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of the
ROYAL NEW ZEALAND INSTITUTE of HORTICULTURE

Vol. 15.—No. 3 *Wellington, April, 1946*

ROYAL NEW ZEALAND INSTITUTE OF HORTICULTURE (INC.).

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JOURNAL OF THE ROYAL NEW ZEALAND INSTITUTE OF HORTICULTURE

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MINISTERIAL ADDRESS

GIVEN TO THE ROYAL NEW ZEALAND INSTITUTE OF HORTICULTURE ON FEBRUARY 7, 1946, BY THE HON. B. ROBERTS, MINISTER OF AGRICULTURE

"It is a great privilege to have had an opportunity for the second time of opening your annual horticultural conference," stated the Hon. B. Roberts, Minister of Agriculture, in his address to the Royal New Zealand Institute of Horticulture on February 7, 1946.

The Hon. B. Roberts

"Since holding the last conference, the outstanding event has been the successful conclusion of the war. However, while the wartime urgency for Victory gardens and increased production has ceased, the post-war period brings us a great opportunity of which we must avail ourselves with vigour and with enterprise. Seldom have there been so many golden opportunities of influencing people for good by horticultural means as there are to-day.

"Change is the order of the day. The people are on the march. We had about six years of depression; we have had six years of war. It is not unlikely that we shall have five or six unsettled post-war years before men and nations return to anything like a settled pattern of life, and what the pattern of life is to be depends upon what we do **NOW.**

"In the preparation of my address I have been wondering how horticulture in general, and the Institute in partciular, can make its greatest contribution to the period in which we live. In common with all other organisations in the Dominion the time has arrived for the Institute to have a definite plan of activity for the future and it is not sufficient to have a **plan** and to do nothing about it. Steps should be taken to implement such a programme—I always say there is only one way of doing anything successfully. First, think intelligently about it; and secondly, act on the decisions made. The measure of our success is generally gauged by the contribution of service we render in overcoming the immediate problems facing us. At this stage I would like to compliment the Institute on the national character of many of its activities. I understand you conduct examinations for the National Diploma in Horticulture, the Seedsmen's Certificate, and the Certificate in Floral Art, arrange for the training of students, assist in Arbor Day celebrations in the main centres throughout the Dominion, and issue a quarterly journal.

"Now this is a very commendable enterprise, but I am sure the members of the Institute would be the first to admit that there is still a very wide field of activity awaiting development. I have tried to think what some of those activities might be and I propose to mention some, although I am afraid I cannot do justice to them all. Here are a few that come to my mind at random:—

"The relationship between

Horticulture and Community Centres,
Horticulture and Peace,
Horticulture and Health,
Horticulture and Education,
Horticulture and the Drift from the Land,
Horticulture and Mass Production,
Horticulture and Secondary Industries,
Horticulture and the Forty-hour Week,

and so a man might go on—relating the basic, fundamental and all-embracing activity of horticulture which started in the Garden of Eden to the baffling and yet urgent problems of our twentieth century civilisation.

"We do well to remind ourselves that with all the changes and variations of modern ways, the basic facts and spirit of life embraced in horticulture—soil, plants and sunshine—are the things by which men and women live; are the things which give health and happiness; are the things which 'heal old sores,' promote unity, give joy and the satisfaction of living. Horticulture can and must emphasise **real** values of life.

HORTICULTURE AND COMMUNITY CENTRES

"The Government, and most people I think, have a feeling that we should not encourage stone structures as memorials after this war, but 'Community Centres' which would have a more lasting and living value. If the Institute wants to select some modern issue, that would breathe life into the dead bones of formality, it could do worse than impress its character and influence upon the hundreds of rural areas scattered throughout this land. This is linked up with the 'drift from the land' into the cities. To sit around and write articles about it, and blame the Government (any government) is just futile—we all voted for School Consolidation, good roads and motor cars, and better education for our children. On the other hand, every farmer or contractor is striving to buy a new tractor, a top-desser, a hay-baler or header harvester. Mr. Patton, late U.S.A. Minister in New Zealand, told me that at the beginning of the war the U.S.A. had 25 million people on the land. During the war they increased production 35 per cent. although five million people had left the land. These modern twentieth-century developments and machines are here to stay. We often hear about people leaving the land, but do we hear about the vastly-increased power which is used on the land and relieves farmer and farm labourer from the crushing toil which in the past often made him a beast of burden or a clod, instead of an intelligent human being?

"It is calculated that a 20 h.p. tractor will do the work of 100 farm labourers and do it at 1/50th of the cost. In 1942 we had on farms 65,699 electric motors and 13,967 agricultural tractors, developing 338,418 horse power, and as eight men have been estimated as equivalent to one horse power we had then substituted over 2½ million units of man power in terms of machinery for the actual man power lost in the 'drift from the land.' Man has always suffered from the curse of Adam, that he shall eat bread by the labour and sweat of his brow, but mass production of farm and horticultural machinery is removing that major curse today.

"Gardening can sweeten and redeem life better than any agency of which I know. A spray of flowers speaks more eloquently to a blushing bride or to a sorrowing widow than any spoken word. Landscape gardening, beautification of homes, garden cities, housing projects—these are the modern ways which elevate the minds and consciousness of the people.

"I think the 40-hour week movement can be used to very great advantage in refining our individual and our collective lives in association with nature and horticulture. Give me an individual—a community—a nation—that can love and produce flowers, fruit and vegetables, and I will show you a people who are intelligent, industrious, refined, patient, noble in adversity, moderate in their pleasures, honest in their dealings, and a friend and comrade to God and man.

INSPIRATION OF THE HOT SPRINGS CONFERENCE

"We **all** suffer from a tendency to carry over the conservatism of former years and compare it with the changes of today. It is not unlikely that we are in the midst of greater changes today than many of us realize. Vast and profound world movements are having their impact on the world, on the nation to which we belong, and on ourselves. We have to adapt ourselves to the changing order, since every problem affects the attitude and consciousness of the individual. Therefore, while the world is in a state of flux, the man or woman, or society, or nation that is active and virile wins the day. I say, 'The 40-hour week, in industry, is intended to keep the old world going, while people with the new spiritual outlook work another 40 hours to build the New World.'

"My judgment, ladies and gentlemen, is that more food and greater primary production will take place during the next ten to twenty years under the inspiration of the Hot Springs Conference and a world agricultural vision than ever before, in spite of the 'drift from the land' and the 40-hour week. The facts of the matter are that more gardening will be done than previously and more people will seek the land and open spaces than ever before, but for pleasure rather than profit.

"I am interested at present in reading an American book called 'Buy An Acre of Ground—America's Second Frontier.' The author, in the first paragraph, say: 'When World War II is over, the country around about our cities for a radius of 50 to 100 miles will become the New Frontier of America. Ten million tiny homesteads will spring up within commuting distance of factory and business; congested urban and industrial areas will spread over the land. This second frontier is the average family's way out of our looming post-war difficulties. It won't solve all their problems, any more than the pioneers of the first frontier solved their problems, but it will be a big help.' What is true of America is true of this country. The wealthy people have built week-end cottages where they re-create their brains and bodies. What they did yesterday is going to be possible for the ordinary man to do tomorrow. Here then is a vast field for horticultural vision and enterprise. The assembly line and mass production will still further invade our industry and lives, but when mass production comes to gardening and horticulture; to fruit, flowers and vegetables, why should we complain? The mass production of State houses is responsible for the mass production of amateur gardeners. The re-discovery that organic manure and compost makes worn-out land live and produce again has been responsible for the enthusiasm of compost clubs, and the urgency of war brought into our ranks thousands of Victory gardeners.

"One of the most potential avenues for research and activity is the relationship between horticulture and health! To this is linked horticulture and peace. It is a matter for congratulation that Sir John Orr, the world renowned British authority on nutrition, has been appointed Director-General of the Food and Agriculture Organisation. New Zealand is a signatory to this organisation for world agriculture. Our own Director-General of the Department of Agriculture is on the Executive Committee. We must produce more food to prevent war, and to build the peace, and we must produce more

of the better kinds of food—fruit and vegetables—to counteract the heavy protein diet to which our people are accustomed. Do not imagine that because the Government has provided a free medical scheme, and has increased hospital accommodation, that it is satisfied! Far from it. All the patient, constructive work of keeping people out of the hospital has yet to be done, and horticulture is one of the royal roads to fitness. In a group of a million people, statistics show us that during the year 320,000 will be sick once, 140,000 will be sick twice, 50,000 three times, and 20,000 sick four times (these are figures quoted before the war); 100,000 people are treated as hospital in-patients and 100,000 as out-patients, which represent an annual loss of 1,500,000 working days. Today the position must be worse, such is the wear and tear of modern industry and living upon the people.

"Neither society nor the Government can be satisfied with such a state of things to say nothing about the financial cost in taxation. To reduce Social Security taxation would, I am sure, be regarded as a real act of statesmanship! Therefore, I recommend horticulturists to study Sir John Orr's nutritional proposals, which will benefit their pockets and teach the people that it is the kind, and not the amount, of food eaten which is important.

