Plant-houses

Large plant house erected in 1884. See Supt's Rep for
Large plant house - partly removed Rep 1897 p. 1.
" " extensively altered Rep 1898 p 2
" " back & interior remodeled
" " Bank built in Rep. 1900 p 2
" " annex built Rep 1904 p. 2
" " budget 1907 p. 146 $750 for Fountains

(2,000—7/06.)

Botanic Gardens, Singapore,

STRAITS SETTLEMENTS.

November 14th. 11 ....., 190 .

Gentlemen,

I have the honour to ask permission to call for contracts to repaint the Planthouse.

Sufficient funds are available to meet this extra expense.

I have the honour to be,

Sirs,

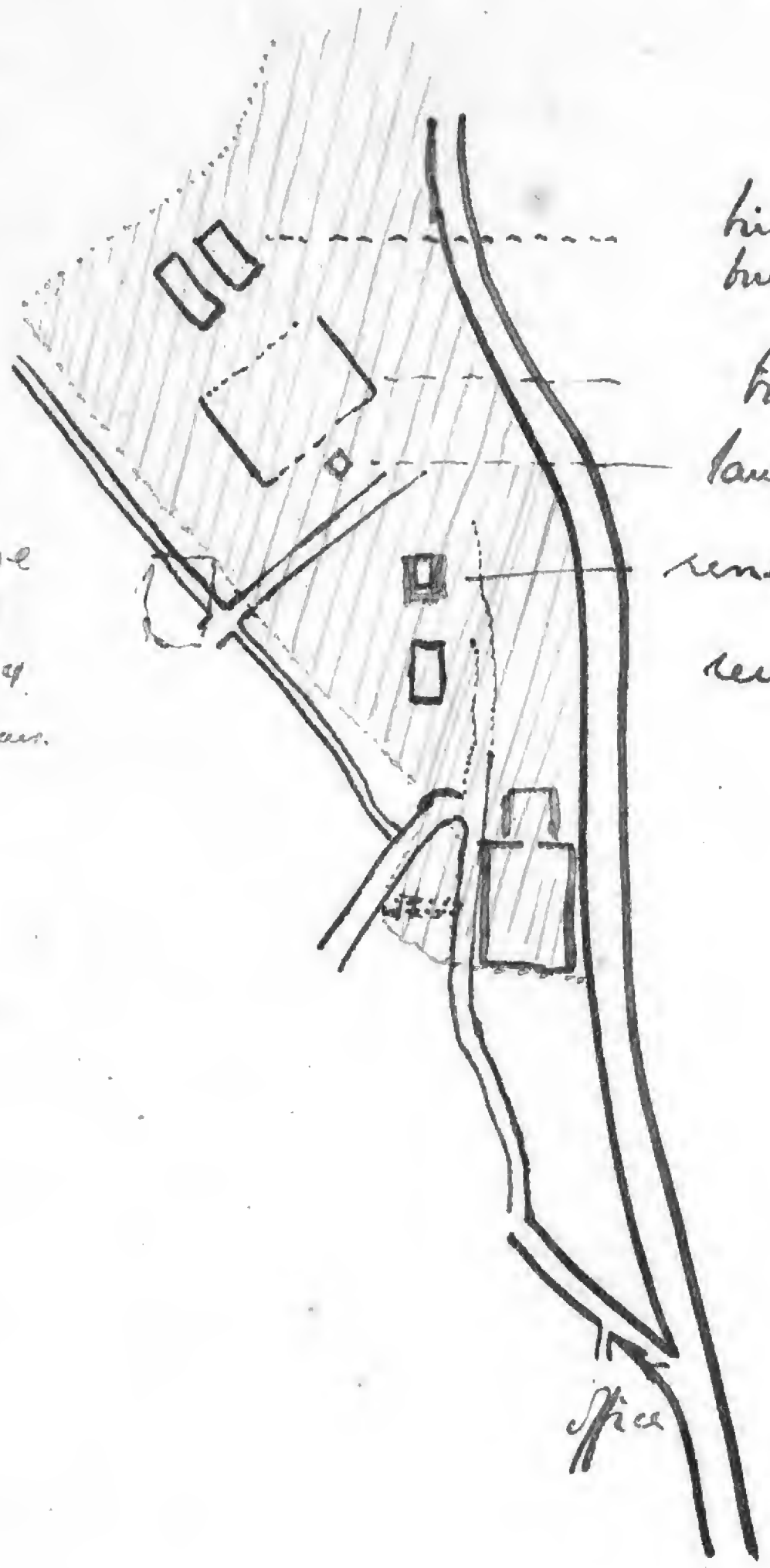
Your obedient servant,

Director of Gardens, S. S.

