



SUPPLEMENT

To the HONGKONG GOVERNMENT GAZETTE of 30th April, 1887.

GOVERNMENT NOTIFICATION.—No. 178.

The following Report of the Superintendent of the Botanical and Afforestation Department for 1886, is published for general information.

By Command,

FREDERICK STEWART,
Acting Colonial Secretary.

Colonial Secretary's Office, Hongkong, 30th April, 1887.

BOTANICAL AND AFFORESTATION DEPARTMENT,
HONGKONG, 12th February, 1887.

SIR,—I have the honour to submit the Annual Report on the Botanical and Afforestation Department for the year 1886.

2. The Superintendent was absent on leave during seven months of 1885, and from the 1st of January to the 2nd of June of the year under report. Mr. WESTLAND deserves credit for the efforts which he made to maintain the efficiency of the Department while Acting Superintendent.

3. ESTABLISHMENT.—I have much pleasure in recording the good conduct of the Head and Second Foresters during a period of trouble and trial when their characters were put to a test. The Head Forester, Mr. LO AQWAI, was the first apprentice taken when I instituted the system of Garden Apprentices about twelve years ago. He is now the most valuable Chinese in the department.

4. A Temporary Clerk was employed for six months to assist the Acting Superintendent and the Permanent Clerk.

5. In consequence of the Dismissal of the Permanent Clerk an examination was held by the Government for the vacant post, Mr. S. MOOTIAN, being the successful candidate, received the appointment. He has applied himself assiduously to his duties, and has given satisfaction in every way.

6. As usual there have been a great many Changes in the Staff of gardeners and labourers. These frequent and unavoidable changes are very detrimental to the state of efficiency which I am anxious to see attained. It is impossible to get trained gardeners to fill vacancies as they occur, the men who are engaged are, as a rule, ordinary coolies chosen on account of moderate intelligence, good character and activity, the ordinary and special duties required of them have to be learnt after the men come to us. All the operations of the gardens have to be daily and constantly supervised which absorbs nearly the whole time of the Head Gardener. Such fairly good Chinese gardeners as there are can obtain \$7 or \$8 a month, and the men, of course, are unwilling to come to us for \$6 a month, or even for \$7 (which are the highest wages paid by this department for gardeners) as they know that here the men have to work harder than in private service where they have very much more of their own way. There is, however, a prospect of some improvement, as provision has been made for an increase in 1887 of a dollar a month each for a few posts in the department, and this cannot but have a good effect.

7. Provision has also been made for the appointment of a Carpenter who will be fully employed. By this arrangement the profits hitherto made by the contractor will be saved, besides securing much greater convenience in always having a carpenter at hand to attend promptly to repairs, and other work.

8. An additional Forest Guard will be employed in 1887. This increase was much needed, as the patrol of the whole island, with the great increase in number and size of trees since forest guards were appointed six years ago, needs correspondingly increased vigilance from the protective staff.

BOTANIC GARDENS.

9. FOUNTAIN TERRACE.—The improvements long projected, and referred to in my Report for 1884, were commenced in the beginning of 1885, by removing from the western end of the terrace trees which were neither very ornamental nor useful, or which were represented adequately by specimens of the same species in other parts of the Gardens. They were not in keeping with their position

and surroundings and the formal arrangement of this popular and beautiful portion of the Gardens. After the removal of the trees, the space they occupied was laid out in beds, the poor soil from which was replaced with better material. These beds were partially planted with roses at the time, and the planting was completed during the past few months. The work of converting the remaining, and larger portion of the ground on the eastern side of the Fountain has been resumed lately, and it will be completed very soon. The arrangement adopted for the improvement of the terrace is designed for two purposes. One is to replace the large trees with plants of a more suitable nature for the character of the place. The other object is to provide a suitable place for concentrating the collection of roses. The roses have hitherto been cultivated in various scattered parts of the Gardens, a method resulting in inconvenience and loss of time in management, as well as exposing the flowers to the cupidity of visitors and professional thieves. For some years flowers in general and roses in particular have received careful and regular attention from flower stealers, who have learnt their business so well that they manage to elude the vigilance both of the watchman, and detectives who have been specially detached for this service. These thieves find a good market in the town for cut flowers, and the very numerous entrances (there are nine) to the gardens, and the low walls which surround the grounds greatly facilitate the ingress and egress without detection of thieves. It is very desirable that something should be done to check flower stealing, but at present there does not seem to be much prospect of the possibility of going much further than the concentration of the roses in one place where they can be more readily seen.

10. On the top of the bank at the north side of the terrace a Collection of Creepers has been planted, and an Iron and Wire Trellies 300 feet long and four feet high has been placed for their support.

11. GREVILLEA AVENUE.—The western end of this walk was a *cul de sac* which visitors, instead of retracing their steps to escape from when they reached its end, got out of by climbing up the grass bank between it and the small walk above; by this the grass was continually worn off. For the convenience of visitors, and the improvement of the end of the avenue, a flight of steps has been made up the bank, and some rock work on each side has been constructed and planted with ornamental foliage plants, which will grow in the shady situation.

12. Epiphytal Orchids (*Phalænopsis spp.*) have been placed on the trunks of the Grevillea (Silky-Oak) trees which compose the avenue. The suitability of the climate for the cultivation of *Phalænopsis* has yet to be proved. So far the orchids, although they were only indifferent specimens of vigour when placed on the trees, seem to afford a promise of success, but the cold of winter, which is not yet over, is the severest trial they have to contend with.

13. THINNING AND REMOVAL OF TREES.—Trees and plants of value and beauty which were in danger of having their symmetrical development dangerously interfered with by neighbours which had already fulfilled the purposes for which they were originally planted, and which were afterwards occupying the places of interlopers, have been going through a course of ejection for several months. A couple of foresters have been employed to do this carefully. There are still of some kinds of trees far more individuals than there should be in the Gardens, which must gradually be withdrawn. Until this is done it will be impossible to provide suitably for and to introduce trees of new, beautiful, and interesting forms.

14. PALMS.—A very considerable augmentation of these has taken place. New species have been introduced from various parts of the world, which have raised the number of those in cultivation to one hundred and four. Most of them are planted in permanent positions, but there are others growing in pots and waiting for fit positions to be prepared for them. The limited ground available will not permit the collection to be very much extended, but when the roses are established in the new rosary, the plot at present occupied by the plants in the New Garden will be available for them.

15. This climate has been found suitable for all palms yet introduced with the exception of *Maximiliana Martiana* and *Stevensonia grandifolia*, both of which have repeatedly succumbed to cold in the dry season. The former is a native of North Brazil and Guiana, and the latter of the Seychelle Islands. The inability of these two plants to bear with impunity the cold of this climate is interesting when we consider that other plants, including palms, from the same and from equally as hot regions exhibit no ill-effects from the cold.

16. CONIFERS.—Not many additions have been made to these. *Dacrydium elatum*, a very beautiful and graceful conifer has been introduced from Penang, and promises to flourish in Hongkong. Before much is done in the increase of the collection, the ground for their reception must be extended, this, however, is possible when means are available. The Conifers being side by side with the Palms make a very pleasing and interesting assemblage, which arrests the attention of intelligent visitors and illustrates in a comprehensive space the interjunction of the regions in which these two most interesting, beautiful, and useful families of the vegetable kingdom luxuriate.

17. GLENEALY RAVINE.—This remains in a slovenly condition, but year after year leaves us in want of means to improve it. The shrubberies require re-arranging and re-planting. The grass lawns are also in very bad order, but it is useless doing anything with these until the string of people who daily walk across them to scoop up water from the nullah can be diverted. This, I trust, will be possible as soon as the necessity for the coolies to come in search of water is removed.

