the small space of 130 cubic feet is utilised in European day schools, it is on the understanding that to the school proper is attached class rooms, so that for a considerable space of time the school population is thinned out by children absent in the class rooms. Moreover, large schools have now their ventilation controlled by mechanical means, and much better results both chemically and bacterially are secured than by natural ventilation in the same space. So far as the dormitories are therefore concerned, the accommodation is absolutely defective.

7. Even with a population as scanty as at present, in these dormitories, the ratio of permissible impurity is quickly attained. I attach a copy of a recent note by me to the Sanitary Board on the subject of cubic space of dormitories. According to the figures there given, room No. 1 is capable of accommodation of 35 children and room No. 2, nineteen. In the case of room No. 1, therefore, on the night of my inspection, there could have been accommodated two more children and in No. 2, two less, provided the school were ranked as affording third-class accommodation. When it is remembered that room No. 1 contained, on an average, 7·5 volumes of carbonic acid per 10,000 against 6 volumes regarded as the maximum permissible impurity, it will be seen that in fixing upon the minimum of 360 cubic feet, in the interests of economy, my figures must be regarded as extremely low, and that there is presupposed much better arrangement as to securing ventilation than actually in force at the time of my inspection of room No. 1; that is to say, care should have been taken to disperse children at regular intervals over the floor space, and it should have been seen that windows were more freely opened, and that ventilation was further arranged for by special openings at the eaves and at the roof. Room No. 2 is absolutely defective for dormitory purposes, and if used as such certainly should not be employed for more than ten children, on the assumption that ventilation is improved by forming at least one more window and arranging for ventilation at the eaves and roof.

8. The arrangement by which the children were intended by the architect to sleep with mats immediately adjoining is exceedingly bad. Even if the total population of two dormitories be limited to 45, as I have now suggested, instead of 102 as intended by the architect, care should be taken to distribute the children; so that the floor space may be correctly utilised.

9. In regard to the remainder of the accommodation provided, the bath arrangements are represented by eight cubicles for the service of which water has to be carried. As the Red Hills water is laid on, it would be a very easy matter to arrange for the use of sprays for washing of hands and face and spray baths for general bathing. This arrangement would be economical of water and of time, and would be sanitarily much safer than the present method. The latrine is exceedingly primitive, and cannot be safely used in wet weather. It affords a very bad object lesson for the mothers of future generations. There is no hospital for the receipt of infectious cases, and granting that such cases would invariably be removed, some method of temporary segregation should be devised. For treatment of urgent cases at night, a special room should be provided. For segregation of skin diseases and ophthalmia also, some accommodation must be set apart. At the present time, the children are largely affected with itch, and nothing but rigorous segregation of such cases will get it out of the school. With the scanty space intended by the architect, irrespective of other obvious sanitary disadvantages, ophthalmia and ringworm would certainly in time have become rampant. Dormitories should not be used for drills as suggested. Special covered sheds should be provided for the purpose.

Madras,
27*th February* 1904.

W. G. KING, Lieut.-Col., I.M.S.,
Sanitary Commissioner for Madras.

Note by the Sanitary Commissioner for Madras, dated 22nd January 1904, No. 373-S.

[*Reference.*—Endorsement of Sanitary Board, dated 12th January 1904, No. 10-S.]

To permit of a complete change of air that will maintain the standard of permissible impurity (=·6 of carbonic acid per 1,000 volumes) and yet not allow of a sensation of draught, 3,000 cubic feet per hour must be passed through an initial cubic space of 1,000 feet per adult inhabitant of a room. Children under ten years of age are usually classed as requiring one-half the amount of cubic space of persons over that age, but an authority (Glaister) who, I think, has reason on his side, considers this proportion should not be less than three-fifths. Above that age, the addition of impurities to air per person is not such as to demand differentiation. This then is the ideal that should be aimed at but, when, having regard to funds, *minimum* requirements are demanded, the standard which is used in India for Central Jail native prisoners when confined in parts intended for those not suffering from disease; namely, 600 cubic feet, must be held to be the least compatible with a fair standard of health. In jails, in this country, it has been repeatedly shown that any diminution of air space below this standard in dormitories is soon followed by a degeneration of general health. It may therefore be assumed that 600 cubic feet per adult native in rooms inhabited solely by the healthy is the minimum compatible with a healthy condition. This view disposes of a mass of arguments that lacks practical demonstration as to the better ventilation being possible in tropical climates than in temperate climates, and therefore less initial cubic space being feasible. As the absolute minimum, therefore, I advise that in dormitories for schools 360 cubic feet (being three-fifths of 600 cubic feet) for children below ten years of age, and for all persons above that age 600 cubic feet should be allowed. The former figure happens to correspond with that laid down by Local Government Board of England as the *minimum* for dormitories in poor law schools.