Approved H. N. Ridley

St. V. B. Down Esq.

Plan houses



built 1905 see Ref. 1905 p.2
built 1908 see Ref 1908 p 1

built 1901 see Ref 1907 p. 1.

bank built 1909 see Ref 1905 p. 2

removed 1901 & rebuilt 1905 repeat p 2

removed 1901. repeat p. 2

there was a house here built 1897 & demolished 1904 see Refs for these years.

B.I. 35/3

Minute paper No...... *Sheet No.*.....

Glass house with 3 spans
built Rep 1897 p. 1
Glass house demolished Rep 1904 p. 2
New Glass house completed Rep 1905 p. 2 ✓
Another 52 × 12 feet. Rep 1908 p. 1. ✓

Plant house with Thy tables built Rep 1901 p. 2 ✓

Nepenthes house removed Rep 1901 p 2

Acid & Hypnea house - burnt removed Rep 1901 p 2

Acid house rebuilt in iron. Rep 1905 p. 2

Potting Shed rebuilt
Seed Shed built } Rep 1905 p 1

Cement tank for germinating Egg plants and Rep 1902 p 2.

Mr. Berry. What houses did Mr Rutley call
~~Nepenthes house~~
~~Acid & Hypnea house~~
~~Acid house~~

128

(G 3)

From whom	N. of Gardens S. S Rees: Agents — Singapore
Place	
Date	CP — 4 — 05

Re: Intimate re: for Iron - Roof S Plant Shed.

Accepts his intimate.

Former Papers.	MINUTES	Final Paper.
116 enclosed 05		

B1-35/5

B1-2nd C

HOGAN & CO., LIMITED.
CIVIL, MECHANICAL AND ELECTRICAL ENGINEERS.
IRON AND BRASS FOUNDERS,
IRON AND COPPER SMITHS.
SHIP AND BRIDGE BUILDERS
AND
GENERAL CONTRACTORS.
MIRBAU ROAD.

TELEGRAPHIC ADDRESS: "HOGAN."

CODES USED: A. B. C. (4TH & 5TH EDITIONS.)

Singapore, 19th April 1905. 190

H. N. Ridley Esqr.

Director.

Botanic Gardens & Forests,

Straits Settlements.

Dear Sir,

We are in receipt of your favour of yesterday's date accepting our tender for iron roof of plant shed, for which we thank you. The work has been put in hand at once.

Yours faithfully,

H

Secretary

(G. 53

No:-I28/05

Botanic Gardens. Singapore,

STRAITS SETTLEMENTS.

I8th. April I905 190

Sirs,

I accept your estimate of $I25 for iron roof of plant shed, and will notify you when the shed is ready for you to start work in the mean time I should be obliged if you would have everything ready so that the work can be done quickly when started.

Yours truly

H N Ridley

Director of Gardens S.S.

Messrs. Hogan & Co

Singapore.

(1,000-Jan, 1905.)

B135/7

HOGAN & CO., LIMITED.
CIVIL, MECHANICAL AND ELECTRICAL
ENGINEERS.
IRON AND BRASS FOUNDERS,
IRON AND COPPER SMITHS.
SHIP AND BRIDGE BUILDERS
AND
GENERAL CONTRACTORS.
MIRBAU ROAD.

TELEGRAPHIC ADDRESS: "HOGAN."

CODES USED: A. B. C. (4TH & 5TH EDITIONS.)

Singapore, 14th April 1905. 190

H. N. Ridley Esqr.

D i r e c t o r,

Botanic Gardens & Forests.

Straits Settlements.

Dear Sir,

In reply to your favour of yesterday's date, re: iron work on plant shed we can undertake to supply heavier materials, that is, rafters to be Tee Iron 2" x 2" x 1/4" purlins of angle Iron 2" x 2" x 1/4" with all bolts and nuts and fixing in place for the sum of Dollars One hundred and twenty five ($ 125:-) .

Awaiting the favour of your esteemed order .

Yours faithfully,

Hogan & Co., Ltd.

SECRETARY

B1·35/8

HOGAN & CO., LIMITED.
CIVIL, MECHANICAL AND ELECTRICAL
ENGINEERS.
IRON AND BRASS FOUNDERS,
IRON AND COPPER SMITHS,
SHIP AND BRIDGE BUILDERS
AND
GENERAL CONTRACTORS.
MIRBAU ROAD.