18. PLANT HOUSES.—The fern collection continues to improve and it shows the great advantage which the house constructed for its accommodation three years ago has been to it, not only in providing the more suitable conditions which were indispensable for successful cultivation, but also in exhibiting the beauties of the plants to greater advantage.

19. The plant house which was built two years ago for other classes of plants, especially foliage plants and orchids, has also been successful in the purpose for which it was designed. A number of orchids which had previously not been successfully cultivated have made better growth, and been preserved in a healthy and vigorous state in consequence of our being able to meet their requirements more completely by the facilities to regulate the shade, shelter, and moisture which the house affords. There is, however, room for great improvement in orchid cultivation, which can only be achieved by the closest and most constant study of the wants of the plants, and unceasing supervision and direction of the workmen in the application of all that plants require.

20. The old structure with a glass roof, the first one of any kind which the Gardens possessed, and which I had built 14 years ago, contains ornamental foliage plants, some orchids, and a few ferns which cannot be grown in this climate without protection from the cold and dry climate of the cool season. These plants it would be utterly impossible to grow without such protection. The house, however, in both size and design meets in a very imperfect manner the needs of the plants; it is in a rotten, tumble-down condition, but I am loth to appropriate much money for repairs to it.

21. This house has fulfilled a good purpose in proving that with such aid very interesting and lovely plants may be grown here, which otherwise it would be impossible to keep alive. Instead of repairing it I hope the Government will be able to grant a sum of money for the Erection of a Glass-house which will be more commodious, and which will be worthy of our justly famed Gardens and Color^y. The house could be filled at once with plants, and it would be a source of the greatest pleasure and benefit to the public.

22. AVIARIES AND ANIMALS' PENS.—In the aviaries several birds have been missing, and others found dead. The assumption is that the mischief has been done by some animal, probably by cats wild or tame. I have not attempted to procure other birds to take the places of the missing ones, because, I hope during the year to be able to put up some new cages which will exclude cats from the larger birds, and rats from the smaller ones. When these cages are up, a few more birds will be obtained.

23. The posts and wire netting which enclose the deer and large birds are much decayed, as well as the little houses inside. All of this I hope likewise, during the year to put in better order, and to improve the general appearance of the pens.

24. ST. IGNATIUS' BEANS (*Strychnos Ignatii*, Berg.)—I am indebted for specimens of dried leaves and wood of this to Mr. CROW, the Government Analyst, who has exerted himself in obtaining them from the Philippine Islands in order to endeavour to clear up the botanical origin of this important drug. Mr. VIDAL, Inspector-General of Forests at Manila, however, has succeeded in procuring complete specimens necessary for the conclusive determination of the plant. A description and two plates have been inserted as an appendix in the "Revision de Plantas Vasculares Filipinas" which Mr. VIDAL published last year. Descriptions of the plant were given by LOUREIRO as far back as 1793, and by BLANCO in 1845, but no complete herbarium specimens seem to have been accessible until last year.

25. CHINESE STAR ANISE.—In my report for 1883 I mentioned that through the enterprise and kindness of Mr. H. KOPSCH, who was then Commissioner of Customs at Pakhoi, some very small seedlings of what was reputed to be the Chinese Star Anise plant had been obtained. These were very carefully nursed, and they had been watched and well cared for since that time. One of them has grown into a small tree 10 feet high, and in September last it rewarded us for the care bestowed on it by producing a few flowers, which were sufficient to enable the species to be ascertained. On reference to the works in the Gardens library I found that it was neither *Illicium religiosum* Sieb. et Zuc. nor *I. anis-atum*, Linn. The former is the Japanese Star Anise and the latter is the plant which had been supposed to yield Chinese Star Anise. I submitted specimens to Kew Gardens for comparison with the dried plants stored in its magnificent herbarium, and with descriptions of species in the library there. Mr. THISELTON DYER, the Director of the Gardens, in reply informs me that the specimen sent is referred to *Illicium cambodiense* of which Kew has specimens from Dr. PIERE besides the latter's figure in "Flore Forestrie de Cochinchine," and that it is nearly allied to *I. Griffithii*, H. f. and T., and *I. majus*, H. f. and T., two Indian species. This is an important additional step in this very interesting question, but the seedlings having been obtained through natives, the question of the source of Chinese Star Anise cannot be considered quite settled, as we have yet to prove that the plants which we have of *Illicium cambodiense* are identical with those which really furnish the Anise of commerce. This cannot be satisfactorily decided until the Anise plants are seen in the districts where they grow by a reliable European, or until our plants produce seeds, when the capsules and seeds can be compared with those in trade; if the two then prove to be identical we may feel pretty sure that the origin of Chinese Star Anise has been discovered. The few flowers which were produced last year were all

wanted for dried specimens, but if the tree blossoms again this year, which there is every reason to expect it will do, the flowers will be left on the tree and fertilized for the production of fruit which will no doubt succeed the flowers.

26. BAMBOO.—In my annual report for 1882 I stated that I had brought together in one collection twenty-five kinds of bamboos. These have continued to do well, and some further additions have been made. I hope whenever there is an opportunity to still further increase the collection. The bamboos of China are of great interest and utility and many of them are probably unknown to science. It is impossible to assign them to their true places in systematic botany until flowers are obtained from which a complete and satisfactory study of them can be made. The bamboo flowers at such long intervals that if we trust to travellers being able to furnish the desired flowering specimens the day will be very far distant when the study will have made much progress. One reason why, the different kinds should be cultivated in these Gardens, is that when flowers are produced they can be immediately secured for investigation.

27. A year or two ago Dr. MACGOWAN kindly sent me specimens of the very interesting square stemmed bamboo, but unfortunately they did not survive the passage. When he was passing through the Colony recently Dr. MACGOWAN was good enough to promise to send me a further consignment, I hope, therefore, to have the plant in cultivation shortly.

28. While writing this note on bamboos I have received a letter from Mr. DYER, the Director of Kew Gardens, in which he says in reference to this very subject:—"The Chinese species of this group are very badly known. There is a kind with large leaves which is used for lining tea chests, but about which nothing else is known. It would be a most important thing to take up vigorously the study of bamboos and procure specimens whenever they are to be met with in flower."

29. TREE TOMATO.—(*Cyphomandra betacea*).—Vigorous plants which grew from seeds sent me by Mr. MORRIS, the late Director of the Jamaica Botanical Department, produced a crop of fruit during the summer, but heavy rains which occurred at the time so seriously damaged the plants that the fruit did not mature properly. I fear that the saturated condition of the soil during the rainy season will prevent this useful plant being successfully grown in the Colony. In the drier, and more sandy soil of Kowloon, however, it is possible that it may succeed.

30. DILLENIA SPECIOSA.—An Indian tree which was introduced about ten years ago bore a heavy crop of fruit. In India the fruit is used for tarts. That which the tree bore was found to be a fairly good substitute for apples, which it somewhat resembled.

31. VITIS MARTINII (?)—The Cochin-China vine again yielded a very heavy crop of fruit. This has received a good deal of attention in America where it is being experimented with as a new wine producer. For this purpose it has been spoken of favourably. It is possible that in some climates which are unsuitable for the cultivation of the grape-vine this one might be of considerable service, I tried the fruit in tarts, and the flavour was found to be good and palatable, but the large seeds are objectionable; however, it is possible that this drawback might be diminished in time by cultivation. The large leaves of the plant give it a distinguished and ornamental appearance which is an additional recommendation for its finding a place in tropical gardens, if not even in hot-houses of temperate climates.

32. GOVERNMENT HOUSE GROUNDS.—When these were laid out many years ago they were planted with such things as could be most readily secured, but unfortunately the selection and variety of trees chosen was in consequence not so good as desirable. From time to time a good many objectionable trees have been removed and replaced with others of a more ornamental character, amongst them being a large number of palms and some conifers. These have all done well and greatly improved the appearance of the garden. There is still a large number of trees, notably the very common banyans and clumps of bamboos, which mar the effect and effectually stand in the way of further improvements which ought to be made without delay.