CHILDREN AND NATURE

"There is not time now to deal with horticultural education. It is sufficient to say that whatever specialised industry or profession we may ultimately engage in, I think every child should have a grounding in the knowledge of the wonderful forces of nature which, in combination, produce life and growth; to understand how life forces operate; the part that heat, moisture, and air play in combination, and separately; to know how the low forms of life are built up into higher forms of life, and how growth is accelerated or retarded. All this must not only contribute to the child's fundamental knowledge and his working philosophy in after life, but must also equip every child with the spiritual basis of existence before he is crushed by the materialistic conception of industry and society by which we are swept along today. Speaking in this strain, horticulture is like man—more spiritual than materialistic—and I feel somewhat impatient with some of my own friends who say our young people are more irreligious than the older generation, and that the world is 'going to the dogs.' Nothing could be further from the truth. Out of the fires of suffering and conflict, there is arising a new world vision! I believe we stand upon the threshold of the greatest period in world history. We want Faith and Courage to go forward!

"Britain's leadership in that New World Order is not diminishing, but is growing in prestige and power. During the war, the British people discovered new resources of moral leadership, and these are the qualities that will be in demand in building the future. We are privileged to be associated with the British Commonwealth of Nations, and we have a great part to play. Horticultural Institutions and gardening enthusiasts are coming into their own. They must preserve the race from slums, from slag heaps and the poisonous refuse of chemical towns, and from the wholly mechanical outlook of the machine age and assembly line. I think it can be done! And you are the people to do it! Let us all help to bring the day when 'Instead of the thorn shall come up the fir tree and instead of the briar shall come up the myrtle tree, and it shall be for a sign, an everlasting covenant that we shall not be cut off,' and may I reverently add to that scripture 'Cut aff by an atomic bomb.'

"I therefore wish your conference every success in this first year of peace, and declare your conference open."

CONFERENCE PROCEEDINGS

REPORT OF PROCEEDINGS of the 23rd annual conference of the Royal New Zealand Institute of Horticulture (Inc.), held in the Centennial Hall, George Street, Timaru, on Thursday, 7th February, 1946, at 9 a.m.

Present: The following members and visitors attended:—

Mr. Hope B. Gibbons (President) in the chair; the Hon. B. Roberts, Minister of Agriculture, accompanied by Mrs. Roberts and Ministerial staff; Mr. W. K. Dallas, Director of the Horticulture Division; Mr. J. P. Hudson, Department of Agriculture, and Mr. L. V. Phillips, Dominion Secretary.

Auckland district: Messrs L. J. Coakley, J. A. McPherson.

Canterbury district: Messrs. M. J. Barnett, D. Combridge, E. R. Hudson, W. J. Humm, A. G. Kennell, T. D. Lennie, T. R. N. Lothian, L. W. McCaskill, J. N. McLeod, B. P. Mansfield, A. H. Shrubshall, L. F. Smith, W. Taylor, Mrs W. Taylor.

Hawke's Bay district: Mr. J. G. C. MacKenzie.

Manawatu district: Messrs P. Black, A. R. Hadfield, F. J. E. Jollie, Mrs. K. H. Dowrick.

Nelson district: Mr. A. White.

North Otago district: Mr. J. Tait.

Otago: Messrs. G. H. Brownlee, B. M. Jeffery, M. Matheson, M. R. Skipworth, G. Stafford, D. Tannock, J. L. Tannock, M. F. Tannock, T. Y. Turner.

South Canterbury: Messrs A. W. Anderson, K. B. Burns, J. D. R. Carolin, F. Chittick, P. B. Foote, E. O. Joseph, G. E. Knowles.

Southland: Messrs I. R. Gardiner, W. R. Martin, J. G. MacDonald, J. Pickard, W. Stapleton.

Taranaki district: Messrs V. C. Davies, T. Horton, D. Watkins, H. Watkins.

Wellington district: Messrs E. Hutt, W. H. Jolliffe, F. A. Jones, J. G. MacKenzie, L. F. Sired.

Wanganui district: Mrs. M. E. Chittick, Mr. L. H. Gillman, Mrs. E. Gower.

Wairarapa district: Mr. L. Robinson.

The Deputy-Mayor of Timaru, Mr. Thompson, extended to the conference a welcome from Timaru and expressed the pleasure of his borough at the opportunity to act as hosts for the delegates to the national horticultural conferences.

The Hon. B. Roberts, Minister of Agriculture and Marketing, declared the conference open.

Apologies for absence were received from Mr. J. W. Andrews (President Municipal Association of New Zealand, Inc.), Mr. E. J. Fawcett (Director-General of Agriculture), Prof. G. S. Peren (Principal Massey Agricultural College), Mr. G. V. Wild (Chairman Examining Board), Mrs. Knox Gilmer, Messrs W. C. Hyde, G. Knowles, F. S. Pope, C. W. Corner, A. R. Entrican, W. T. Goodwin, N. R. W. Thomas, G. S. Nicol, P. Thomson, Miss E. M. Newton, Mrs. A. McGillivray, and Miss P. M. Long, representative Stratford Borough Council.

The minutes of the 1945 conference as circulated were taken as read on the motion of the chairman and duly confirmed.

Delegates to the 23rd annual conference of the Royal New Zealand Institute of Horticulture (Inc.).

PRESIDENT'S ADDRESS

In moving the adoption of the executive's report and statement of accounts, the President of the Institute, Mr. Hope B. Gibbons, referred to a number of the projects which had been undertaken by the executive during the past year—referred to in detail in the executive's report. He expressed regret at the absence of Mrs. Knox Gilmer, Mr. G. S. Nicoll and Mr. W. C. Hyde, active members of the Executive who were unable to attend the conference.

Mr. Hope B. Gibbons

Among the directives emanating from the previous conference was the question of providing a technical information service, the provision of a committee to study horticultural activities, and a widening of contacts with other horticultural bodies both within the Dominion and overseas.

These were major issues and could not be carried out comprehensively without more funds than were possessed at the present time. "First of all," said Mr. Gibbons, "it requires secretarial facilities. At present our secretary, Mr. Phillips, is doing work and providing facilities much in excess of his remuneration, and were it not for the fact that he is also secretary for several horticultural associations his and our present activities could not be sustained. We owe Mr. Phillips a hearty vote of thanks for his work and interest."

He thanked the Minister of Agriculture for having made available for the current year double the amount of the usual Government subsidy. This had made it possible to improve the quality and design of the "Journal" which had found a great deal of favour among members generally.

He expressed the thanks of the Institute to Mr. R. E. Owen, the Editor of the "N.Z. Journal of Agriculture," who had assisted in its production, and appealed to members to co-operate in the furnishing of literary matter for publication in the "Journal."

He also referred to the work which had been done in the revision of the Examination Syllabus, and particularly to the services of the sub-committee of the Examining Board, consisting of Messrs. Wild, Hyde and Hutt. He stated that the new syllabus would be published as soon as possible.

"Those who attended last year's Horticulture Week," said Mr. Gibbons, "had an opportunity to see Massey College and its facilities for education. Since then Lincoln College has appointed a lecturer in horticulture (Mr. Lothian). Both colleges have made progress and are predestined to play an important part in horticultural education. From the Institute's point of view we would welcome an acceleration of their provision of facilities for teaching the practice of horticulture. Much as we support and emphasise the importance of theory we must stress the necessity for practice if horticultural art is to make the progress for which we work.

"By the same token we would ask our friends in the Horticultural Trades and the Parks and Reserves to accelerate their efforts to increase the number of trainees on their staffs.

"The future of horticulture demands more trained men or women who can work with a knowledge of what they are doing. Yes, there is work for what we might term plain labourers, but all such men require some knowledge to be of any value. Our objective is to provide more knowledge and get better results."

The President then moved the adoption of the executive's report and statement of accounts.

In seconding the adoption of the report and statement of accounts, Mr. V. C. Davies stated that both the report and presidential address had given a firm lead to what could be expected from the Institute. He was satisfied that, if its present policy and practices could be carried out and widened, the Institute would be a powerful influence in the sphere of horticulture in the Dominion.

Mr. L. W. McCaskill expressed the view that the Examination Syllabus as revised should again be circulated to District Councils and raised certain questions concerning the examination procedures with which he was not in accord.

Mr. M. R. Skipworth spoke in similar terms and **it was resolved** that on the first appropriate occasion Messrs L. W. Caskill, J. P. Hudson, M. R. Skipworth and M. J. Barnett be invited to attend a meeting of the Examining Board for the purpose of giving further consideration to these matters.

Mr. P. B. Foote, in referring to the present membership of the Institute as reflected by the annual accounts, stated that the executive should take in hand immediately the question of increasing the membership and of directing District Councils concerning the scope and nature of their activities.

The annual report and statement of accounts were duly adopted.

ELECTION OF OFFICERS:

The following members were appointed to executive positions for the ensuing year:—

President: Mr. Hope B. Gibbons.