TELEGRAPHIC ADDRESS: "HOGAN."

CODES USED: A. B. C. (4TH & 5TH EDITIONS.)

Singapore, 12th April 1905.

H. N. Ridley, Esqr.

Director,

Botanic Gardens & Forests,

Straits Settlements.

Dear Sir,

We can undertake to supply and fix in place light iron Tee rafters and Angle Tees for the roof of one of your smaller houses in the garden as per our tracing enclosed for the sum of Dollars Seventy five only ($ 75:-) .

Yours faithfully,

HOGAN & CO., LIMITED.

SECRETARY.

B1-39B

(G 53

No:-II6/05

Botanic Gardens. Singapore,

STRAITS SETTLEMENTS.

13th. April, 190 5.

Sir,

In reply to your estimate for iron works on Plant Shed will you kindly furnish estimate for iron work of double width and thickness.

Yours truly

Director of Gardens S.S.

To Messrs. Hogan & Co

Singapore.

(1,000-Jan., 1905.)

B1·25/10

No Minutes should be written on this page. A separate half-sheet to be used if required.

From Whom ....

Place ....

Date ....

POSSIBLE IMPROVEMENT of the

LARGE PLANT HOUSE, SINGAPORE.

Former Papers. | MINUTES. | *Final Paper.*

Committee,

The large flower house, Singapore, was built on the plea of the necessity of having a show building for Agricultural Shows. It was made a mongrel structure that emptied would not be unsuitable for shows, and when not wanted for shows could be filled with plants.

The plea of needing it occasionally for shows is no justification for the spoiling of it as a flower house.

I want to alter its stages and its roof. Towards getting that done I have had the accompanying report made by Mr. Anderson upon a visit to Penang.

Pages 1 and 2 and the last page may be read.

Philip Snowden[?]

27

Before going on to consider the Penang Pot Plants, species by species, a general inspection of the Penang Plant Houses, gives one the impression that plants can be shewn to much greater advantage in comparatively small houses, than by having all the various varieties, e.g. Palms and Ferns in one large house as in Singapore.

The various stages in Penang, though leaving much to be desired, are decidedly a step in the right direction. Generally, the plants in Penang could be staged with a much greater telling effect than can be hoped for in the S'pore plant house.

Taking this from the purely showman's point of view, Penang scores by visitors being able to see, generally, every individual plant. In S'pore, however, this staging effect is quite lost and indeed is quite impossible with the stages as they are at present. In many instances, the beauty of a plant is not seen unless the visitor can look down upon it and also when the plant in question is more or less separated from its neighbours.

In the case of the S'pore stages, this is quite impossible except perhaps in the first row of plants and in most instances, these happen to be the poorer specimens because of the narrowness of the paths.

Another point in favour of the Penang style of stages is that many fewer plants would be required and it would therefore be possible to obtain specimens of a much higher standard than at present.

Horticulturally it is somewhat difficult to compare the specimens in the two Gardens, for naturally the Penang plants could easily be greatly improved, indeed in some instances, the specimens, though clean, are decidedly poor.

On the whole, the Penang Pot Plants, excel over the S'pore plants by reason of their apparent cleanliness. This, in my opinion, is solely due to the better existing conditions in the supply of light and air. and also the higher elevation of P. Garden.

Nowhere is the entrance of air curtailed in any way and except in No.2, there is a most noticeable lack of the stuffiness so apparent to the visitor in the S'pore Plant House.

B1.35/13

With such perfect freedom in the circulation of air to the plant houses, a healthier tone is obtained and to this lack of circulation of air, both above and underneath the leaves of the plants, must be attributed the noticeable lack of tone of the S'pore Pot plants.

After carefully considering the houses at Penang and Singapore and the house in Kuala Lumpur, it is quite evident that attap roofs are not conducive to good results. In none of the places mentioned can the plants under attaps be said to be truly happy but are generally considerable drawn. This is most noticeable in S'pore because of the height of the attap roof and to a lesser degree in Penang and Kuala Lumpur.

House No.1.

This house is at present under repair and nothing in the way of notes could be made.

It is similar in size and shape to No.3 which is described in turn.

Pots versus planting out.

In considering the question of planting out versus pots, No.2 affords a good example of what might be done in this direction.

There is absolutely no doubt that many plants thrive infinitely better when planted out and this can be seen in No.2, though latterly, the house has been considerably neglected and the commoner varieties have been allowed to swamp the choicer ones..