33. PLANT SALES.—The demand for plants continues to steadily increase. During the year 1887 plants were sold, and they realised \$409.35, which is an excess of \$137.50 over the sales for 1885. The sales would have been greater if the supply had been equal to the demand. Means are not adequate for the cultivation of certain kinds of plants, but I hope that a re-arrangement of nursery appliances, and an extension of the ground which will be effected this year will place us in a better position to meet public requirements, and a growing taste for plants. A Glass-house fifty feet long is in course of construction, when finished it will be used for propagation and growth of delicate plants which in the early stages of growth require its protection. A new Catalogue of Plants for sale in 1887 has been printed.

DISTRIBUTION AND EXCHANGE OF PLANTS AND SEEDS.

34. The total number of plants and trees distributed was 6,771, and of packets and bags of seeds 180 weighing about 40 lbs. Of the trees and plants 1,918 were sold, 2,800 supplied free to the Royal Engineers for planting at the new forts, 800 given to various Police Stations and planted at the Government Hospital new grounds, and the balance, 1,253, were distributed in exchange.

35. Of plants received in exchange the number was 1,326, and of bags, boxes and packets of seeds 186, weighing about 70 lbs.

36. The following is a list of Recipients of plants and seeds:—

Acclimatization Society, Brisbane.	Edge, Rev. J. C.
Acting Governor of Fiji.	Faber, Rev. E., Shanghai.
Armstrong, A. G.	Hambling, H. W.
Assistant Superintendent of Forests, Penang.	Henry, Rev. B. C., Canton.
Awan.	Humphreys, J. D.
Bamsey, W. S.	Lane, Crawford & Co.
Botanic Gardens, Cambridge, England.	Liot, E., Peking.
" " Ceylon.	Livesey, J.
" " Melbourne.	H. E. the Governor of Macao.
" " Mauritius.	8 Police Stations.
" " Natal.	Metta, S. M.
" " Saharunpur.	Patrait, Rev. C. E.
" " Sydney.	Ribeiro, F. V.
" " Townsville.	Royal Botanic Gardens, Calcutta.
" " Trinidad.	" " Kew.
" " and Plantations, Adelaide.	Silva, J. M. A.
Botanical Department, Jamaica.	Woodin, E. L.
Coxon, Mrs.	Wotton, W.
Cundall, C. H., Manila.	

37. The following is a list of the names of persons and institutions to whom I am indebted for plants, seeds, and animals:—

Armstrong, J. M.	Faber, Rev. E. Shanghai.
Armstrong, A. G.	Henry, Rev. B. C., Canton.
Botanic Gardens, Hobart Town, Tasmania.	Holmes, A. M.
" " Jamaica.	Italian Convent.
" " Mauritius.	Lammert, Mrs.
" " Natal.	Mitchell, Captain.
" " Saharunpur.	Royal Botanic Gardens, Calcutta.
" " Townsville.	" " Ceylon.
" " Trinidad.	" " Kew.
Chee Bee.	Shepherd, Mrs.
Cooper, Wm. M., Ningpo.	Sunda Sing.
Coxon, Mrs.	Vidal, S., Manila.
Cundall, C. H. Manila.	Walker, H., Borneo.
	Woodin, E. L.

38. To the Royal Botanic Gardens, Kew, I am indebted for two Wardian cases of useful and ornamental plants which I selected at Kew and brought with me when I returned from England in June.

39. A valuable collection of orchids was kindly contributed by Dr. KING, Superintendent of the Royal Botanic Gardens, Calcutta.

40. SENOR DON SEBASTION VIDAL Y SOLER, Inspector-General of Forests, Manila, also kindly sent a very valuable collection of Manila orchids.

41. Kew also sent out a number of succulent plants which should have special mention.

42. LOAN PLANTS.—The collection grown specially for loan for decorative purposes at public balls and other entertainments has not been in such good condition as I hoped they would be by this time, but before the next season of festivities I hope that, with more special care devoted to them, they will be more worthy of the purposes for which they are intended. These plants are always lent free, the only charge made being that for their conveyance.

43. GOVERNMENT CIVIL HOSPITAL.—Application was made to this Department to plant with shade and ornamental trees the new Grounds adjacent to the Hospital which had been designed for the recreation of the patients. A considerable amount of planting was done accordingly, but the prospect is not anticipated of the successful results being achieved which might have been had this Department being placed in a position to deal with the grounds at a much earlier stage in the progress of their formation.

44. REGIMENTAL BAND PERFORMANCES.—Throughout the summer months the Band of the 2nd Northamptonshire Regiment, through the kindness of the Colonel and Officers, entertained the public every Sunday, commencing at 9 o'clock P.M. when the weather permitted, and during the cold weather commencing at 3.30 P.M. It has been the custom to illuminate the Gardens for these performances with Japanese paper lanterns. These illuminations necessitated the erection on Saturdays of material

on which to hang the lanterns, and which, in consequence of Sunday being a *dies non* remained until Monday. These fixtures were thus unsightly for the whole of one day and parts of two others. The lanterns also necessitated the attendance of a number of men. To dispense with the unsightliness of the lantern fixings, the attendance of men on Sundays, the expense of the lantern illuminations, and the circumstance of the lanterns being subject to extinction of their lights by a sudden shower I had the honour to propose the introduction of gas for the purpose of illuminating the two terraces and entrances. The proposition was approved and the necessary vote for carrying out the work was placed at my disposal, when gas was at once laid on and the requisite fixings were made.

45. At the request of the Colonel of the Regiment a Wooden Platform two feet high and 28 feet in diameter was constructed for the use of the Band when it performs in the Gardens. At present there is only one situation where this platform can be placed. It has to be carried and put in position on Saturday, where it remains until Monday. When it is not in use the appearance of the platform to say the least, does not add to the beauty of the terrace. It would be desirable to find another place for it, if this can be done without interfering seriously with the effect of the music, where the platform might be planted off from view.

46. AL FRESCO FÊTE.—In November a large Fête in aid of the Alice Memorial Hospital was held in the Gardens on two nights. Very extensive preparations in the way of mat structures for theatre, fancy work stalls, refreshments, bar, and other things had to be made. I believe there were about 6,000 people admitted to the Gardens on each night. Considerable damage was done to the grass turf, and most of the flower beds which had just been filled for the winter season were so much trampled on that they had to be replanted after the fête was over, some shrubs and plants in pots were also destroyed. The staff for some time after the fête had to be withdrawn from their usual occupations in order to get the Gardens into respectable order again.

47. HORTICULTURAL SHOW.—The Annual (15th) Flower Show was again held in the Gardens. The space required for the exhibits was greater than it previously had been. These shows have been productive of the greatest good in the cultivation of vegetables, in which, as is most desirable, the Chinese take more and more interest, which is a proof that to them the industry is a paying one.

48. It would greatly enhance the value and interest of the shows if exhibitors would have each plant carefully and conspicuously named.

49. A new interest was attached to the exhibition last year by the award of Silver and Bronze medals—called Belilios Medals—and Money Prizes provided for by a handsome Endowment Fund which was generously placed at the disposal of the Committee by Mr. E. R. BELILIOS. It is hoped and expected that these prizes, which will be offered every year, will still further stimulate horticultural enterprise in the Colony.

50. OFFICE.—Since my return from leave I have devoted much time to the institution of an improved system of office work and arrangements, which were urgently needed, and of the working up of arrears in both ordinary routine, and correspondence. Improved furniture and conveniences were pressingly necessary, and they have been obtained. By these improvements work is greatly facilitated, and much time is saved.

51. In consequence of the absence of the Superintendent for half the year correspondence, especially foreign, has not been so great. The average number of letters despatched from the office for the year was about 1,500, of which one-third was foreign correspondence.