Vice-Presidents: Messrs. W. H. Rice, Auckland; L. W. Delph, New Plymouth; C. W. Corner, Napier; P. Black, Palmerston North; J. G. MacKenzie, Wellington; A. White, Nelson; M. J. Barnett, Christchurch; G. E. Knowles, Timaru; D. Tannock, Dunedin; and Dr. J. G. MacDonald, Invercargill.

Executive Comittee: Messrs V. C. Davies, New Plymouth; H. L. Esau, Masterton; W. T. Goodwin, Wellington; W. C. Hyde, Palmerston North; E. Hutt, Lower Hutt; J. P. Hudson, Wellington; J. A. McPherson, Auckland; T. S. Waugh, Lower Hutt; R. L. Macalister, Wellington; and Mrs. Knox Gilmer, Wellington.

Auditor: Mr. J. L. Arcus, Public Accountant, Wellington .

ELECTION OF HONORARY NEW ZEALAND FELLOW:

On the motion of Mr. W. K. Dallas seconded by Mr. J. G. MacKenzie, **it was resolved** that Mr. M. J. Barnett, of Christchurch, be elected an Honorary New Zealand Fellow.

Mr. Dallas referred to the fine record of service to horticulture rendered by Mr. Barnett and the high standard which he had set in all his wok.

Mr. Barnett in replying stated that he appreciated the honour contained in the award, which he regarded as a tribute to the standards set by Parks and Gardens Superintendents in New Zealand, and thanked all those who had assisted him during his career in horticulture.

REMITS:

Beautification of Town and Countryside: That the executive approach the Government to make available suitable film strips featuring town and countryside beautification which may then be distributed to interested institutions as a means of education and propaganda.

In moving this remit, Mr. R. Wilson stated that it was important that educational material should be made easily available to the public. What is being done in horticulture in New Zealand and overseas could be conveyed best by suitable film strips, and the Institute could assist organisations such as Beautifying Societies in obtaining these films.

The remit was seconded by Mr. A. H. Shrubshall and carried.

Damage to Native Vegetation: That this Council views with the utmost concern the extensive damage being done to the native vegetation of New Zealand by goats and other animals and requests the Government to treat their extermination as a matter of urgency.

This remit was moved by Mr. V. C. Davies, who referred to the damage done to reserves by goats, deer and opossums. The Government, of course, was aware of the situation and doing a limited amount in the destruction of such animals, but it was not enough. If no further steps were taken, it might well be that posterity would be deprived of its heritage through the destruction of native vegetation.

Mr. L. Robinson seconded the remit and referred to the way in which erosion was promoted as a result of the elimination of trees and plants.

The remit was carried.

Tree Planting: That farmers in treeless areas be encouraged to set aside a reasonable acreage for the growing of trees.

Mr. P. B. Foote in moving this remit emphasised the commercial value of a tree-growing policy. Trees should be grown on farms particularly in gullies, riverbeds and other waste places. Farmers could carry out planting in their spare time, and they derived considerable benefit in the form of shelter, firewood, posts, stakes, and even royalties where the trees were ultimately milled.

He referred to the aesthetic value of a national tree-planting policy, and considered that the reason why action had been limited in the past was the lack of suitable advice and education, fencing difficulties, and insufficient royalties. Suitable educational information could be given through schools by qualified teachers, and horticulturists could assist by inspection and advice on the farm.

In seconding the remit, Mr. M. J. Barnett stated that after viewing rural England and Scotland he was of the opinion that there was a wide need for farmers in New Zealand to realise the value of the wood lot, and that the State Forest Service, Agricultural Colleges, and others should help in promoting the objective sought by the remit.

The remit was carried.

Executive Committee: That, in order to promote the maximum administrative efficiency of the Institute, an executive committee not exceeding 10 in number be elected, and that quarterly meetings of representatives of District Councils and affiliated bodies together with leading horticulturists be held.

Mr. F. A. Jones in moving this remit stated that its purpose was to obtain the services of a small but able team of men as a management committee to control the executive side of the Institute's affairs, and at the same time to provide a means whereby the best brains in horticulture could assemble several times a year for the purpose of advancing the interests of horticulture through the Institute in the most effective manner.

The remit was seconded by Mr. E. Hutt, who considered that by passing this remit and implementing it no great financial burden would be involved, as with Parks and Gardens Superintendents he was sure that the local authorities concerned would feel that the matter was of sufficient importance to send their appointees on such occasions.

The remit was supported by Mr. J. MacPherson and Mr. B. P. Mansfield, who considered that attendances should be good, and that it should promote the best interests of horticulture throughout New Zealand.

The remit was carried.

District Councils: That it be a recommendation to the Executive that it should take appropriate steps to promote the formation of District Councils of the Institute in those districts where no District Councils exist.

This remit was carried on the motion of Mr. W. K. Dallas, seconded by Messrs. M. J. Barnett and T. D. Lennie.

Supplementary Remits: A number of late remits had been circulated to members and **it was resolved** on the motion of Mr. J. P. Hudson, seconded by Mr. A. H. Shrubshall, that these should be deferred until the next conference, when it would be more appropriate to discuss them. In speaking to this motion Mr. Hudson drew attention to the fact that in the United Kingdom the Royal Horticultural Society had a membership of some 25,000, the vast majority of whom were amateur gardeners. In New Zealand it appeared that a very great proportion of the members of the Institute were professional horticulturists, and this comparison might well be a matter for study and investigation by the Executive Committee.

NEXT CONFERENCE:

Mr. J. G. C. MacKenzie, of Hastings, stated that he was authorised to extend an official invitation from the Mayor and Councillors of Hastings that the 1947 Horticulture Week should be scheduled for Hastings. He was thanked for conveying this information and assured that it would be placed before the National Horticulture Week Committee for consideration at an early date.

Votes of thanks were accorded to the Local Arrangements Committee for the excellent nature of the programme which had been arranged on behalf of the delegates, to the representatives of the Timaru Borough Council who had taken a personal interest in the welfare of the conference, to the chairman for his able conduct of the proceedings, to the auditor, Mr. J. L. Arcus, and to the press.

USE OF EXPLOSIVES

APPLICATION OF INSECTICIDE DUSTS

Very successful pioneer work in developing a quite unconventional method of pest control in forest and park areas has been done at the New York State Museum, Albany. Charges of insecticide dusts were fired from mortars and the air currents following the explosion were found to give an excellent distribution under the right weather conditions. The use of cemented paper mortars would render the treatment inexpensive and its application in many fields of pest control in war and peace is visualised.

(Horticultural Abstract No. 1642 for 1944—an abstract of an article in the Journal of Economic Entomology, 1944, 37: 230-4.)

"FAIRFIELD"

PIONEER NURSERY OF OTAGO

By Wm. MARTIN, B.Sc.

(Grandson of Mr. William Martin, the Founder)

AMONG the passengers who arrived in Otago in 1848 in the "first two ships" —the *John Wycliffe* and the *Philip Laing*—were two aunts and three grandparents of the writer, of whom one—William Martin—had the distinction of establishing, at Fairfield near Dunedin, the pioneer nursery of the province, and a garden which developed into one of the largest private collections of plants in Australasia. This garden, now slipping into the limbo of the past, is the subject of these notes.

The late William Martin was born on October 22, 1823, at Lesmahagow in Lanarkshire, Scotland, and in due course served his apprenticeship in the Horticultural Gardens, Edinburgh. He was of a family many members of which in his own and previous generations were nurserymen, gardeners, and students of plant life. While thus apprenticed he studied diligently subjects which included mathematics, surveying, botany, Latin, Greek and Hebrew.

Upon deciding to join the pioneer band of settlers to Otago, he proceeded to make preparations for the venture, and the following inventory of his belongings on the *Philip Laing* in the writer's possession contains some interesting items so far a prices were concerned:—

Silver lever watch (bought in 1945), £6/14/-; single-barrelled gun, £3; pit saw, £1; crosscut saw, £1; handsaw, 5/-; large and small axe, 4/10; one pair blankets, 12/-; one black coat, £3; two pairs dress trousers, £1/16-; top coat, £2/10/-; one spade, 3/-; one scythe, 3/-; mounting for same, 2/6; reaping hook, 1/-; camp oven, 7/1½; two chairs, £1/3/-.

FORMED HIS FIRST NURSERY GARDEN

On arrival at Port Chalmers Mr. Martin, then 25 years of age, took casual employment at Sawyers Bay, Waverley, Leith Valley, and at Green Island Bush, where he formed his first nursery garden, with vegetable culture the principal activity. In 1850 he took a farm block of 186 acres at "Fairfield," and a year later he married Miss Mary Kirkland.

An area of seven and a half acres of the homestead block was immediately laid out as a nursery, and it was not long before a wide variety of plants arrived from England, Scotland, and Australia.

Unfortunately, owing to wholesale burning of letters and correspondence in later years, details of these early transactions are probably lost for ever, but it is quite certain that by far the greater number of plants imported into Otago in its earliest years were to the order of my grandfather.

Two invoices in my possession are marked, "Invoice of first importation of fruit trees to Dunedin, 15th. July, 1850, William Martin," and "The first importation of Californian Tree Seeds into Otago"; as these have considerable historical interest, they appear in this article.