Infinitely better results could be obtained than are noticeable in this house. There is the same stagnant feeling present and this is entirely due to the surrounding vegetation having been allowed to grow at will and this vegetation forms a dense hedge on one side of the house, excluding the necessary amount of air.

In considering this question from the point of view of adequate supervision by watchmen, such a scheme cannot be thought of, if the watchmen are to have an uninterrupted view of the whole house from one place.

If the main idea is to be from the watchmen's point of view, then some very formal scheme must be adopted, for naturally the plants will grow larger when planted out in their proper rooting medium than when they are confined to pots.

This supervision is not really necessary when plants are planted out, for beyond, say a Begonia leaf or two, very few visitors are likely to root up a plant and carry it away without being spotted at the gate, or entrance to the house.

For a house such as No.2 in Penang, shade is again the most careful point to be considered and split bertam chicks seem to be successful.

The roof, to my mind, is not quite high enough. Curved roofs seem to be the best from an artistic point of view and also from the purely horticultural side.

Straight paths should be avoided and the style adopted, absolutely informal with occasional pools of water(this entirely apart from the water supply necessary for the watering of the plants).

Such a house as this should be entirely devoted to the choicer species of plants and plants such as Thunbergia and Curculigo avoided.

Certain islands could be devoted to Aroids, others to ferns etc.etc..

It is quite feasible to make the Store plant house into one of this nature. Irregular stages running all the way round for plants which require more careful supervision in regard to watering than can be afforded when such are planted out.

Short list of plants growing successfully in No.2 Penang.

Iguanura spectabilis

Philodendron Marei

Cyclanthus bipartitus

Medinilla in variety

Spathyrhyllum cannaefolium

Tree Ferns (a little more shade required)

Pinanga maculata

Ludovia crenifolia

Cycads.

Cyrtosperma Johnstoni

Dieffenbachias

Heliconia rubro-striata (excellent)

Ptychoraphis singaporiensis

House No.3

The material used in the roofing of this house is as follows:-

in the four entrances,attaps are used with a covering of split bertam above the paths:

the actual centre is free of covering except for the meagre shade afforded by a fairly tall Livistona which was originally planted in the centre,but has almost outgrown its usefulness:

for the semi centre,split bertams are used and are placed about ½inch apart. These bertams last for about three years,and are simply nailed on to the framework of the roof.

The stages are flat and though full advantage is not taken of this in the general staging effect,yet every plant can be seen easily and distinctly and the character of individual plants is not impaired by the bunching so noticeable in Singapore plant house.

The most striking difference between the plants in this house and in the S'pore P.H.,is the total absence of dirty leaves. This ,I consider,is entirely due to the free circulation of air and also to the amount of diffused sunlight available.

The plants in the actual centre are not happy,it being too hot for the varieties employed.

I consider that the water in the centre would act more beneficially if the centre(actual) were not so exposed to the more or less direct sunlight. This could be done by removing the Palm and erecting a light roof slightly higher that the one as mentioned covering the semi_centre.

Name of plant | Whether better or worse grown in Penang. | Probable reason for this.

Dracaena Sanderiana | All specimens better in Penang than in S'pore. Shrubbier and altogether of a healthier tone. | Due to the drier locality and also in a lesser degree to the better supply of light and air.

Dracaena Goldiana | Doing much better in Penang, on shady side of centre stage. Under attap not so good. (under bertam best) | ditto to above.

Alocasia Lowii | Much better in Penang | Decidedly due to the presence of a constant circulation of air, and sufficient supply of diffused sunlight.

Schizmatoglottis calyptrata | Specimens not so good in Penang as in Singapore but plants not so drawn. | Due to slightly better supply of light and air, the latter most decidedly.

Schizmatoglottis zonata | excellent specimens in Penang. Clean healthy and not drawn. | ditto.

Ludovia crenifolia | Poor specimens and unhealthy plants in Penang. Much better in all ways in S'pore. | Entirely due to the wrong situation in which the plants are placed. Not sufficient shade and altogether too hot.

Xanthosoma Lindeni. | Much better in Penang. Though the individual leaves are not so large, yet the plants are more compact and make better horticultural specimens. | due to sufficient supply of air and correct light.

Anthurium picturatum | Cleaner plants in Penang but specimens not so large as in S'pore. | Absence of necessity to syringe-more air correct light.