2. The class of school which could only afford an amount of cubic space for its inmates based upon the standard considered absolutely requisite by a paternal Government for its convicts should be considered by the Educational department as of an inferior class, and be entitled to a less grant-in-aid than those capable of giving a better air ration to the people, and thus preserving in a better degree their physical and mental capacity; for, without attempting to go into the facts, I may state it has been clearly proved in connection with schools in Great Britain that the better the ventilation the greater has been the grant-in-aid on the results system showing that mental vigour is closely allied to the attainment of uncontaminated air. Consequently, I think, Boarding schools should be graded into three classes as follows:—

		c. ft.
First-class dormitories ..	For persons over 10 years of age ..	1,000
	„ under 10 years of age ..	600
Second-class dormitories ..	For persons over 10 years of age ..	800
	For children below 10 years of age ..	480
Third-class dormitories ..	For persons above 10 years of age ..	600
	For children below 10 years of age ..	360

For Europeans and Eurasians the above amount should be increased by one quarter.

3. In all cases of giving a grant-in-aid, beyond the mere statement of cubic space, the inspecting officer should be required to certify (1) as to the suitability of means to secure air change in the space, (2) that dormitories are used for none but sleeping purposes, (3) that separate accommodation exists for the sick and (4) that not more than thirty persons sleep in any common dormitory. In reckoning the cubic space, no height above 13 feet should be taken into account.

4. My opinion was not asked as to the amount of cubic space permitted in day schools by the Educational department, but I may state that the standard requirements are far below what is really suitable.

W. G. KING, Lieut.-Col., I.M.S.,
Sanitary Commissioner for Madras.

Order—No. 175, Educational, dated 12th March 1904.

With his letter read in G.O., No. 2, Educational, dated 5th January 1904, the Director of Public Instruction submitted an application from the Madras Diocesan Committee of the Society for the Propagation of the Gospel for a grant of Rs. 10,870 in aid of the Committee's new building for St. Ebba's girls' school at the Sullivan's Gardens, Madras. The building has two dormitories attached to it, one of which is intended to accommodate 72 girls and the other 30 girls. As it appeared to Government that the space and ventilation provided in these dormitories were not sufficient, the Sanitary Commissioner was requested to inspect the building and report on the matter. That officer accordingly now reports that the two dormitories actually contained only 54 girls on the night of his inspection and that even with this scanty population the larger dormitory contained at the time of the inspection 7·5 volumes of carbonic acid per 10,000 and the smaller one 11 volumes per 10,000, as compared with 6 per 10,000, the accepted standard of permissible impurity of air in habitations. He recommends therefore that the number of inmates should be reduced, that an additional window be opened in the smaller dormitory, that windows be more freely kept open in both the dormitories, that the inmates be dispersed at regular intervals over the floor and that further ventilation be provided in both rooms by special openings at the eaves and roofs.

2. The Governor in Council has recently sanctioned an alteration in the Grant-in-aid Code and in the Educational Rules, under which dormitories attached to educational institutions and intended for the accommodation of ten or more inmates should provide 30 superficial feet and 400 cubic feet of space per head. Under this rule not more than 33 girls can be allowed in the larger of the dormitories attached to St. Ebba's school and not more than 17 in the smaller dormitory. His Excellency in Council considers that unless the Diocesan Committee undertakes to conform to this rule and until it carries out the improvements in the ventilation suggested by the Sanitary Commissioner, the building grant for which it has applied should not be paid. The Director will ascertain and report whether the Committee is prepared to give the guarantee and carry out the improvements referred to.