The first invoice, receipted by "J. Smith and Allan for Mr. G. Aiken, July 15, 1850," reads as follows:—

List of Apple-trees, etc.—

Ribston Pippin 3 trees of it	Court of Wick 6
Golden Ditto 2	Hawthornden 6
Golden Reinette 5	Keswick Codlin 3
Golden Harvey 6	Scarlet Nonpareil 10
King of Pippins 3	Scotch Nonpareil 10
Russet Nonpareil 2	Orange Pearmain 5
Kark's Admirable 4	Green Reinette 3
Nonsuch 3	Franklin Pippin 6
Golden Nob 10	Middleston Pippin 2
Cambridge Pippin 5	Downton Pippin 8

	£	s.	d.
	£7	0	0
Bigarreaus Cherries 4		6	0
Good peaches 4		10	0
Gooseberries and Currants 7doz.	1	1	0
Quinces 4		4	0
Green Bergamot pears 2		3	0
Black Cluster vines 8		8	0
White Fountainblow vines 8 (Frontignan?)		8	0
	£10	0	0

The first importation of Californian tree seeds into Otago was received from Edward C. Moore, January 28, 1869, per R. B. Martin & Co., and reads as follows:—

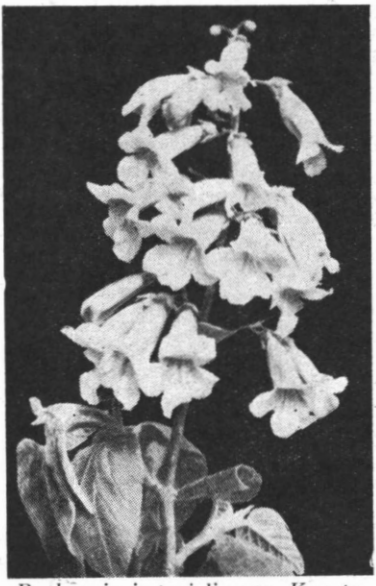
	£	s.	d.
¼lb *Wellingtonia gigantea*, 6/4½ an oz. 6$ 25c.	1	5	6
½lb *Cupressus macrocarpa* 5$	1	0	5
½lb *Abies Douglasii* 15$	3	1	3
½lb *Pinus Lambertiana* 7$ 50c.	1	10	7
½lb *Pinus Magnus* 5$	1	0	5
¼lb *Cupressus Lawsoniana* 4$	0	16	4
½lb Silver Fir 7$	1	8	7
Charges Freight 2$ 50c.	0	10	3
Pitters (?) 75c. 53 at 49	0	3	1
	£10	16	5

The first printed catalogue 1872-3 enumerates over 600 different kinds of plants as being available for sale, while the introduction states, "although all the plants mentioned and a considerable number more, are under cultivation at this Nursery . . . there are a number of things which will not be ready to send out this season." This catalogue is remarkable in that 21 years after the original settlement of Otago no fewer than 105 different species of conifer were on sale, including not a few of the rarer varieties, e.g. *Libocedrus chilensis, Picea grandis, Podocarpus nubigena* (Chili), *Prumnopitys elegans, Taxodium distichum* (the deciduous Cypress), *Torreya californica,* and the two *Widdringtonias* from Cape of Good Hope. Altogether there were 18 pinus, 11 silver firs, 14 cupresses, 8 junipers and 6 retinosporas. At the time, it is doubtful if any other grower in the southern hemisphere had a more representative collection of conifers. Prices ranged mostly from 5/- to 18/- a dozen, though well-grown yew (*Taxus baccata*) and the *Ginkgo biloba*—then listed as *Salisburia adiantifolia*—were priced 5/- each. The catalogue lists also 209 other trees and shrubs, 109 herbaceous plants, and 116 greenhouse plants, besides numerous ferns and fruit trees.

SPECIALISED IN BETTER TYPES OF SHRUBS AND TREES

The business expanded so rapidly that when the second catalogue was issued nearly twenty years later no fewer than 1400 species of plants were offered to

the public. The firm was now known as William Martin & Son, and had begun to specialise in the better types of shrubs and trees, in alpines and rockery plants, and in native plants. The garden was acquiring a reputation quite apart from its nursery side, for Mr. Martin—a true lover of plants—had been establishing gradually a permanent collection of choice plants which were now maturing into "things of beauty." Rhododendrons had become a speciality (20 species and 27 named hybrids were catalogued) and thrived particularly well. The creamy white *R. Aucklandii,* the yellow *R. Falconeri* and the sweet-scented *R. Fragrantissima* were prime favourites of Mr. Martin; but foremost of all and considered at Kew as "one of the finest hybrids in existence" was the beautiful pink hybrid raised at "Fairfield" and known as "Marquis of Lothian." Other choice hybrids carried the names of his wife, "Mary Martin," his two daughters, "Margaret Martin" and "Jane Martin," and his home, "Fairfieldii."



Paulownia imperialis var. *Kanata.*

Another hybrid of rare excellence raised at "Fairfield" and much in favour at Kew was *Veronica Fairfieldii,* or, in more modern parlance, *Hebe Fairfieldii.* This plant was almost certainly a cross between *V. Hulkeana* and *V. Lavaudiana* which for many years occupied the same border and grew quite close together, but whether the hybrid was natural or artificial I cannot say.

Towards the latter end of his life, Mr. Martin maintained the garden at "Fairfield" more for his own enjoyment and that of his many friends than as a nursery. He was quite content if the garden "paid its keep." In November, when the rhododendrons and azaleas and many other plants were at their best, it was common for as many as 500 visitors a week to wander round and enjoy the beauty and fragrance of the flowers. Not only amateurs but also botanists of note visited Fairfield. Among honoured guests and visitors were Dr. Lauder Lindsay, the celebrated cryptogamic botanist (who stayed with Mr. Martin during the whole of his few months in Otago in 1861), Dr. S. Berggren, an equally famous botanist, and such well-known New Zealand students as Messrs. T. W. Kirk, J. Buchanan, A. Purdie, T. F. Cheeseman and Dr. L. Cockayne, Dr. D. Petrie, and Dr. C. Chilton.

ENGLISH TREES—SPLENDID GROWERS

It is not possible in a short article to present a complete description of this outstanding garden. English trees grew splendidly and amongst these were the copper beech, golden ash, hornbeam, horse-chestnut and weeping elm. Japanese and other maples, *Acer negundo, A. palmatum,* and *A. saccharum* (sugar maple), were beautiful in season, as were the Canadian *Amelanchier,* the North American tulip tree (*Liriodendron tulipifera*) and the *Magnolia stellata* from Japan. The Japanese Umbrella Pine (*Sciadopitys verticillata*), the Noble Fir (*Abies nobilis*), and the Big-cone Pine (*Pinus coulteri*) were distinctive conifers. The South African Silver Tree (*Leucadendron argentum*), though ultimately succumbing to frost, did well for many years. The *Catalpa bignonioides* (*syringifolia*), the Waratah (*Telopea truncata*) and a large tree of our rare but native *Olearia*

fragrantissima, still growing wild only a mile away, were also noteworthy trees. A Kauri (*Agathis australis*) which, in 30 years, grew only 9 feet, suddenly shot up and doubled its height in a matter of two or three years. There was also a very large specimen of the related Monkey Puzzle (*Araucaria araucana* (*imbricata*)) ultimately damaged badly by lightning.

Of the shrubs worthy of note, the rhododendrons and azaleas held pride of place; but Kalmias (*K. angustifolia* and *K. latifolia*), *Pieris* (*Andromeda*) *japonica* and the closely related *Clethra alnifolia,* the Carolina Allspice (*Calycanthus floridus*) and the Winter Sweet (*Chimonanthus fragrans*), *Cantua buxifolia* (*dependens*) with its showy red bells, *Correa alba* and *C. speciosa,* and Yellow Spanish Broom (*Spartium junceum*) were all choice shrubs of early introduction. Camelias thrived at "Fairfield," as did the old-fashioned Fuchsias, and both Persian and English lilacs. Other shrubs that attracted attention include the Tea Plant (*Thea sinensis* Var. *Bohea*) the Snowdrop Tree (*Halesia carolina* (*tetraptera*)), the Mexican Anchor Plant (*Colletia cruciata*), the English Butcher's Broom (*Ruscus aculeatus*), the scarlet-berried *Skimmia japonica,* and various aloes and yuccas. An aloe throwing up its massive flower stalk was observed to grow 5in. a day—a truly remarkable rate.

A never-ending source of admiration was a Cupressus macrocarpa 30ft. high that had been trimmed like a haystack with close impenetrable sides. Then an unrivalled collection of paeonias (20 Moutan and 25 herbaceous) made a gorgeous display in the flowering season. Next to them were the tulips and hyacinths and then the narcissi, most of which were the progeny of bulbs first introduced into Otago by Mr. Martin.

Snowdrops, snowflakes, crocuses, freesias, grape-hyacinths, lilies-of-the-valley, fritillarias, and primroses were other early introductions much sought after by the settlers.