52. In addition to the general Administration of the Department the Superintendent either writes or drafts all of the Correspondence, directs and supervises the Forest work, and attends to the keeping and progress of the Herbarium with the aid of native assistance only. In both office and herbarium there is room and necessity for more skilful assistance than that which is available, as it is impossible to entirely keep up with the increasing demands of important subjects which are continually pressing for attention.

53. The time of the Head Gardener is entirely taken up with the management of the native staff within the Botanic and Government House Gardens and the execution of the manifold operations therein, and with the sale of plants.

54. HERBARIUM.—More and more interest is being directed to the Botany of China, and it is a pity that this institution which in many respects is so conveniently situated for research in important and interesting subjects has not the means for extending and more completely fulfilling the work which still remains to be done in bringing to light the botanical treasures of the Chinese Empire. However, I acknowledge with pleasure the aid which the Government has so generously placed at my disposal so far for botanical research. Valuable results have been obtained for some years past, results which have met with the hearty acknowledgment of eminent scientific men in England, and the last year has, although there was so little time for scientific work, had a large share of good results.

55. In this work I have to thank the Rev. B. C. HENRY, of Canton, for a large package of plants which he collected and dried during a journey across the island of Hainan. I named such plants of the collection as were known to me, and submitted the remainder, to Kew Gardens. The result of the investigation there proved the collection to be of unusual interest, and of richness in new species.

Careful and intelligent travellers like Mr. HENRY are able to render great and valuable services to botany while on journeys undertaken for other purposes. I should always be glad to receive collections from travellers and also to give such advice and assistance as might be needed in indicating the best methods of collecting and preserving the specimens.

56. To the Rev. E. FABER I am also indebted for a fine collection made in the neighbourhood of Ningpo and Shanghai. These plants are of much interest, but they have not, for want of time, been yet fully examined.

57. Mr. W. M. COOPER, Her Majesty's Consul at Ningpo, is also entitled to best acknowledgments for botanical specimens and information of much interest which has been communicated from time to time, as well as for consignments of seeds of useful plants.

58. Mr. WESTLAND has been successful in the discovery and collection of several new plants on the mainland and islands close to Hongkong, on a few occasions when he was able to get away from his duties in the Gardens.

59. The year has seen the commencement of the publication by the Linnean Society of the "Index Floræ Sinensis" or an Enumeration of all the known Plants of China. This establishment has been of much service in contributing to Kew Gardens material and information for use in the production of this very important work.

60. By the death at Amoy in June, of the late lamented Dr. HENRY FLETCHER HANCE, China lost not only its most learned and courteous botanist, but also the rich collection of dried plants, and an extensive botanical library. I at one time hoped that part of the herbarium might have been secured for Hongkong, but instead of this being so, the whole Herbarium has been purchased by the Trustees of the British Museum.

61. There is immense work to be yet done in China, not only in the discovery of a vast number of plants which it is certain are yet unknown to science, but also in the introduction and collection of information on plants used in medicine and domestic economy. In the advancement of such work, this Department, with increased facilities, could render still more important services.

62. LIBRARY.—My visit to England afforded a good opportunity to procure a number of books which were required to augment the library of the Department. With the aid which the Government was good enough to place at my disposal this opportunity was not lost.

63. Following is a list of the titles of works, including the periodicals which are taken, that were added during the year:—

A new Species of Cycas, Dyer.
 Balanophoræ, Griffith.
 Botanical Magazine for 1885.
 Botany of the Voyage of the Herald, Seemann.
 Commelynaceæ et Cyrtandraceæ, C. B. Clarke.
 Cryptogamic Plants, Berkeley.
 Descriptive and Analytical Botany, Le Maout and Decaisne.
 Dr. Cantors' Plants, Griffith.
 Early European Researches into the Flora of China,
 [Bretschneider.
 Enumeratio Plantarum, China; Bunge.
 Ferns of British India, Beddome.
 Florula Adenensis, Anderson.
 Flora British India, Parts XII. and XIII.
 " Capensis, Harvey and Sonder.
 " Cochinchinensis, Loureiro.
 " Japonica, Siebold.
 " " Thunberg.
 " Javæ Blume.
 " of India, Roxburgh.
 " of New Zealand, Hooker.
 " Vitiensis, Seemann.
 Flowers, Fruits and Leaves, Lubbock.
 Forest Flora of British Burma, Kurz.
 Forests and Moisture, Brown.
 Gardeners' Chronicle for 1886.
 Gardens of the Sun, Burbidge.
 Geographical Distribution of Ferns, Baker.
 Geography of Plants, Daubeny.
 Hydrology of South Africa, Brown.

Icones Plantarum Sponte, China.
 Icones Selectæ Plantarum, Japan; Kaempfer.
 Illustrations of Natural Orders of Plants, Oliver.
 Journal of Botany, Vols. IX and XXIII.
 Latin Dictionary, Smith.
 Ling Nam, Henry.
 Les Palmiers, de Kerchove.
 Manual of Botany, Balfour.
 " of " Bentley.
 " of Timber Trees, Gamble.
 Memoire sur la Famille Melastomacées.
 Modern Forest Economy, Brown.
 Nomenclature of Japanese Plants, Matsumura.
 On Nepenthes, Hooker.
 On the Movements of Climbing Plants, Darwin,
 Pen Ts'ao Kang Mu.
 Peruvian Bark, Markham.
 Plantæ Davidianæ, Franchet.
 Preparation and Use of Rheeæ Fibre, J. Forbes Waston.
 Reboisement in France, Brown.
 Remarks on Gnetum, Griffith.
 Reports on Insects Injurious to Plants, Whitehead.
 Residence Among Chinese, Fortune.
 Sea Weeds, Grey.
 Select Extra, Tropical Plants, Mueller.
 Social Life of Chinese, Doolittle.
 Tea Districts of China, Fortune.
 Ternstroemiaceous Plants, Champion.
 Text Book of Botany, Sachs.
 Wanderings in China, Fortune.

64. The parts which have been published during the year of the "Flora of British India," the "Index Floræ Sinensis" (several copies), and some parts of "Icones Plantarum" have been generously presented by Mr. DYER, of Kew Gardens, for which donations I have to sincerely thank him.

65. I have also to acknowledge with thanks, the various Reports of the Indian Forest Department, which have been generously contributed as they were published.

66. In addition to these I am also indebted for various Annual Reports and Papers of the numerous Indian and Colonial Botanic Gardens with which we are in correspondence.

67. The Annual Reports of this Department are regularly sent in exchange to all our correspondents.

68. The library contains, besides the various reports and papers, 270 volumes.

69. In Appendix No. 1 I record a few notes made during a visit to San Ui in the delta of the Canton river on the Palm which is cultivated extensively by the Chinese for the production of leaves for making fans, rain coats for coolies, and for use as thatch, for which it is so extensively employed in South China.

FORESTRY.

70. The area of ground operated on in artificial reproduction was smaller than in some previous years. It was necessary to reduce the operations of 1886 for two reasons, one of which was in consequence of the weakening of the controlling staff, and the other was to meet the circumstances of the reduced vote for 1887 which was contemplated in 1885. By providing a small balance from the vote for 1886 I was enabled to devote it to the operations which could be carried out in that year as part of the following season's planting, thus enabling us to accomplish more work during the present year when the staff is again complete and competent to resume the full complement of work.

71. The number of trees planted was nearly up to the average. It was in the rearing of trees *in situ* that the diminution of area operated on was effected. This operation was entirely suspended. With the exception of a few thousands of trees planted in the neighbourhood of Deep-water Bay the planting was successfully accomplished. The few which were not successful suffered for want of water in a spell of dry weather which succeeded the planting of them.

72. The total number of trees planted was 299,911, of these 293,000 were China Pines, 4,500 Camphor trees, and 1,000 Pride of India trees. The remainder consisted of miscellaneous trees to the number of about 1,200.