Anthurium cristallinum. | In comparison with S'pore plants poor in Penang, but leaves fairly clean and of healthy tone. | Reason for poorness due to wrong potting compost used.

Anthurium Ferrierense | Compact and healthier looking in Penang and flowering apparently more frequently, but specimens not so large as in S'pore. | Light and air and defficiency in size due to wrong compost.

Anthurium (white spathe)	slightly cleaner and slightly. deeper green in leaf but specimens not nearly so large in Penang as in S'pore.	ditto to last
Anthurium magnificum	slightly healthier and cleaner in Penang but again specimens not nearly so large.	ditto to above
Maranta zebrina	Poor in Penang under attap. S'pore plants better(much)but slightly drawn by being under attap also.	want of light and air for S'pore. want of light and cultural attention for Penang.
Pleurnium variegatum	Poor specimens under attaps but better under bertams in Penang.	No suitable place for this plant in S'pore plant house as it would get much too drawn under present conditions as to light and air.
Carludovica palmata	Poor and unhappy in Penang. Good specimens in S'pore but a little yellow owing to want of correct degree of shade.	In Penang,entirely due to wrong situation,much too sunny.
Monalcrena singaporensis	Much poorer specimens in Penang but slightly more compact.	Penang too much sun S'pore too little sun and air.
Heliconia illustris.	Poorer specimens in Penang as far as regards size but better colour and healthy tone.	Want of attention in Penang.Want of correct light and air in S'pore. This applies equally to all vars.of Heliconia in S'pore they are much too drawn and lack colour.At present they are subject to shade of attap one side and almost the direct rays of the sun on the other,and consequently are drawn and scorched.
Palms.	In this house,the plants have a good healthy colour, but it cannot be said that the specimens are any better than in S'pore as far as regards size.They are decidedly clean,however,and lack the unsightly deposit so apparent on the S'pore Palms grown under Attaps.	Want of air and a decent supply of diffused light for those in S'pore underattaps.

Kentia Sanderiana,Kentia McArthuri and such like fairly common Palms.

81-35/20

Houses 4,5,6,7 are propagating houses so that it was somewhat difficult to form an idea as to the success attained fertile plants will naturally be constantly be changing.

Particulars of the plants in these houses at the time of my visit can be given if desired.

House No.8

This house has the covering afforded by the creeper, Anaecraegra racemosa and on the whole, quite sufficient shade is available.

There are three central stages running the length of the house with four side stages. All are quite flat and have no terraces.

On the side next House No.9 the stage has a roofing of Attap. The Caladiums cannot be said to be happy and the other half of this stage is devoted to the display of Orchids in flower. As these plants do not remain for any considerable length of time under the attap, no ill effect could be noticed.

Plenty of air is available and the Orchids seem to thrive exceedingly well. The greenness of the Ferns is most probably due to the largeness and deepness of the pots employed. Ferns generally do not require deep pots.

I enquired about the presence of mealy bug ? on the creeper but was told that none had ever been noticed. Should mealy bug ever attack the creepers employed for shade, then the only certain cure would be to cut the creeper down. This is mentioned because of the need for care in the selection of Creepers for ~~this purpose~~ the purpose of giving shade to a plant house.

Caladiums	better in S'pore in every way.	Penang plants small and inclined to be drawn by being under attaps.
Orchids	Generally better in Penang with few exceptions.	Situation largely responsible for this.
Calanthe veratrifolia	Better in Singapore	Probably purely cultural details responsible for this.
Coelogyne pandurata	Better in Penang	
C.cristata	ditto	
C.pubescens etc.etc.	ditto	
Asparagus		
Aeschynanthes Lobbii	Much better in Penang	Right shade and air.
Aeschynanthes obscnica	ditto	ditto
Adiantums Bausei macrophylla Colliasii tenerum polyphyllum trapeziforme etc.etc.	Better colour in Penang but plants evidently newly potted.	Plant house in S'pore,hopeless for this class of ferns. Much too stagnant and also the light is far from being right.
Adiantum Marisii	much better in Penang lovely specimen.	
Davallia pallida	proper in Penang.	cultural details lacking.

House No.8.

No.8 is entirely covered with Congea torrentosa. The arrangement of the stages is the same as in No.8. The house is about 3 feet lower than No.8.

Palms on the whole look better in the Congea House than elsewhere, but the staging leaves a little to be desired as the plants are bunched and lack individuality.

The two outside stages have two terraces or steps and in the case of the stage next No.8 the staging effect is quite good.