3. The Sanitary Commissioner also thinks that the bathing and latrine arrangements should be improved and that accommodation should be provided in a separate building for the treatment of infectious cases. An extract (paragraph 9) from his report will be furnished to the authorities of the school, whose attention will be drawn to Colonel King's recommendations on these points.

(True Extract.)

A. G. CARDEW,
Ag. Secretary to Government.

To the Director of Public Instruction.
„ Sanitary Commissioner.

Exd. K. Murugesan.

EDUCATIONAL DEPARTMENT.

NOTES CONNECTED WITH G.O., No. 175, EDUCATIONAL, DATED 12TH MARCH 1904.

[SUBJECT.—*Building Grant for the St. Ebba's Girls' School, Royapettah.*]

From the Director of Public Instruction, No. 5237, dated 3rd December 1903.

The Director requests sanction to the payment of Rs. 10,870 in aid of the new building constructed at a cost of Rs. 32,611 for the St. Ebba's Girls' School, Sullivan's Gardens, Royapettah, Madras.

2. The building has already been completed and the Public Works department has said that the plans and estimates in such cases need not be referred to them—*vide* notes in G.O., No. 520, Educational, dated 19th October 1903.

3. The building is intended as a boarding and school house and, under rule 113 of the Grant-in-Aid Code, a grant is payable on account of either class of buildings. There appears therefore to be no objection to the payment of the grant in this case.

4. The draft placed below may issue.

P. T. THARYAN—9-12-03.

A. GALLETTI—9-12-03.

Please refer me to the rule of the Grand-in-Aid Code to which the Architect refers at pages 11—13 of his letter, dated 15th November 1902.

A. G. CARDEW—10-12-03.

There is no provision about this either in our Grant-in-Aid Code or in the English Code for 1901—the latest we have. In our Educational rules it is stated that in primary schools for general education held in closed buildings, the dimensions of the building should be such as to provide at least six square feet and sixty cubic feet space for each pupil on the rolls and that in other schools for general education the space provided for each pupil on the rolls should not be less than eight square feet and eighty cubic feet—*vide* article 10, chapter II. This provision, however, refers to class rooms and not to rooms used as dormitories.

2. For bed-rooms Dr. McNally's scale is 40 square feet per head, 12 or 14 feet high—page 98 of the Sanitary Handbook. This however seems to be a very high standard.

3. In the present case the main dormitory is intended for 72 girls and its dimensions are 60′×16′-3″. This space is totally insufficient. The mats have to be spread side by side without any space between and the mats are after all only 2′-6″ wide.

Laterally.

A. GALLETTI.

P. T. THARYAN—12-12-03.

Space is provided between the rows of mats. The floor space in the main dormitory is 1,008 sq. ft.; 14 sq. ft. and 182 c. ft. for each girl; in the smaller dormitory floor space 535·04 sq. ft.; 17·8 sq. ft., 232·7 c. ft. for each girl. Then there is the verandah, of which the dimensions are not given; but roughly the verandah floor space may be put at 360 sq. ft. (*vide* plan 60×6). Both dormitories open into the verandah. Some of the girls would no doubt sleep in the verandah. Total floor space including verandah, about 1,900 sq. ft., or nearly 19 sq. ft. per girl; cubic allowance, supposing the verandah to be roofed at the same height as the dormitories, nearly 250 c. ft. per girl.

The Sanitary Handbook, page 98, recommends 500 c. ft. for "dwelling rooms." The Madras Educational rules are content with 60 c. ft. in primary class rooms, 80 in other class rooms. The amount of carbon dioxide expired during sleep is, I believe, not greater than that expired during waking hours, though it is greater in proportion to the volume of air expired, the volume of air expired during sleep being smaller. If this is so, in spite of the counsel of perfection of the Sanitary Handbook, the space here provided, being three times that required by the rules for day dwelling rooms, must be considered sufficient for night dwelling rooms.