73. CAMPHOR TREE.—A large number of trees of this species were planted in 1885, and they appear in fairly good condition. It is probable that this tree will be successful in Hongkong, but it is too early to yet pronounce positively one way or another on the subject. If the conditions do prove suitable for the tree, it will be a valuable acquisition, for besides affording pleasant variety to the sylvan effects of the landscapes, the timber may in time be of value.

74. The early made plantations of China Pines at high altitudes, and in wind-swept patches do not, as I anticipated, succeed very well. However to put the theory to the test a sufficient number of trees were planted in exposed places and at high elevations for experiment. Now the selection of lands for planting is made at comparatively low altitudes.

75. PINUS MASSONIANA.—In 1882 I obtained from Japan seeds of this tree which is indigenous to that country, and of a sturdy habit, with which to experiment for cultivation above the height at which the China Pine did well. The seeds were sown *in situ* at an altitude of from 1,000 to 1,400 feet. The growth of the tree is slower than that of the China Pine, but the trees are very healthy and of robust habit, and they seem well adapted for bearing the adverse conditions for general tree growth which prevail towards the tops of the hills.

76. QUERCUS FISSA.—At the same altitude as the Japanese Pine, young trees of this Hongkong Oak were planted. Some of them, where a little sheltered, have grown very well, and they now measure as much as 9 feet in height and the same in diameter.

77. TRISTANEA CONFERTA.—A member of the myrtle family, and native of North Australia, Queensland, and New South Wales. It grows into a large tree and the timber is well spoken of in Australia. The rapid growth of a solitary tree of this which had been introduced from one of the Botanic Gardens of Australia, and planted in our Botanic Garden led me to send to Australia for a supply of seeds. From these 800 trees were raised in 1883 and planted out three years ago. The majority were planted on the north side of the island at about 300 feet altitude, and a number of them at a similar height on the south side of the dividing ridge. All have made remarkable progress, the height of the trees now being as much in many instances as 20 feet. The growth and vigour is greater than that of any tree yet tried, if we except the Gum trees, and of these only a few kinds equal the *Tristanea*.

78. GUM TREES.—The *Eucalyptus* trees continue to do well. Of those planted near the Military Sanitarium two years ago a few species have become splendid vigorous trees. These are on the top of a ridge where the soil is naturally loose and deep. At the same time as these trees were planted, a quantity of the same species were planted at not more than 100 to 200 feet above sea-level, those near the Sanitarium are at about 800 feet. Of twelve kinds three succeeded better at the low level than corresponding plants of the same species at the higher level, five succeeded better at the higher level, while four succeeded equally at both places. The result of the experiment is therefore slightly in favour of the higher altitude for *Eucalyptus* cultivation.

79. ALEURITES VERNICIA.—(Chinese Varnish and Wood-oil-tree.) A plantation of this on Mt. Parker is flourishing and has entirely met my anticipations. The young trees are of an average height of about $2\frac{1}{2}$ feet. The situation of the plantation is well sheltered and the soil is good and deep. Seeds, however, which were sown at the same time near Pokfulam in an equally sheltered position, but where the soil was shallow, and in which there was a large mixture of stones, have produced trees very inferior to those on Mt. Parker.

80. SOWING BROADCAST *in Situ*.—In 1883 and 1885 experiments were made of sowing seeds broadcast amongst grass in various places without any preparation of the soil. In two places the results have been very good, and the young trees are so promising that I intend to adopt the method on a larger scale on lands similar to those where the experiments succeeded. The cost has not yet been accurately ascertained, but it appears so small that I believe double the area of that accomplished by transplanting from nurseries can be operated on in an equally successful manner by the new method. The selection and demarcation of the lands suitable for the system will, however, require to be done carefully by European agency, and this, under the present organization of the staff, seems hardly possible with the great amount of other work which demands all available time.

81. BAMBOOS.—In 1885 an operation, which has not yet been reported, was commenced in the Bowrington Plantation of dividing large clumps of bamboos and transplanting them in one of the divisions with a view to the replacement with the bamboos of the pine trees which now exist there, and of the production of a supply of bamboo canes for the use of the department, and probably for sale. The soil and situation is well adapted for the bamboo, and if the whole of the enclosure be planted with bamboo there should in the course of a few years be an annual revenue from that source.

82. I hope to be able to introduce from the bamboo growing districts to the north-west of Canton, and from other places, many of the valuable kinds of bamboo which are of such inestimable use to the Chinese. These will be planted in the Bowrington Plantation, besides placing one specimen of each kind in the collection within the Botanic Gardens.

83. PHYLLANTHUS EMBLICA.—This is a small shrub, a member of the large order of Euphorbiaceæ, which bears an edible fruit, often an inch in diameter, of a very acid taste, somewhat resembling a hard smooth, round, green gooseberry, and which is apparently palatable to the natives. It is found growing wild scattered about various places in the Colony, not very high above sea-level.

84. The bark is a valuable tanning material, and is in much request by fishermen, so much so that we have great trouble in conserving the shrubs which exist. I am informed that the fishermen place a higher value on it as a tanning material than even on Mangrove bark.

85. I have procured a large quantity of seeds of this plant, and they will be sown in the nurseries with a view to rearing plants for making plantations with. It may be possible that plantations of it will in time be valuable.

86. CLEARING OFF BRUSHWOOD.—The brushwood in some plantations having become ranker than desirable near roads where it impeded free passage of currents of wind, and where it afforded too much cover, I arranged to have the most advanced plantations cleared of the undergrowth. The plantations through which the Peak road passes have been done.

87. Those near Kennedy Road are begun and the work there and in other plantations will be continued when more important works free men to enable them to do it.

88. The clearance of undergrowth will not only be done free of expense to the Government, but a revenue will be collected from it.

89. SPECIMENS FOR INDIAN AND COLONIAL EXHIBITION.—A collection of specimens of wood of different kinds of Hongkong trees was made and taken with me to England, where they were cut and polished, and afterwards named and set up in the Exhibition.

90. Specimens of a large number of articles made from bamboo and used in domestic economy were afterwards collected by the Acting Superintendent and forwarded to the Exhibition.

91. PLANTING OPERATIONS BY CONTRACTS.—These are done under five different contracts. They are:—1. Supplying Seeds, 2. Rearing Trees in Nurseries, 3. Making Tree Pits, 4. Planting Trees, and 5. Rearing Trees *in Situ*.

92. Prices paid vary somewhat one year with another. For instance the price paid for Seeds in 1885 was higher, with one exception, than at any other time. The contract just made is next to the lowest on record. The contract for 1885 for making Tree Pits was higher, than it was in the two previous years, while that just made is fixed at the same price as the previous one. The 1885 contract for Planting Trees while lower than in some previous ones was about fifty per cent. higher than the last contract for the same kind of work. The 1885 contract for Rearing Trees was lower than it was in the two previous years, but not so low as it was three years before, while it was a good deal higher than the one recently made.

93. Last year's tenders threw out the experienced men who had for several years given satisfaction in Rearing Trees. A new man entirely without experience in this work received a contract for all the trees which were wanted. Although the contract price is low, we are paying dearly for the contractor's inexperience as the trees are the most inferior which I remember.

94. FERN ROCKERIES OUTSIDE THE GARDENS.—These are maintained by the vote for Afforestation. The heaviest costs are caused by artificial waterings throughout the dry months. The dense shade in Gleanealy was the cause of a number of ferns and some other plants continually dying out. To remedy this disadvantage of shade I have had some trees and large shrubs removed in order to admit more light. The large trees in the neighbourhood also do much evil by their roots growing up amongst the soil in which the ferns are planted, and thereby very much impoverishing it.