One point about the plants on this stage is that the plants are not nearly so clean as in other parts of the house, the leaves being covered with the fungus so noticeable in S'pore House. I consider this is entirely due to the absence of a sufficient supply of air. As mentioned above, No.9 is about two feet lower than No.8 and this throws the stage in question below the level of the stages in No.8, so that the air somewhat stagnates thereabouts.

Nephrosperma van Houtteana.	Much better in Penang.	.This Palm does not seem to thrive in S'pore.It has been tried repeatedly.
Carludovica palmata	Good colour but smaller specimens than S'pore.	Shade and air
Lygodium scandens.	Very good in Penang and much better than in S'pore.	The correct amount of shade and air.
Asplenium squarrosum	Much better in Penang. A lovely specimen in this house.	Evidently Penang suits this plant better than S'pore for in all situations,Penang scores.
Aeschynanthes Lobbii	Better in Penang.	Plentiful supply of air and correct light.
Curreria picturata.	No difference,if anything,the S'pore specimens are larger.	
Aspidistra lurida and variegata.	Better specimens in Penang.Larger and cleaner in every way.	Situation largely responsible for this, for all are good. Cleanliness,plenty of air and correct light.
Aglaonema crotatum	No difference	
Philodendron Marei	Better in Penang.	Ours somewhat neglected and crowded in Anthurium stage. Requires more air.
Dracaena Godseffiana	No better in Penang.	
Gastrochilus ?	Bigger specimens in Penang.	Largely due to big pots and more air.
Licuala grandis	Better in Penang.	Seems to be happier altogether in Penang than in Singapore.
Palms generally	no better specimens than in S'pore but colour deeper green and a little cleaner.	Specimens too much bunched on stages in P. Want a little more shade in S'pore.

Pinanga Kuhlii		
Phoenix rupicola		
Thrinax spp.		
Schizmatoglottis zonata	good, same as in House No.3.	
Maranta vittata	not so lanky in Penang, decently dwarf.	same complaint with ours as in case of Heliconias.
Heliconia sp.	good plants in Perang. Not in S'pore.	
Maranta zebrina	good and slightly more compact than in S'pore.	Might slightly better, and of course air.
Dracaena • Sanderiana	much better in Perang	similar reason as given in case of House No.3.
Alocasia Lindeni	not any better than in Singapore, a little cleaner and better tone but smaller specimens.	Ours have been a little neglected. They require more air than they can get at present.
Maranta sp.	Very good healthy plant in Penang.	Have not got this sp. in S'pore.
Aspidistra lurida	Good specimens but covered with fungus.	Not enough air for this plant.
Selaginella spp.	deeper colour in Penang and in the majority of cases, better specimens.	More air than ours get and the Penang plants are in larger pots in the majority of cases and are not packed as close as ours in S'pore.(stages)

B1.35/26

For the Singapore Plant House,I suggest the removal of all the existing stages.An irregular stage to run round the sides as at present but consisting of only two tiers,the lowest one about 2 feet from the ground level.

The centre to be devoted to plants in soil,in irregular islands and with,if possible,water as in Penang.

The annexe also to be devoted to rockwork,circular in shape and some sort of fountain or dripping well in the centre.

I suggest the utilization of the space at the end opposite to the present annexe as a flower house. Irregularly circular in shape,with low(3feet)stages round the sides and an irregular island stage in the centre for the staging of tall plants such as Sunflowers,pot ixoras etc.etc.Amaranthus and so on. The centre stage to be only about 1foot from ground level. ~~Stages~~ Stages and paths covered with gravel.

For shade,the roofing of the centre of the plant house in the shape of two semicircular arches as in No.2 Penang and to run the entire length of the house.

The side stages sloping as at present but without the excessively high pitch. The existing annexe,as in Penang No.3 (semi-centre)

Either bertam(split) or split bamboo(steeped) to be used as a roofing material. Bertams or Bamboos require to be tied together,either by wire or by string.

The suggested new Flower House would be entirely devoted to the exhibition of flowering plants and the few green plants necessary for staging effect. Good results were noticed in K.L.house by the employment of corrugated iron roofing,fairly highly placed,and irregular holes cut in the convex ridges. The space above the paths to be left open and the ~~roof~~ roof for the centre stage,about two feet higher than for the sides.

MEMO for Mr. Anderson in regard to Plant houses.