A

2. As to Mr. Molesworth's remark that a height of 13 feet is not sufficient, the Sanitary Handbook, page 98, says: "A greater height than 12 or 14 feet is not generally found useful for purposes of ventilation. Nothing would therefore be gained by raising the height of the rooms. The Sanitary Handbook considers that large superficial space should be provided and recommends 40 sq. ft. In this case we have 19 sq. ft. Submitted that if we are to take any objection, it is to the number of girls in the dormitories. At 40 sq. ft. there would be room for 25 girls in the big dormitory (instead of 72), 13 in the small dormitory (instead of 30) and 9 in the verandah. But our Educational rules lay down only 8 sq. ft. for class rooms, and the English Code of Regulations for day schools, page 18, lays down no more.

A. Galletti—14-12-03.

I am unable to agree with the Assistant Secretary's view, especially with the passage marked **A**. In class rooms used by day, pupils are never confined for more than three hours at a time, whereas in sleeping rooms they may remain and probably do remain for 10 (or even 12) hours at a stretch. A degree of ventilation, moreover, is tolerable by day which cannot be safely borne by night, when outer clothing is removed and the body rendered more liable to chills by sleep. No safe comparison can, I think, be made between the superficial and cubic space provided in rooms intended for sleeping purposes and that provided in day living rooms. Nor is the standard laid down in McNally so entirely a counsel of perfection as never to be realized. In Jail wards 40 superficial feet and 600 c. ft. are actually provided, and any one who has entered a jail ward at night will know that, even with this allowance, there is much stuffiness (to say no more) unless lateral ventilation is plentiful. With rooms, again, only 13 feet high, the air in hot months must become very heated. At the passage (page 98) of the Sanitary Handbook which the Assistant Secretary quotes the writer goes on "Height is, however, of great service in keeping rooms cool in hot countries when the roof is strongly heated by the sun."

2. It is very necessary that a standard of superficial and cubic space should be laid down in the Educational rules, so that Missionary or other societies constructing dormitories and expecting to be aided by Government should know what is required. The Sanitary Board may be asked to advise on these points.

3. In the present case the late Director allowed the work to be begun (and even completed, in anticipation of the plans being approved) "in view of the urgent need for accommodation." This was a most unbusinesslike and inconvenient course, and the result now is that the hands of Government are tied. We must either sanction a grant to the building as it stands, or repudiate the late Director's action. Before sanctioning the grant, reference should, I think, be made to some Sanitary or Medical authority as to the sufficiency of the ventilation. If this is sufficient, it will then be enough to do as the Assistant Secretary suggests, and impose a limit to the number of girls to be located in the building.

Notice this in a word or two of caution for the future.

G. S. F[orbes].

A. G. Cardew—14-12-03.

G. S. F[orbes]—10-12-03.

A draft is placed below for approval requiring the Sanitary Commissioner to report as to the sufficiency of the ventilation of the building and requesting the Sanitary Board to advise as to the minimum amount of superficial and cubic space which should be provided for each pupil in dormitories. The point about permitting works to be begun in anticipation of the plans being approved may be noticed in the final orders to be passed on receipt of the Sanitary Commissioner's report.

T. Kanakasundaram Pillai—23-12-03.

P. T. Tharyan—23-12-03.

The question of amending the rules may be treated separately? and the opinion of the Director of Public Instruction as well as the Sanitary Commissioner obtained? the Director of Public Instruction should presumably be consulted and he might hold different views from the Sanitary Commissioner. I have put up the general case—amendment of rules—separately.

A. Galletti—2-1-04.

A. G. Cardew—2-1-04.

[G.O., No. 2, Educational, dated 5th January 1904.]

From the Sanitary Commissioner, No. 860-S., dated 29th February 1904.

The question of the sufficiency of ventilation provided in the dormitories attached to St. Ebba's school was referred to the Sanitary Commissioner. The larger of the two dormitories is intended to accommodate 72 girls. The Sanitary Commissioner thinks that not more than 35 children should be allowed to occupy it provided that windows are more freely opened than on the night of his inspection and that ventilation is further arranged for by special openings at the eaves and at the roof. He thinks also that care should be taken to disperse the children at regular intervals over the floor space—paragraph 7 of his note, dated 26th February 1904.