95. Arrangements have been made for extending the rockeries on the eastern side of the road down to St. Paul's College. The construction of the rockery will be gradually carried out, but the planting cannot be completed until plants suitable for the work can be prepared, which will take a little time. For work of this kind the preparation of the plants should be the first consideration to attend to, and the construction of the rockeries should go on and be completed to suit the time when the plants would be ready to put in their places. However, circumstances over which I had no control, but which it was advisable not to allow to slip by without using, rendered the reverse of this method necessary.

96. PROTECTIVE SERVICE.—The Forest Guards made 38 arrests for infringements of what I might call forest laws. Of this number of offenders 26 were sentenced to imprisonment, 5 were fined, 4 were required to find securities, and 3 were dismissed by the Magistrates before whom they appeared.

97. The villagers of Little Hongkong maintain their bad reputation for cutting down and damaging trees, and I fear that the mischief cannot be stopped entirely until some such measures as I recently proposed shall be put into force.

98. Five months ago I reported some extensive destruction of trees which had been going on on Mount Davis systematically for apparently about twelve months. I had information which placed my suspicions on squatters near Belcher's Bay, particularly on rice-husk burners near the telegraph house, as the perpetrators of the mischief. I personally visited these people and remonstrated with them—there was not sufficient evidence for prosecution to be instituted. This was shortly before the squatters about Belcher's Bay were ejected. Since that time the mischief which had been going on has entirely ceased.

99. Although cases of tree and shrub cutting are continually going on the individual cases are, as a rule, of a comparatively trivial nature, yet if the plantations and trees of the island are to be effectively protected it is necessary to apply sharp punishments when offenders are caught, as the difficulty of bringing home punishments to the offenders is very great.

100. Altogether there is an improvement in the results of the efforts of the protective staff, as, with the exception of the cases at Little Hongkong and Mt. Davis, general tree cutting does not occur now as it did formerly.

101. GRASS FIRES.—The advent of the dry season is always accompanied with much anxiety about the plantations. The past year has witnessed fires of unusual number and extent, which have burnt a rather large number of planted as well as naturally produced trees in addition to a very large area of grass only. The fires appear to originate in Chinese Cemeteries from burning incense sticks used in worship at the graves, and from the carelessness and thoughtlessness of pedestrians in throwing down lighted matches as they pass along the roads.

102. I would here take the opportunity of requesting those of the public who have occasion to use matches as they pass along roads or over the hills, to be good enough to extinguish the fire before matches are thrown down, as by so doing they may prevent most serious damages to trees.

103. The subject of presenting barriers to the spread of fire from roads and cemeteries, or of removing inflammable material from adjacent ground, should be taken in hand very soon. The only practicable method of accomplishing this will entail great care and skilful management of resources, which I trust will be organised in time to meet the next season's dangers.

104. QUARTERS FOR FORESTERS.—We have long suffered the want of inadequate quarters in which to accommodate the majority of the Foresters. It is most important, especially in cases of grass fires occurring, to have a large body of men on the spot, who will be available at once when they are suddenly required to extinguish fires which happen at times out of work hours, or for other purposes.

105. Arrangements are, however, now being made for the accommodation of some more men, for which I have to thank the Surveyor General in kindly meeting the requirements by converting a building, which was not wanted for other purposes, into quarters for a portion of the staff.

106. STORE AND TOOL ROOMS.—The greatest inconvenience is experienced by the very poor accommodation for the safe custody of tools and working material. However, some relief is, I believe, shortly to be experienced by the erection of sheds which are so much needed, and for which, also, I have to thank the Surveyor General.

107. ASSISTANCE TO ROYAL ENGINEERS.—Very frequent applications have been made by the Royal Engineers' Department for assistance and advice on subjects connected with planting at the Forts and in other places. Aid, as far as possible, has been freely given.

108. An application, which received the approval of the Government, was made for this Department to rear a large quantity, —fifteen to twenty thousand,—of Gum trees for planting on lands of the War Department. I procured seeds from Australia, and the young seedlings are all doing well. They will be ready to hand over to the Royal Engineers in about a month or two hence. It was arranged that the Royal Engineers should pay for the costs of material and labour used in rearing the trees.

109. Appendix No. 2 shows the numbers and kinds of trees planted in the year.

110. In Appendix No. 3 I reproduce a most interesting paper by Dr. MAX VON PETTENKOFER on the influence of plants and plantations. This paper will, I think, be perused with much interest at the present time when the sanitation of the Colony is receiving so much attention, Dr. MAX VON PETTENKOFER shows very clearly the great influence which trees exert in sanitary matters, and their general good effects on the well being of mankind. Some doubt is entertained as to the influence of trees on rainfall, but whether trees attract rain or not, no one can doubt but that they regulate the distribution of water, which is a most important effect. Experiments and experience also prove that trees exert a considerable influence on temperature.

111. From my own experience in Hongkong, which has extended over nearly sixteen years, I have found a reduction of several degrees, more particularly at night, of temperature at the Gardens since trees within the Gardens and in plantations around them have been planted and cast a shade over the surface of the ground. The southwest winds of the summer pass over plantations of trees extending from Victoria Gap to the Gardens before they reach the thermometers from which my observations have been made, and I have little doubt but that in travelling over this distance of tree covered land the temperature is either reduced slightly, or that there is not the augmentation of radiated heat from rocks and soil which there was when the hills were destitute of trees.

I have the honour to be,

Sir,

Your most obedient Servant,

CHARLES FORD,
Superintendent,
Botanical & Afforestation Department.

Appendix No. 1.

ON THE CHINESE FAN PALM, GINGER, &c.

At the end of last October I availed myself of an opportunity at San Ui in the delta of the Canton river, and situated about 50 miles south-south-west of Canton, of seeing the cultivation of the Fan Palm; and the manufacture of fans from its leaves, as well as seeing something of the plants of the Ginger family which are cultivated by the Chinese.

FAN PALM.

Although foreigners have frequently visited the San Ui district I believe the fan palm had not been botanically examined, and some uncertainty prevailed as to the species of palm to which it belonged. Flowers and fruits, which are important organs needed in botanical determinations, were absent at the time of my visit, but I carefully examined the plants which I saw in cultivation and the examination led me to the undoubted conclusion that the palm is *Livistona sinensis*, Mart.

The Rev. B. C. HENRY, who has travelled much in the Kwangtung province, says in his very interesting book "Ling-Nan" that the palm district extends about twenty miles from east to west, and ten miles from north to south.

It appears that fan palm cultivation is confined to the San Ui district. In reference to this Mr. HENRY says:—"That the limitation of this industry is a matter of necessity and not of choice is proved by attempts made at various times to cultivate the palm in other places, attempts that have always resulted in failure."

Judging from the appearance of the country in travelling through the delta the reputed failure of the palm when its cultivation has been attempted in other places than the San Ui district could scarcely be attributed to soil, as everywhere this had much the same appearance of richness and constituency. Knowing the immense influence which winds have on the growth and success of not only delicate plants, but also on the hardiest of trees, it is possible that the uninterrupted sweep of certain winds over the flat lands of the delta, combined with some other minor uncongenial circumstances, may be the cause of failure of the palm for commercial purposes. The San Ui district is protected by lofty hills to the north and westward, which possibly afford the conditions of shelter that the palm requires for the development of perfect leaves suitable for the manufacture of fans.

The palm plantations are situated on flat alluvial lands about six to ten feet above the water of the rivers and creeks which run through the delta, and they are intersected with numerous open canals or ditches, four feet wide and more, for carrying off the surplus water in the rainy season, and for retaining it, by means of wooden sluices fixed in the banks which surround the plantations or fields, for purposes of irrigation.

The land is not wholly given up to palm cultivation, but other crops, as Bananas, Plantains, Papayas, Oranges, Peaches, Ginger, Betel-pepper plant, and various vegetables occupy shares of the ground.