The large plant house of the Singapore Gardens has two sets of faults, one is in regard to the roof, and the other in regard to the stages. As regards the roof I am of opinion that it shuts out too much light from many parts of the house and stagnates the air. As regards the stages they raise large plants so much above the visitor that he cannot see them displayed at their best; and again administratively it is wrong that they should hide so much of the house from the watchman on duty, who if he is to see what visitors are doing must follow them indecently closely. If we come to exhibit, as I hope we shall do, better and better plants in the plant house, our watch must be more efficient, and for that the watchmen must be able to see further.

As regards the annexe, its gangways are far too narrow.

My idea of a plant house well suited to this climate is not at all met by the large plant house in Singapore but we have got to make the best of it, and to try to get in different parts of it the conditions which we should attain better by several smaller structures.

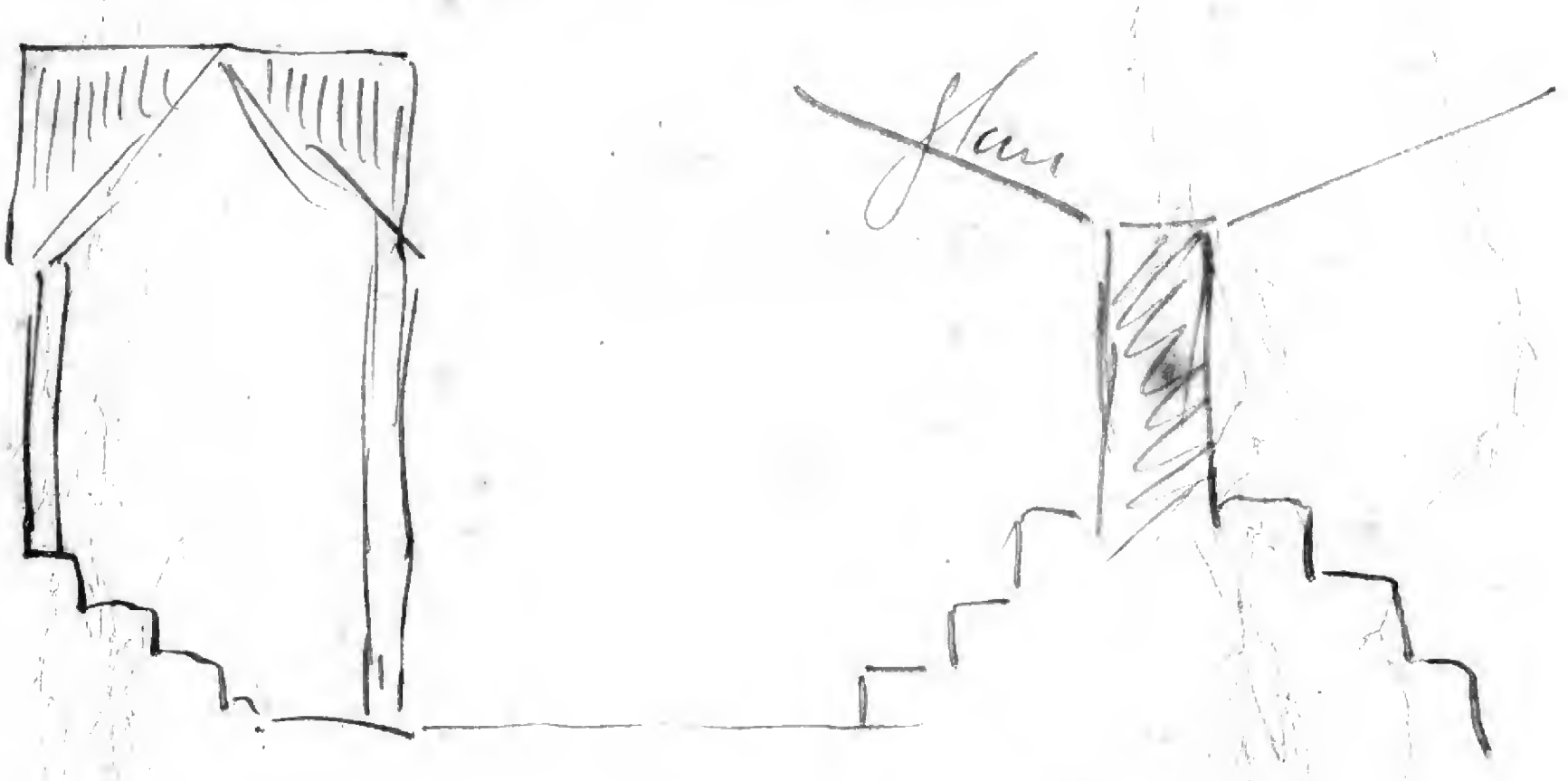
I think that we need a little glass so arranged that it does not stagnate the air, but keeps off the beat of heavy rain; this is for our exotic flowers raised from English seed. I think that we want to imitate the conditions of the forest where the sunlight flecks the ground only. And I think that we want to

obtain a place where the evening sun enters freely but the mid day sun is shut out altogether.