2. As regards the smaller dormitory intended for 30 children, the Sanitary Commissioner is of opinion (paragraph 7 of his note, dated 26th February 1904) that it is absolutely defective for dormitory purposes. It is capable of accommodating 19 children but if used for dormitory purposes the Sanitary Commissioner thinks that not more than 10 children should be allowed to occupy it and that too only after the ventilation is improved by forming at least one more window and by providing ventilators at the eaves and roof.

3. The authorities of the school may be furnished through the Director with the substance of the Sanitary Commissioner's recommendations and the improvement of ventilation may be insisted upon before any grant is sanctioned. It is difficult to see how any orders as to the maximum number of girls to be accommodated in the two dormitories can be enforced. The authorities of the school may, however, be asked what they propose to do in this matter, as well as for the improvement of the bath and latrine arrangements and for the provision of a segregation room—*vide* paragraph 9 of the Sanitary Commissioner's note, dated 26th February 1904.

P. T. Tharyan—4-3-04.

As to the Sanitary Commissioner's numbers: 35 and 19; they don't fit the dimensions. At 600 c. ft. there would be room for 24 girls in the big dormitory, 11 in the small dormitory; at 400 c. ft. 33 and 17; at 36 sq. ft. 28 and 15. Under the new rule proposed in the linked file only 28 and 15 would be allowed; total 43.

2. The Sanitary Commissioner also contradicts himself further down: he says the total of his figures for the two dormitories is 45; but 35+19=54.

But whether the figure is 45 or 54 [he probably means 54 in both places and has merely transposed the figures in the last place] the fact remains that the Sanitary Commissioner, after a personal inspection and after a practical experiment on the air with Haldane's apparatus, states that more girls might be allowed to sleep in the two dormitories than would be allowed under the proposed rule [43].

3. We might ask the Sanitary Commissioner to get his figures right before we send on his remarks.

A. GALLETTI—5-3-04.

If we furnish the school authorities with the substance of Colonel King's recommendations, and tell them that the maximum number of girls should be regulated by the rule proposed in the linked file, viz., 400 cubic and 30 superficial feet, enough will have been done on that point. The dimensions of the buildings are—

	Sq. ft.	C. ft.	Girls.
No. I...60′ × 16′ 8″ × 13′ =	1,000	13,000	33
No. II...30′ 8″ × 16′ 8″ × 13′ =	511	6,644	17
		Total ...	50

They intended to put in "about 100', inmates! (See Current page 1.)

A. G. CARDEW.

The mission may be told that not more than 50* girls should be put in the two dormitories, and may be asked to carry out the improvements in ventilation.

2. Their attention may be drawn to the Sanitary Commissioner's suggestions as to bath and latrine accommodation.

A. G. CARDEW—8-3-04.

Yes. I understand that, till amendments are made of the construction, the grant will not be paid.

J. T[HOMSON]—9-3-04.

A draft is submitted below for approval.

P. T. THARYAN—11-3-04.

A. G.—11-3-04.

A. G. C.—12-3-04.

[G.O., No. 175, Educational, dated 12th March 1904.]

Stock Form No. 151
5,000—13-7-03.

~~Local & Munl~~ (1904) Department.

CURRENT No. 376

From

[*Name*] Lieut.-Col. W. G. King, C.I.E. Ims.,

[*Designation*] Sanitary Commissioner

[*Station*] Madras.

No. 860 S

Dated Dec 29-2-1904

Enclosures 2

Received 1-MAR 1904 SECRETARY TO GOVT. LOCAL & MUNICIPAL DEPARTMENTS 190 .

Registered 2 3 1904

SUBJECT.

Forwarding his remarks on letter from the Director of Public Instruction, Madras recommending a grant of Rs 10870/- be sanctioned for the construction of a new building for St. Ebba's Girls' School, Sullivan's Gardens, Royapettah, Madras.

BACK PAPERS.