The cultivation of the palm and the manufacture of fans from its leaves is a most important industry. According to Mr. HENRY the manufacture of the fans after the leaves have been cut gives employment to about one hundred firms and from ten to twenty thousand people.

When the plantations are made the young seedlings are placed at various distances apart in order that the different kinds of leaves which are produced from plants growing at close and wider distances asunder may be obtained for the manufacture of fans for which thick or thin, or large or small, leaves are required.

The most perfect plantation which I saw was about half a mile in length, and a quarter of a mile in width. It was drained by means of open canals as above described.

The main body of plants were in perfectly straight rows, and they were exactly four feet four inches apart. The stems were from two to four feet high, and they bore about six fully developed and perfect leaves, the petioles (stems) of which were five feet long, and the blade or leaf itself three feet long.

Next to and surrounding the main body of palms was a belt about a hundred feet wide of smaller palms which were growing at only two feet from each other. The stems were but one foot high, they bore the same number of leaves (six) as the larger plants, but unlike them, half the number of leaves were bad. The leaves and their stems were each one foot shorter than those on the larger plants, and the petioles were much more slender.

Outside of this belt and on the extreme margin of the plantation there was a second belt, which however was very narrow. It consisted of only three rows of palms, the plants being very close together, only one foot four inches apart. None of the leaves on this belt appeared good enough for fan manufacture.

The inner belt of plants was intended by reason of thicker planting to serve as a screen to protect the main plantation from the damaging effects of winds, while at the same time it affords finer leaves for smaller fans. The marginal and closely planted belt was placed on the river bank to serve as a fence to keep intruders out of the plantation. For this purpose the palm, while in a young state, and when planted close together, is well adapted, the spines on the petioles presenting a barrier sufficiently offensive to the bare stockingless and shoeless legs and feet of the Chinese coolie.

The long straight vistas, the regularity of the planting, and the canopy of the verdant leaves overhead produce on the visitor a delightful impression which is worth travelling some distance to experience.

Other plantations contained palms of all ages. Some had trees upwards of a hundred years old, according to the assertions of natives, but these plantations always contained trees of mixed ages, young plants having been constantly added to take the place of older ones as they died out, or were blown down by winds. The old trees were always of a very stunted appearance, a condition which would naturally ensue from the continued lopping of their leaves. The stems of these old trees I noticed were not more than half as thick as trees of the same height seen growing in Hongkong where the natural growth of the tree is not restricted by the loss of its leaves. A parasitical fungus or lichen covered these old trunks and gave them the appearance of having been white-washed. The tallest trees seen were only about twelve feet high, but they were said to be upwards of a hundred years old. The leaves on these old trees are larger and stouter than those on young plants, and the stems of the leaves are only about a foot long.

The palm begins to yield leaves suitable for fans when it is about six years old.

The first cutting of leaves takes place early in the year, and the leaves which are somewhat damaged by the winterly winds, and consequently of inferior quality, are used for thatch in the construction of the "matsheds" which are so extensively used for temporary purposes in China.

Leaves for fan making are obtained in April, one, two, or three leaves being taken from each plant, and the process is continued each month until November, when, I was informed, cutting is discontinued for a few months. The leaves are taken from the plantations to a clear space covered with short grass turf. Here each leaf has a thin piece of bamboo placed across the blade where it is joined on the stem. Each end of the bamboo is secured in its place by the loose end of a segment of the leaf being dexterously bound round it. The bamboo prevents the leaf curling up while it is drying. The leaves are then laid out singly on the turf to dry in the sun, and collected and stacked at night. The process is continued daily until the leaves are quite dry, when they are either sent off direct to the town to be made into fans, or they are stacked for a time until the manufacturers are ready to receive them.

The manufactory of the fans is carried on chiefly in the town of San Ui, but there are also some establishments in the country where this is done.

The dried leaves are subjected to a process of blanching by means of sulphur. They are then straightened and rendered shapely by being held and manipulated over a charcoal fire. The operator as he finishes the fans places them one by one on each other making a heap on the floor; the heap is firmly pressed down by the weight of the operator who stands on a board placed on the top of the heap while he is working at succeeding fans. When a heap of twenty or thirty fans have been thus treated they are removed and another series is begun.

The next process is sewing on the bindings at the edge of the fans, this is done by women and children, chiefly at their own homes, and the fans returned when finished to the manufacturer. The more expensive fitting on of horn and bamboo handles is done at Canton.

The portion of the leaf stalk which is not required as a handle for the fan is not wasted. It is composed of a fibrous material that is utilized in making short lengths of rope used as slings to suspend baskets from carrying poles.

Around the stem and bases of the leaf stalks there is a quantity of fibrous substance somewhat resembling coir fibre. This is carefully collected and also used for making ropes.

GINGER.

Some doubt has existed as to whether the Chinese have not one or more kinds of plants in use as ginger that are unknown elsewhere. I have taken steps for collecting together and cultivating all the kinds of plants generally included by the Chinese as ginger with the hope that when in cultivation they can be studied and observed in such a manner as to secure all possible information in connection with this subject.

While at San Ui I was fortunate in being able to obtain from cultivated plants good flowering specimens. These I dried, and together with specimens of the roots (properly rhizomes) forwarded to the Director of Kew Gardens for a study of them to be made there, where they can be compared with other kinds, or with specimens of the same kind from other places.

The specimens which I procured were, without doubt, *Zingiber officinale*, the species commonly in cultivation in other parts of the world.

It is, however, possible that some other plant, which is not a true ginger, may be used in making the celebrated Canton preserved ginger, but all the information which I have yet obtained points to the species *Zingiber officinale* as the only kind which the Chinese use for this purpose.

The ginger cultivated on the Lo-Fau mountains has a wide reputation amongst the Chinese as being of unusual efficacy in medicine, this superior quality may however be derived merely from peculiarity of soil or climate which communicate to the plant exceptional properties.

GLYCOSMIS CITRIFOLIA.

Near the town Kom Chuk I observed growing rather abundantly amongst the mulberry plantations as shrub which had been cut down (coppiced) a good deal. On approaching nearer I found it to be *Glycosmis citrifolia*, a shrub indigenous in Hongkong. An inquiry as to the purpose for which it was used elicited the information that the leaves are pounded, made into cakes, and then used for making a strong kind of wine known as Chow-peng-sze. I regretted not being able to successfully pursue inquiries, and gather further information on a subject of some interest. Possibly some traveller will be able to supplement the knowledge with further particulars.

The shrub is a species of the natural order *Aurantiacæ* to which the orange belongs. It bears a small, sweet, jelly-like, edible fruit about the size of a large pea.

ORANGES.

I inspected plantations of the orange which Mr. HENRY mentions in "Ling-Nam." It is known by the name Tim Kom. No orange which I have tasted in China equals it for sweetness, it is also very juicy and of a fine flavour. Amongst the Foreign community I believe this orange is not so well known as it deserves to be. It has a high market value, the price in Hongkong being thirteen cents per pound.

While alluding to oranges I may mention that I was recently favoured with an opportunity of tasting an orange from the North, known as the Quinine Orange. This has a distinct bitter taste resembling quinine.

Mr. WM. COOPER, Her Majesty's Consul at Ningpo also kindly forwarded me a Chinese lemon of large size, but of shape nearly round, quite unlike the European lemon.

CHARLES FORD,
Superintendent,
Botanical & Afforestation Department.

Appendix No. 2.

TABLE OF KINDS AND QUANTITIES OF TREES PLANTED.