SENSITIVE PLANTS

In the greenhouse, fernery, tropical house, and vinery apart from the great variety of plants offered for sale, many were kept more for their own intrinsic interest or beauty. Among the Fly-catchers were the tropical pitcher-plants (*Nepenthes*), Venus Flytrap (*Dionaea muscipula*) from the peat bogs of Carolina, and the well-known but seldom seen *Sarracenias.* Of equally absorbing interest were the pots of sensitive plants (*Mimosa pudica*). Gloxinias, coleus, begonias and orchids supplied a fine display of colour, while coffee, ginger, and banana were economic tropical plants of interest. *Lapageria rosea* and its Var. *albiflora* bore abundant pink and pure white blooms respectively.

In the fernery at one time there was a complete collection of British ferns, besides 26 species of maidenhair ferns, one of which closely resembled our New Zealand kidney-fern.

Later, a holly hedge, which 60 years before had replaced a hedge of gorse, was uprooted in the course of alterations. Though there was no gorse in the neighbourhood, thousands of seedling gorse plants sprang up along the site of the early gorse hedge from seed that had lain dormant for more than half a century.

On the death of the pioneer founder in 1905—my father was killed in an accident nearly ten years earlier—the nursery was carried on by Miss Martin (till she died in 1918) under the able management of Mr. Herbert Christie, and later of Mr. W. Kenworthy. In 1919 Mr. F. Seaton, of Mosgiel, who had served his apprenticeship at "Fairfield," and whose wife was a daughter of Mr. Martin, then bought the nursery and maintained it partly as a commercial and partly as a private garden. Since his death various people have bought the property. However, the memory of the garden still remains fresh in the minds of many who knew it in its palmy days.

Horticulture in Otago was first established in 1850 at "Fairfield" which, for over half-a-century, retained its position as the first garden in Otago. This article is a tribute to its memory.

AVOCADO GROWING

A POSSIBILITY IN NEW ZEALAND?

By LAI-YOUNG LI, Plant Research Bureau, Department of Scientific and Industrial Research, New Zealand, and Lingnan University, Kwangtung, China.

AVOCADO is a tropical as well as a sub-tropical fruit which in recent years has gained popularity because of its extraordinary dietary qualities. From its original home in the tropics and sub-tropics of the Americas, its culture has now spread to parts of the United States, Hawaii and other Pacific Islands, India, China and Australia (Popenoe, 1935).

Normally the avocado tree attains a height of 50 to 60ft., but when budded and grown under orchard conditions the tree is smaller. The fruits vary in size, colour, and shape according to varieties. In New Zealand markets, one sometimes sees imported egg-shaped fruits, dark-green in colour and the size of a large apple. The edible part is the yellowish pulp, between the seed and the skin, of the consistency of firm butter and of nutty flavour. It is used in salads or seasoned with salt and pepper and used as butter on bread.

Botanically, avocado is called *Persea Americana*, a member of the Laurel family to which Camphor and Tawa also belong. According to their adaptability to climate, three races of *P. Americana* are recognized—West Indian, Guatemalan, and Mexican. The West Indian inhabits the lowlands of American tropics and is intolerant to cold, being seriously injured at temperatures much below 32deg. F. The Guatemalan and the Mexican are of upland origin and are more resistant to low temperatures. The Mexican race is the hardiest of the three.

In the United States, the avocado industry was established commercially during the past 25 years. Commercial plantings are limited to the relatively frost-free areas of California (San Diego, Orange counties and Los Angeles) and Florida (Dade, Polk and Highland Counties). In 1939, California had 14,235 acres in avocado, while there were about 3,000 acres in Florida. In 1938 California and Florida produced 28,200,000lb. and 4,440,000lb of fruit respectively (Traub, 1941).

This article aims at assembling some information about avocado especially for local farmers, gardeners, and orchardists so that it may stimulate interest in this valuable fruit and in its possibilities in New Zealand.

FOOD VALUE

The avocado has a remarkable composition, the nutritive value of which is much above that of ordinary fruit. As compared with apple, pear, grape, berries, citrus fruits, and banana, its protein content is approximately three times, mineral content two to three times, and fat content up to 60 times higher. The vitamins are likewise well represented in avocado. The energy values of the edible portion of the commonly-used fruits are relatively low, ranging from 175 calories to 400 calories per pound, while the average for avocado is 1,056 per pound (Jaffa and Goss, 1923). The table on page 16 compiled from several sources (Hughes, 1941; Hodgson, 1930; Weatherby, 1928; Jaffa and Goss, 1923; Haas, 1937, and Chatfield and McLaughlin, 1928) gives some idea of the nutritive value of avocado in relation to other fruits.

TABLE I

Composition of the Edible Portion of Some typical Fruits Compared with Avocado.

Fruit	Protein per cent.	Fat per cent.	Carbo-hydrates per cent.	Water per cent.	VITAMINS			
					A	B	C	D
Apples	0.3	0.4	14.9	84.1		Fair or Good	Fair	Poor
Apricots	1.0	0.1	12.9	85.4	Good	Excellent	Good	Fair
Avocado	2.1	20.6	4.5		Good	Excellent	Good	Fair
Bananas	1.2	0.2	23.0	74.8	Fair or Good	Fair or Good	Good	Good
Cherries	1.1	0.5	14.8	83.0	Good		Good	
Grapefruit	0.5	0.2	10.1	88.8		Good	Excellent	Good
Lemons	0.9	0.6	8.7	89.3		Fair	Excellent	Good
Oranges	0.9	0.2	11.2	87.2		Excellent	Excellent	Good
Peaches	0.5	0.1	12.0	86.9	Fair or Good	Fair or Good	Good	Fair or Good
Pears	0.7	0.4	15.8	82.7		Good	Good	Good
Pineapple	0.4	0.2	13.7	85.3		Good	Good	

ADAPTABILITY

Avocado prefers a climate having no extremes of heat or cold, with high relative humidities and free from severe winds. Its climatic requirement is somewhat similar to that of the citrus trees, particularly the lemon. In fact, successful avocado and lemon plantings are generally found in the same locality (Traub, 1941). In countries where avocado culture is already established, as in the United States, the important limiting factor in production is damage caused by low temperature. The centres of the largest production are therefore confined to sections in southern California and peninsula Florida.

The areas in New Zealand which have climatic conditions (especially temperatures) approaching those of the American avocado-growing districts are Auckland, North Auckland (Kerikeri and Whangarei), Tauranga and Gisborne (Tables II and III). Taking both temperatures and rainfall together, the New Zealand districts resemble Florida more than California. The mean annual rainfall of Auckland and Tauranga of 57.3 and and 52.3in. respectively compare very closely with 61.9 of Dade and 52.1in. of Highland counties in Florida. The rainfall of Auckland and Tauranga is more evenly distributed than that of Florida districts, and where the soil is deep and well managed, drought should not be a limiting factor (Table II).

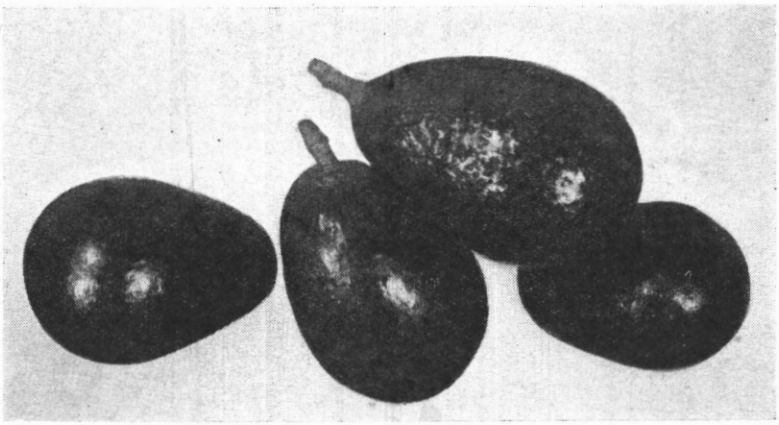


Fig. 1: Avocados from Mr. Cameron's tree, Auckland (actual diameter 8.5 centimetres). Photo by Miss M. J. Dahlberg.

The most important climatic factor limiting the culture of avocado seems to be low temperature and frost injuries. In California, Professor Webber (Webber, 1918) made the following observations: "30deg. F.—Nothing injured as far as could be observed; at 28deg. F.—New foliage scorched on Guatemalan type; West Indian varieties showing considerable foliage damage; at 21 deg. F.—All Guatemalan types killed to bud; a few of the hardiest Mexican varieties, such as Knowles and San Sebastian, with young leaves only injured.

"Varieties of the Mexican race are most resistant to both heat and cold, although in January, 1937, a prolonged period of temperatures below 32deg. F. with a minimum at least as low as 16deg. either killed the tops of many trees or defoliated them to different degrees and injured many fruits. . . . . In most cases the trees were not killed by that freeze, and the characteristic vigorous growth of the avocado resulted in a very rapid recovery during the succeeding season." (Traub, 1941.)