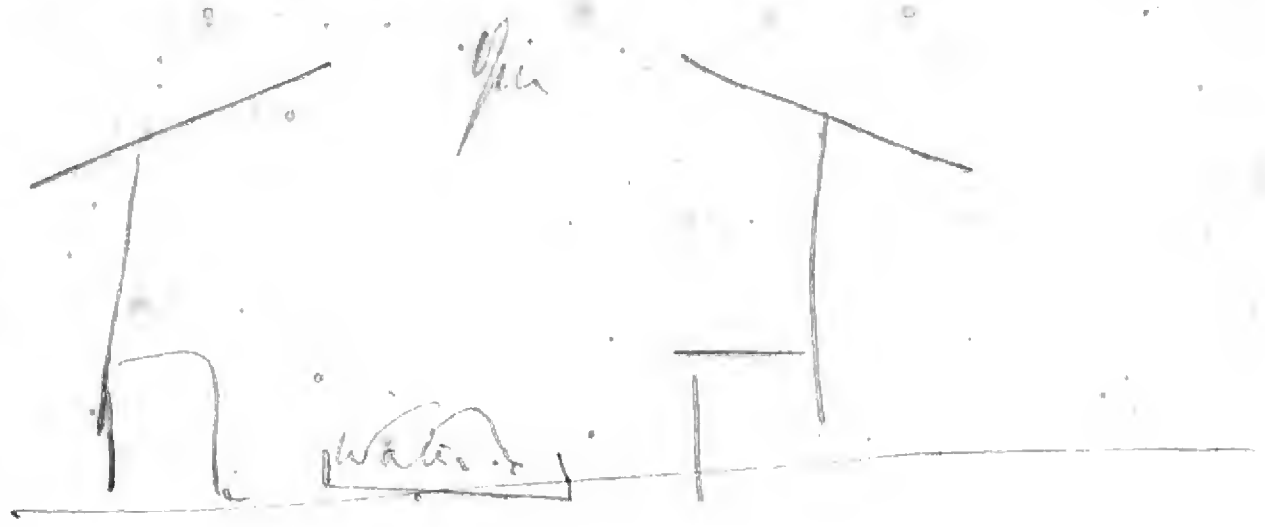
I believe that we could modify our existing structure at the least cost to suit our purposes by making the annexe into a fernery, and the main structure into a place of three (verbal) roof-conditions- i glass, ii lath or bertan, and iii no roof: and I suggest doing it in this way.

Over the central circular stand would be glass draining the rain water to the centre or to the back: round the outside would be the lath roof, and between an area of no roof. The lath-roof should not have the high pitch of the present roof as it stagnates air very much: but gables could be put into it at either end and in the middle opposite the steps, both because they would let air in nicely and so that visitors descending the steps might see that there are flowers in front of them. One must considered the showman's side.

The triangular stages of the main house, I would level. The three central stages of the annexe I would reconstruct as two only.



On visiting Penang, Mr Anderson will find a plant house thus constructed



He should consider what the central opening means and what the evaporation from the water. He will find other houses not quite so light, but all lighter than ours in Singapore.

It is probable that we do not need any water to supply moisture to the air: for Mr. Haniff states that he must have charcoal under his ferns and begonias to feed moisture to the air, and apparently we do not need it in Singapore. But I am sure that we need more light.

Mr Anderson will find the sides of the plant houses descending low. In the east the cultivation of the betle pepper is a high art, and it is always shaded from the rising and setting sun, whether shaded overhead or not. The need of this plant is typical of that of many, but not of all. We can get these diverse conditions in different parts of our plant house without trouble: but my experience leads me to believe that there hardly grows a Phanerogamic plant in Nature which does not get a little direct sunlight in some part of the day.

I want Mrs Anderson in Penang to take the

contents of the Fenang plant house species by species and to tabulate them in three columns thus:-

Name of plant	Whether better or worse grown in Penang	Probable reason of this.

He should also give consideration to the question whether ther is gain in planting the larger plants direct in the soil as is done in the largest house there.

No Minutes should be written on this page. A separate half-sheet to be used if required.