FURTHER PAPERS

No. 860/S

Office of Sanitary Commissioner,

Madras, 26th February 1904.

To

The Secretary to Government,

Local and Municipal Department.

Sir,

With reference to G.O. No. 2/D, dated 5th January 1904, I have the honour to forward herewith a Note by me on the subject therein referred to.

I have the honour to be,

Sir,

Your most obedient servant,

Lieut-Col, I.M.S.,

Sanitary Commissioner for Madras.

[E. 12]

1,200—7-10,06.

EDUCATIONAL DEPARTMENT.

READ AGAIN G.O., No. 2 Edl., dated 5th January 1904.

" " " " " 190

READ ALSO:—

C. No. [illegible], From the D. P. I., No. [illegible], dated [illegible] 1903.

" " 376, " " Sanitary Commissioner, " 860/S, " 29th Febry. 1904

" " " " " 190

ORDER No. 175, dated 12 3 1904

W.

With his letter read in G.O. No. 2 Edl, 5th January 1904 the D. P. I submitted an application from the Madras Diocesan Committee of the Society for the Propagation of the Gospel, for a grant of Rs. 10,870 in aid of the Committee's new building for St. Ebba's girls school at the Sullivan's gardens, Madras. The building has two dormitories attached to it, one of which is intended to accommodate 72 girls and the other 30 girls. As it appeared to Government

Government that the space and ventilation provided in these dormitories were not sufficient, the Sanitary Commissioner was requested to inspect the building and report on the matter. That officer accordingly now reports that the two dormitories actually contained only 54 girls on the night of his inspection and that even with this scanty population the larger dormitory ~~(at the time of the inspection contained~~ 17·5 volumes of Carbonic acid per 10000 and the smaller one 11. volumes per 10.000, as compared with 6 per 10000, the standard accepted ~~by sanitarians~~ of permissible impurity of air in habitations. He recommends (therefore that ~~not more than 45 inmates should be allowed in the two dormitories, provided~~ that an additional window be opened in the smaller dormitory, that windows be more freely kept open in both the dormitories, that the inmates be dispersed at regular intervals over the floor ~~space in them~~ and that further ventilation be provided ~~arranged for~~ in both rooms by

the n°. of inmates should be reduced

Yes: but was this a clerical error for 54? and an arithmetical error for 43?

M

Seems to be neither - 45 is made up of 35+10 - vide para: 7 of the S.C's report.

PJ

P.

by special openings at the eaves and roofs.

2. The Governor in Council has recently sanctioned an alteration in the Grant-in-aid Code and in the Educational rules under which dormitories attached to Educational institutions and intended for the accommodation of 10 or more inmates should provide 30 superficial feet and 400 cubic feet of space per head. Under this rule not more than 33 girls can be allowed in the larger of the dormitories attached to St. Ebbas' School and not more than 17 in the smaller dormitory. His Excellency in Council considers that unless the Diocesan Committee undertakes to conform to this rule and until it carries out the improvements in the ventilation suggested by the Sanitary Commissioner the building grant for which it has applied should not be paid. The Director will ascertain and report whether the Committee is prepared to give the guarantee and carry out the improvements

referred

4 6

referred to.

3. The Sanitary Commissioner also thinks that ~~arrangements should be made for the use of sprays for washing of hands and face and for general bathing, that the latrine arrangements which are now primitive in character and afford a bad object lesson for the mothers of future generations~~ the bathing area should be improved, that accommodation for the treatment of infectious cases ~~at least~~ until they are removed from the school and a special room for treatment of urgent cases of illness at night should be provided and that the dormitories should not be used for purposes of daily ~~the attention~~ sleeping. (should be provided in a separate building)

An extract from (para. 9) ~~of~~ his report will be furnished to the authorities of the school whose attention ~~should~~ will be drawn to ~~those~~ Colkin's recommendations on these points ~~of the Sanitary Commissioner~~.

DH 11/3/14

M.S.W. 12 30/4

2. The D.P.I. ✓ } Secy 15/5/14
" Sanitary Comm. } with extract from para 9 of his report

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