TABLE II

Mean Monthly Rainfall in Inches Recorded at Auckland, Tauranga, New Zealand*, at San Diego and Orange County, California, and at Dade and Highland Counties, Florida, United States of America**

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Auckland (Henderson)	3.11	4.21	3.26	4.98	7.38	5.86	6.23	4.44	5.33	5.00	3.60	3.89	57.29
Tauranga	4.09	3.64	3.99	4.71	5.13	5.28	4.95	4.20	4.28	5.17	5.33	3.51	52.28
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	Year
San Diego, Calif. (40 yrs. record)	.04	.05	.09	.52	.72	1.84	1.97	2.22	1.59	.71	.31	.05	10.11
Orange, Calif. (40 yrs. record)	.00	.02	.14	.65	1.03	2.01	2.59	2.71	2.15	.86	.42	.07	12.65
Dade (Homestead) Florida ..... (23 yrs. record)	7.08	8.29	9.18	9.14	2.13	1.20	1.94	1.72	2.17	3.47	7.34	8.22	61.88
Highlands, Florida (37 yrs. record)	8.06	7.60	6.78	3.97	1.70	1.83	2.18	2.49	2.25	2.56	4.58	8.12	52.12

* Kidson, E., in Hamilton, W. M., 1937. "A Preliminary Survey of the Citrus Industry in New Zealand." Department of Scientific and Industrial Research Bulletin 53.

** U.S.D.A. Year Book Agriculture, 1941. "Climate and Man."

Judging from these experiences and from the experience of lemon culture it seems probable that temperatures below 28deg. F. are a limiting factor to commercial avocado growing. However, such a critical temperature is subject to variation within limits according to the influence of other factors such as the variety, the physiology of the tree, and the microclimate of the area under consideration.

The largest American avocado-producing area is San Diego County, which is without frost (U.S.D.A. Yearbook, 1941). In New Zealand, Auckland is relatively frost free (Kidson, Table III).

Avocado trees suffer from severe winds, which often break their limbs. Suitable trees for windbreaks could be used with advantage.

Avocados grow in a wide range of soils from light sandy ones to heavy clays, but the best avocado trees and highest sustained production are obtained on the deeper alluvial and the better-drained upland soils. The ideal soil for avocados is porous and well aerated. In this connection the well drained, immature brown-loam soil of Auckland and North Auckland may

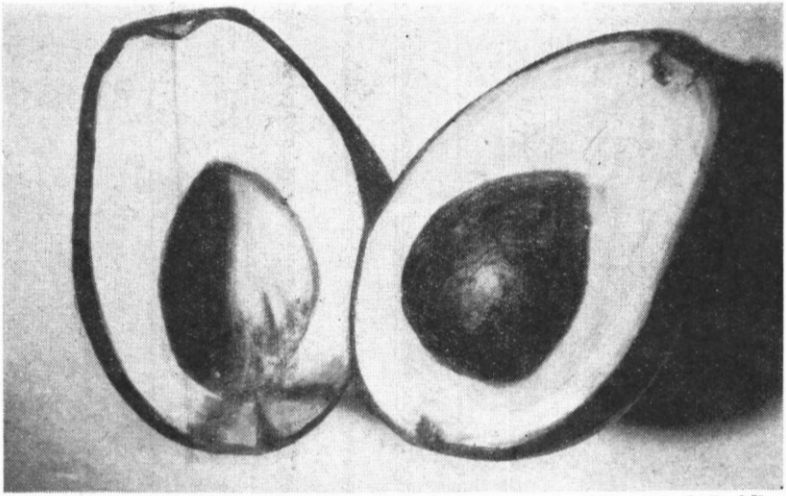


Fig. 2: Fruit in Fig. 1. cut longitudinally. Photo by Miss M. J. Dahlberg

prove suitable for avocado. Trees on soils with a comparatively loose upper stratum but a compact subsoil will show dieback after a few years and any lack of drainage is fatal (Round, 1942).

BRIEF NOTES ON CULTURE

Avocado trees of commerce are either budded or grafted on seedlings. Although the Mexican race shows more resistance to cold and is chiefly used as rootstocks in California, Indian and Guatemalan races are also used. Seedlings of the West Indian race are generally used in Florida as stocks. Seeds may be either sprouted first in boxes, or planted directly in the nursery. Larger seeds are preferable to small ones (Hodgson and Egger, 1938). Recently it was found that the removal of seed coats from avocado seeds prior to sowing hastened germination from four to six weeks and promoted uniformity in standard size (Egger, 1942).

Seeds planted in the spring may be ready for budding in the autumn or in spring of the following year. Shield budding with matured budwood of

TABLE III

Temperature and Frost Data Recorded at Auckland and Tauranga, New Zealand*; California and Florida, United States of America.**

	Temperature in Degrees Fahrenheit				Frost Records	
	Jan. Mean	July Mean	Max.	Min.	Days of frost in screen a year	
Auckland (City)	72.6	57.0	81.5	35	None	
Tauranga	74.1	57.6	87.0	24.5	13	
	July	Jan.	Max.	Min.	Killing Frost First in Autumn	Killing Frost Last in Spring
San Diego (40 yrs. Record)	67.5	55.1	110	25	None	None
Orange County, California (26 yrs. Record)	71.7	52.9	111	18	Dec. 7	Feb. 7
Dade (Homestead), Florida (27 yrs. Record)	80.5	66.8	98	26	(First half of the year)	
Highlands, Florida (37 yrs. Record)	81.5	63.6	102	21	Dec. 25	Jan. 12

* Kidson, E., in Hamilton, W. M., 1937. "A Preliminary Survey of the Citrus Industry in New Zealand." Department of Scientific and Industrial Research Bulletin 53.

** U.S.D.A. Year Book Agriculture, 1941. "Climate and Man."

the current season's growth is generally used. Autumn-budded trees will normally be ready for transplanting in the following spring. During transplanting, nursery trees are usually balled, care being taken to disturb the roots as little as possible. In the choice of varieties for permanent planting, both climatic adaptability and the physiology of flowering should be taken into consideration.

The stamens and pistils of the avocado flower normally mature at different times and the flowers of a particular tree normally have two distinct periods of flowering. Furthermore, varieties differ in the time of the day their flowers open. These, together with climate, influence avocado pollination. In California, with variety Fuerte, no difficulty has been experienced in pollination. In Florida, mixed variety plantings are generally recommended.

The trees should not be spaced closer than 20 by 20ft. in the orchard. The distance varies somewhat with soil and variety, being wider spaced in lighter soils.

At present we do not have much knowledge about the fertiliser requirement of avocado trees. General commercial experience indicates that a fertiliser programme satisfactory for a citrus grove is also a proper one for avocados, bearing in mind that avocado is a slightly grosser feeder than the citrus. Cover crops are being used to some extent in avocado groves, especially in young plantings. In an old grove it is usually too shady to allow successful growth of cover crops. Shallow cultivation is done in young orchards to control weeds.

Pruning reduces the succeeding crop and is justifiable only when it is necessary to cut back diseased trees or to facilitate orchard operations.

Mature trees in California have an average yield of one to two crates of 40lb. per tree a season for most varieties, although occasional yields of five to 10 times this amount have been reported.

Little is known of the diseases attacking avocado trees in New Zealand. A rot caused by *Glomerella* has been observed on this fruit collected in Auckland. A suspected virus trouble has also been observed in Auckland.

NOTES ON AVOCADO IN NEW ZEALAND AND FUTURE POSSIBILITIES

As far as the writer knows, avocado culture has been attempted in Kerikeri, Warkworth, Auckland, Thames, Tauranga, Gisborne, New Plymouth, Wanganui, and Feilding in New Zealand. Of all these localities tried, the trees have fruited only in Tauranga, Gisborne, Thames and Auckland. Table IV gives a brief summary of experience of avocado culture in New Zealand.

Records also show that some avocado trees have flowered profusely in localities other than Tauranga, Auckland, Gisborne, and Thames, but have so far failed to fruit. It was pointed out earlier that some varieties such as Fuerte experience no difficulty in pollination, while others require mixed-variety planting in order to facilitate adequate pollination. This may throw some light on the cause of barrenness in some trees in New Zealand.

At Auckland University College grounds, Professor Lancaster showed the writer an avocado tree over 10 years old. It was apparently not given enough space and light and has not fruited yet.

On November 8, 1944, the writer was shown three healthy avocado trees at Mr. John R. Cameron's property, 28 Speight Road, Kohimarama, Auckland. The best of the three trees is a 12-year-old seedling measuring about 22ft. high and has a diameter of 9in. at 1ft. above ground. The tree commenced to bear at the age of eight. Mr. Cameron (Cameron, 1943) writes: " . . . At the present moment it has about 40 fruits which will ripen in

November-December. The fruit is round, green, rough-skinned and of fine eating quality and flavour, weighing from 12oz. to over 1lb." The fruit of Mr. Cameron's trees has a desirable form for packing. The seed is small, enclosed tightly by a relatively thick layer of pulp (Figs. 1 and 2).

According to the owner, the tree came to New Zealand as seeds packed in a doll-dog sent by Mrs. G. Knoppe, of San Diego, California, United States of America, to a grand-niece of Mr. Cameron in 1931.