Bischoffia javanica.....	282
Bermuda Juniper (Juniperus bermudiana).....	28
Bamboos.....	40
Candle-berry-nut Trees (Aleurites triloba).....	80
Cryptomeria japonica.....	40
Cork-oak (Quercus).....	22
Camphor Trees (Cinnamomom camphora).....	4,580
Divi Divi (Casalpinia coriarea).....	52
Litsaa sp.....	86
Moreton Bay Pine (Araucaria Cunninghamii).....	30
Pride of India (Melia Azederach).....	1,070
Privet (Ligustrum sinensis).....	300
Pine Trees (Pinus sinensis).....	293,039
Rose-apple Trees (Jambosa vulgaris).....	262
	299,911

CHARLES FORD,
Superintendent,
Botanical & Afforestation Department.

Appendix No. 3.

EXTRACT FROM "THE INFLUENCE OF PLANTS" BY DR. MAX
VON PETTENKOFER.

"I consider the impression which plants and plantations make upon our minds and senses to be of hygienic value; further, their influence upon the conformation of the soil with which health is in many respects connected; and finally, their influence upon other qualities of the air, than carbonic acid, oxygen, and ozone: among these may be mentioned in passing, shade in summer, and decrease of wind and dust."

"It is an old observation, needing no demonstration, that the cheerful and happy man lives not only an easier, but on the average, a more healthy life than the depressed and morose man. Medical men, and especially 'mad doctors' could tell us much of the great value of a certain relative proportion of pleasureable and painful impressions upon health, and how frequently some unfortunate position, an absence of pleasure, or too much of painful impression" is the cause of serious illness.....

"I consider flowers in a room for all to whom they give pleasure, to be one of the enjoyments of life, like condiments in food. It is certainly one of the most harmless and refined. We cannot live on pleasure alone; but, to those who have something to put up with in life, their beloved flowers perform good service."

"The same may be said of private gardens and public grounds, and of the artistic perfecting of them. The more tastefully laid out, the better the effect. Though tastes differ there is a general standard of taste which lasts for several generations though it varies from time to time, and is subject to fashion. As their object is to give pleasure, public grounds should accord with the taste of the age, or aim at cultivating it. This is a justification for going to some expense for aesthetic ends."

"Modern hygiene has observed that certain variations in the moisture of the soil have a great influence on the origin and spread of certain epidemic diseases, as for instance cholera and typhoid fever—that these diseases do not become epidemic when the moisture in the soil is not above or below a certain level, and has remained so for a time. These variations can be measured with greater accuracy by the ground-water of the soil than by the rain-fall, because in the latter case we have to determine how much water penetrates the ground, how much runs off the surface, and how much evaporates at once. The amount of moisture in the soil of a forest is subject to considerably less variation than that outside. EBERMAYER has deduced the following result from his meteorological observations on forestry: 'If from the soil of an open space 100 parts of water evaporate, then from the soil of a forest free from underwood 38 parts would evaporate, and from a soil covered with underwood only 15 parts would evaporate.' This simple fact explains clearly why the cutting down of wood over tracts of country is always followed by the drying up of wells and springs."

"In India, the home of cholera, much importance has been attached in recent times to plantations as preventitives of it, it has been always observed that the villages in wooded districts suffer less than those in treeless plains. Many instances of this are given in the reports of Dr. BRYDEN, President of the Statistical Office in Calcutta, and Dr. MURRAY, Inspector of Hospitals. For instance BRYDEN compares the district of the Mahanadda, one of the Northern tributaries of the Ganges, the almost treeless district of Rajpooor, with the forest district of Sambalpoor. It is stated that in the villages in the

plain of Rajpooor, sixty or seventy per cent of the inhabitants are sometimes swept away by cholera in three or four days, while the wooded district of Sambalpoor is often free from it, or it is much less severe. The district commissioner, who had to make a tour in the district on account of the occurrence of cholera, reports among other things as follows:—

“The road to Sambalpoor runs for sixty or seventy miles through the forest, which round Petorah and Jenkfluss is very dense. Now it is a remarkable fact, but it is a fact, nevertheless, that on this route, traversed daily by hundreds of travellers, vehicles, and baggage-trains, the cholera rarely appears in this extent of sixty miles, and when it does appear it is in mild form; but when we come to the road from Arang, westward to Chicholee Bungalow, which runs for about ninety miles through a barren, treeless plain, we find the cholera every year in its more severe form, the dead and dying lying by the wayside, and trains of vehicles half of whose conductors are dead.”

“In the same report Dr. BRYDEN continues:—

“I will mention one other fact as a result of observations, namely, that places surrounded by those vast and splendid groves which are occasionally seen lying in low and probably marshy situations surrounded by hills, and which, from the mass of decaying vegetation, are very subject to fever in September, October, and November, are seldom visited by Cholera, and if it occurs there are but few deaths, while places on high ground, or in what are called fine, airy situations, free from trees and without hills near, so that they are thoroughly ventilated suffer very much from cholera.”

“MURRAY gives a number of instances showing the influence of trees on the spread of cholera, one of these may find a place here.”

“The fact is generally believed and not long ago the medical officer of Jatisgar in central India, offered a striking proof of it. During the wide-spread epidemic of cholera in Allahabad, in 1859, those parts of the garrison whose barracks had the advantage of having trees near them enjoyed an indisputable exemption, and precisely in proportion to the thickness and nearness of the shelter. Thus the European Cavalry in the Wellington Barracks, which stand between four rows of mango trees, but are yet to a certain extent open, suffered much less than the Fourth European Regiment, whose quarters were on a hill exposed to the full force of the wind; while the Bengal Horse Artillery, who were in a thicket of mango trees, had not a single case of sickness; and the exemption cannot be regarded as accidental, as the next year the comparative immunity was precisely the same.”

“We need not however go to India to observe similar instances of the influence of a certain degree of moisture in the soil favoured by woods or other conditions; we can find them much nearer home. In the cholera epidemic of 1854, in Bavaria, it was generally observed that the places in the moors were saved, in spite of the otherwise bad condition of the inhabitants. The great plain of the Danube from Newburg to Injoldstadt was surrounded by places where it was epidemic, while in the plain itself there were but a few scattered cases. The same thing has been demonstrated by Reinhard, President of the Saxon Medical College. Cholera has visited Saxony eight times since 1836, and every time it spared the northerly district between Plusse and Spree, where ague is endemic.”

“Even if these deductions must be accepted with caution from an etiological point of view, still, on the whole, they indisputably tell in favour of trees and of woods.”

“Surface vegetation has also other advantages, besides its use in regulating the moisture in the soil; it purifies it from the drainage of human habitations whereby it is contaminated and impregnated. If this refuse matter remains in soil destitute of growing vegetation, further decomposition sets in, and other processes are induced, not always of a salubrious nature, but often deleterious the products of which reach us by means of air and water and may penetrate into our houses. A great deal of heat is neutralized by evaporation from the leaves, another portion by the decomposition of carbonic acid, just so much as is set free when we burn the wood and other organic combinations into the composition of which it enters. The heat produced by burning wood in a stove is derived from the sun; it is but the captured rays of the sun again set free by combustion. We learn from EBEMAYER'S work that the temperature of the trees in a forest, and even in the tops of them, is always lower than the air in the forest.”

“Besides this, shade in the open air always causes a certain draught which acts as a kind of fan. All must have noticed when walking in an oppressive heat, when the air seems still as death, that a refreshing breeze arises as soon as a cloud casts a shade.”

“The shade of a single tree, therefore, cools not only by intercepting the sun's rays, but also by the effect of gentle fanning. The shelter of a thick wood, however, is much more agreeable than that of a single tree. The air in a wood is cooler than that of an open space exposed to the sun. The air from outside is drawn into the wood, is cooled by it, and cools us again. And it is not only the air that cools us, but the trees themselves. Observation has shown that the trunks of trees in a wood breast-high, even at the hottest time of day, are 5° Centigrade cooler than the air. We therefore lose considerable heat by radiation to these cooler objects, and can cool ourselves more easily at a temperature of 25° Centigrade in a wood than at a much lower temperature in an open space.”

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