TABLE IV

Summary of Records of Avocado Culture in New Zealand.

Localities in New Zealand where culture tried.	Localities in New Zealand where Avocado has fruited.	Varieties.	Owners.	Authority.
Tauranga	Tauranga	——	J. H. Davidson	Rice, 1927.
Warkworth	——	——	A. M. Shaw	Shaw in Allison, 1930.
Aramoho, Wanganui	——	Puebla, Fuerte, Spinks, Dorothea, Dutton, Lyon, Caliente, Northrop, Mayapan Nabal, Duke and Mexicolo.	A. Allison	Allison, 1930.
Tauranga	Tauranga (Lyon)	Lyon, Northrop, Harmon, Abonacate, Miserve.	Department of Agriculture	Everett, 1937.
Feilding	——	Fuerte	——	"
Thames	Thames (Lyon)	Lyon	——	"
Ormond, Gisborne	Ormond, Gisborne	Fuerte? and Puebla?	——	"
New Plymouth	——	——	——	"
Kerikeri	——	——	——	"
Auckland	Auckland	——	J. R. Cameron	Present study.
Auckland	——	——	Auckland University	" "
Auckland	——	——	Plant Diseases Division D.S.I.R.	Li, and Woodhead.

Judging from the available data (Table IV) and from performances of Mr. Cameron's tree, it seems likely that under proper shelter and on suitable soil avocado can be grown in Auckland and in other localities having similar conditions in New Zealand. More extensive and

careful, planned trials with the varieties of Mexican race may be worth carrying out and this should precede any commercial planting. Its culture, even as a home garden tree, should not be overlooked on account of both its dietary and ornamental possibilities.

LITERATURE

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EXPERIMENTAL SEED STORAGE

By MISS A. M. MACMORRAN, B.Sc.

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SINCE 1941 a study of seed-storage methods has been in progress at the head office of the State Forest Service, Wellington. The investigation covers seed of nine coniferous tree species, three of which are indigenous and six exotic, and is being carried out to determine the effect of long-term storage on viability.

Seed required for this project was collected from State Forests and forwarded to Wellington. Moisture content was determined immediately, and that of a certain percentage reduced by 2 to 3 per cent. to discover whether drying has any effect on viability. Progress results show that there is no significant difference in germinative capacity between such slightly-dried and non-dried seed. After being carefully subdivided into suitable quantities, the seed was bottled and, according to the storage method, either corked and sealed, corked only, or merely paper-covered; some of the bottles were then stored at room temperatures and the remainder at varying refrigeration temperatures.

The investigation has been in progress for three years, and each year a quantity of seed sufficient for current germination tests has been removed and examined. Both laboratory and soil tests have been carried out and the results summarised and compared. Laboratory tests include a cutting test, and a biochemical test using either sodium biselenite or indigo carmine according to the species, while soil tests are standardised as far as possible, and all seedlings counted and removed every seven days. It is not possible at this stage of the investigation to give any final figures, as the seed is to be stored for 10 years with annual or biennial testing as results indicate; but preliminary results suggest that, while indigenous species lose a certain amount of viability even when stored for short periods, cold storage is more satisfactory for these species than storage at room temperatures. For example:—

Agathis australis (kauri) stored 1942:

Original average germinative capacity	50% (soil test)
1944 average germinative capacity of seed stored at room temperatures (33-78 deg. F.)	0% (soil test)
1944 average germinative capacity of seed stored at 10-15 deg. F.)	32% (soil test)

Germination tests carried out with the following exotic species:—*Pinus nigra var. calabrica (P. Laricio)* (Corsican Pine), *Pinus contorta var. latifolia (P. Murrayana)* (Lodgepole Pine), *Pinus radiata (insignis)* (Monterey Pine), *Pinus strobus* (American Eastern White Pine), *Pseudotsuga taxifolia* (Douglas Fir), and *Cryptomeria japonica* (Japanese Cedar), show that these species, with the exception of *Cryptomeria japonica,* can tolerate storage at normal temperatures for several years without complete loss of viability, although the lower the temperature the better; but that long term storage at room temperatures is not the most suitable method for coniferous tree seed. Examples are:—

Pinus nigra var. calabrica stored 1942:

Original average germinative capacity	99.0% (soil test)
1944 average germinative capacity of seed stored at room temperatures (33-78 deg. F.)	74.5% (soil test)
1944 average germinative capacity of seed stored at 35-40 deg. F.	81.5% (soil test)

Pseudotsuga taxifolia stored 1941:

(Continued on page 25)

FLAVOUR IN TOMATOES

The following correspondence published in The Gardeners' Chronicle merits the careful consideration of all tomato growers:—

IT would appear that the raisers of new varieties of Tomatoes pay little attention to flavour, whereas weight of crop, shape of fruits and resistance to Cladosporium appear to be their chief concern. I venture to predict that if the average person, who has to queue up in order to get a few apologies for Tomatoes, could sample some really ripe specimens of a well-flavoured variety he would never purchase the leathery bags of acid again. One remedy is to sprinkle these vinegary fruits with sugar, after cutting them, and then apply the usual condiments. After separating the seeds from the flesh, it is at once obvious that the seeds and pulp are more acid then the flesh, and flesh in a Tomato is what is referred to as "those objectionable divisions." To my mind these divisions, or carpels, are the deciding factor as regards flavour, and the more carpels a Tomato has the less seeds and pulp, and therefore less acid. There are probably more vitamins in the seeds and pulp than in the flesh, but this is just a guess.

Good flavour can be promoted by feeding with potash, which increases the sugar content of the fruits, but if the raisers would concentrate on producing varieties with a large number of carpels then I think that breeding for flavour would be largely unnecessary.

Three years ago I grew several varieties of Tomatoes with a view to ascertaining the best variety for flavour. The varieties grown were Stonor's M.P., Stonor's Exhibition, Sutton's Best of All, Sutton's Early Market, Sutton's Open Air, Kondine Red, and Majestic. All seven varieties were grown in one house, and received the same treatment throughout. As some of the varieties had ripened fruits before the later maturing sorts, the test for flavour was not conducted until all the plants had fruits of a corresponding ripeness. Six fruits of each variety were picked, each variety was numbered, and the number pinned to each fruit. Six of my employer's guests sampled the fruits on three different occasions, and the result was the same each time. Sutton's Open Air secured five votes the first time, four the second time, and six at the third trial. Majestic was voted second, and the other varieties were judged about equal, with the exception of Stonor's Exhibition, which was last on the list.

From these results it will be seen that Open Air (eleven carpels) and Majestic (five carpels) were adjudged first and second respectively. While I realize that other factors may influence flavour, it seems very interesting that the varieties with the "objectionable divisions" should be considered by six persons (who should be in a position to judge flavour, if only because they were all men used to good food) to be the best flavoured. The smooth, globular fruits of certain varieties have—as their only merits—heavy cropping capacity, a medium-sized fruit which is easy to weigh out, and a suitability for the show table.—J. Haslam, Matson Ground Garden, Windermere. (Letter published in The Gardeners' Chronicle, September 30, 1944.)

Original average germinative capacity	56.5%	(soil test)
1944 average germinative capacity of seed stored at room temperatures (33-78 deg. F.)	13.0%	(soil test)
1944 average germinative capacity of seed stored at 35-40 deg. F.	22.5%	(soil test)

Pinus radiata shows no significant loss of viability, whether stored at room temperatures or at 35-40 deg. F., over the period 1941-44.

The question of flavour in Tomatoes is a subject which has been under investigation at the John Innes Horticultural Institution this autumn.

In our experiments all the varieties were grown in the open. We have already come to the preliminary conclusion that it is unwise to compare Tomato fruits according to their "goodness" of flavour, as the criteria of "goodness" vary with the individual tasting. The two main variables in flavour are sweetness and acidity. These are not mutually exclusive, but can occur together, as in lemonade. Fruits which have neither sweetness nor acidity are regarded by all as having no flavour. Where there are two fruits of about equal sweetness but of differing acidity, people can be roughly classified as being "sweet-toothed" or "sour-toothed," according to which they prefer. Judging by some of his remarks and his preference for Sutton's Open Air, Mr. Haslam is a "sweet-tooth" on this classification. Among the staff at this Institution the "sweet-tooths" appear to be in a minority.

But within these two classes of tasters there is variation. Some "sweet-tooths" prefer a flavourless Tomato to one which is sweet but acid, while others do not. Some "sour-tooths" prefer a sweet, non-acid fruit to an acid non-sweet one, while others do not. Apart from the above sources of variation in individual preference we have to allow for the liability of the taster to be influenced in his judgment of flavour by other factors, such as firmness of flesh, and toughness of skin. In my opinion it is unwise to endeavour to obtain comparisons of more than two samples at a time, as otherwise the taster is liable to be confused and his judgment impaired.

In our experiments we asked each individual tasting two fruits to say (a) which had the better flavour, (b) which was the more acid. In this way we gained information both on the individual's tastes and on the flavour of the classes to be compared.

Our conclusions were (i) that as the flesh appeared to be almost tasteless, the higher the proportion of flesh, the less the flavour of the fruit (not the more sweet as Mr. Haslam claimed); (ii) that the pulp around the seeds could vary considerably in sweetness and acidity, and (iii) that it was this variation which was the basis of the sweetness and acidity of the fruit as a whole.

These can be illustrated by means of three varieties which were studied.

The bush variety Victor is nearly all flesh, and has very little flavour, sweet or acid. The variety Harbinger has a good proportion of pulp, and under good growing conditions has a fruit which is at once both sweet and acid. The variety Badsey's Potato Leaf (which is closely related to Woodward's Open Air Wonder and to Sutton's Open Air, which Mr. Haslam rated so highly) also has a good proportion of pulp, in spite of the many partitions, and is sweet but relatively little acid. The difference between Harbinger and Potato Leaf is due not to different amounts of flesh but to different acidities of the pulp.

It appears from the above that if we are to select for "improved" flavour we must, to satisfy everyone, select in more than one direction, and that to do so we must judge fruits not on individual opinions of goodness, but on the less subjective lines of sweetness, acidity, firmness, toughness of skin, etc.

Our conclusion is then, in contrast to Mr. Haslam's, that if we are to improve the flavour of Tomatoes we must select not for an increased proportion of flesh, but on the contrary for a minimum of flesh combined with a highly flavoured pulp which should be either sweet, or sweet and acid, to cater for both sections of the Tomato-eating public.—A. J. Bateman, John Innes Horticultural Institution, Merton Park, S.W.19. (Letter published in The Gardeners' Chronicle, November 11, 1944.)

GARDENING BOOKS

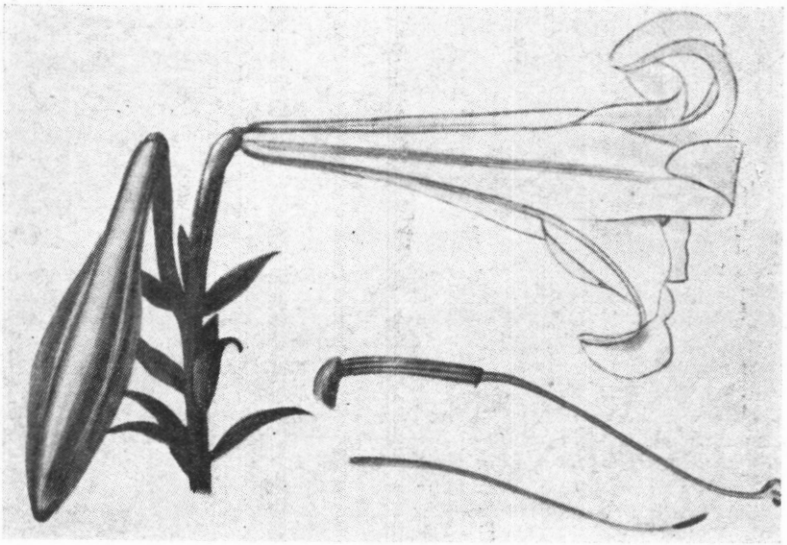
By E. O. PETERSEN

ONE of the objects of the Royal New Zealand Institute of Horticulture is to establish, assist or endow libraries—I need not quote in full—and at the present time and under our present conditions it appears to me that this should be the primary object. All the other objects are good, even admirable, but if many of them are carefully considered it will be found that they could be seriously encouraged only if a really comprehensive library were available. Such a horticultural library to fulfil its many purposes would need to be large —say, 10,000 books and twice as many pamphlets—and a collection on this scale would be valuable.

Later, I have a scheme to place before the members of the Institute—rather, the outline of a scheme—but just now I would like to write about gardening books. I have said before that there are no poor or bad garden books. They differ, it is true, yet the only difference is that some are better than others.

MANY GARDENING BOOKS NOT ORIGINAL

The art, the game, or the business of writing gardening books is not new, for ever since gardens were first thought of some gardener or other has had the urge to write and let others know of his plants and his experiences. This, it must be allowed, was, and still is, all to the good, but if you study the books it will soon become obvious that a great many are, seemingly, not written by



The Bermuda Lily in 1856—reproduced from a painting by Dr. Cogswell.
—Royal Horticultural Society Photograph.

gardeners at all. Indeed, many are not original—they are plainly compilations. If you have an immense file of gardening books published over a hundred years or more, you may trace the main theme running through quite a number, with a few additions here, a few alterations there, and, of course, a few omissions somewhere else.

That the author and the publisher shared the opinion that the reader would always try to keep up with the times by purchasing a modern work, and would not bother to dig up the past as well as his garden, is abundantly clear.

There is something about a very old garden book—the large type used in its printing, and the usually simple language in which it is couched—that calls to mind at first perusal a school book for one of the primers. Indeed, a sequence of these books covering a period of years, say from 1700 to 1900, in one way appears like a gradually-improving or advancing series of text-books from the primers up to the higher forms.

This early impression, however, often does not last. Often it is quickly dispelled, for in some of these books there are an attention to detail and a record of close observation that are too rarely found in the modern works.

I have in mind a small book published in 1812. It is "A Concise and Practical Treatise on the Growth and Culture of the Carnation, Pink, Auricula, Polyanthus, etc., etc.," by Thomas Hogg, Florist of Paddington Green, Middlesex. Thomas Hogg, "the scholarly Mr. Hogg" as he was frequently referred to by the fanciers of his own day, was at one time a schoolmaster, but early in life he became a gardener and florist.

From a man of such discernment we may look for something of special interest; in his little book we find it. His introduction is a lengthy one, and covers a wide field. Only the note upon his reason for undertaking to write upon these flowers and their mode of treatment, which he admits are described more or less in almost every book upon gardening, calls for mention. He writes: "With all due deference I beg to state, that I have nowhere been able to meet with that account of these flowers and their management, which I from my own knowledge and experience would be induced to adopt and follow —because the directions given are too vague, general and defective to be reduced to practice."

THE CARNATION—"A WONDERFUL FLOWER"

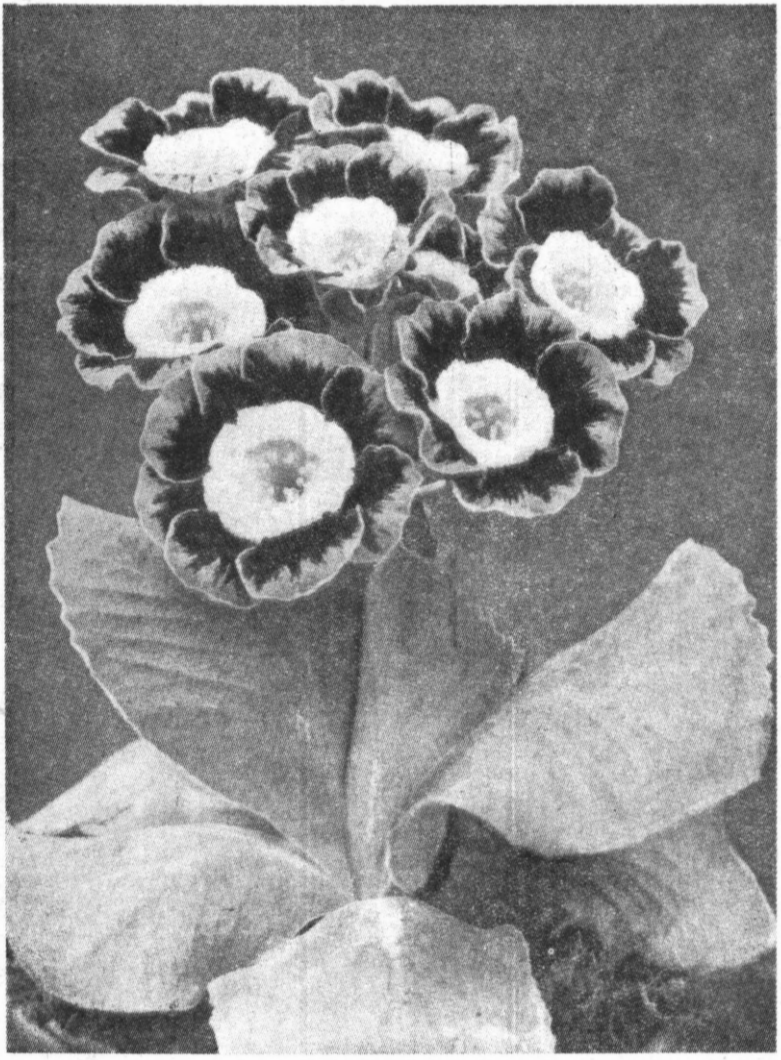
The treatise runs to 304 pages, and of these 120 are devoted to the carnation—an account chiefly of interest now for its history of the many varieties. The two illustrations, a bizarre carnation and a yellow picotee, "hand-coloured after nature," are remarkably life-like, the colouring, despite the lapse of time, still being bright and clear. The picotee shows a large, deep canary-yellow bloom lightly marked with reddish-brown—a wonderful flower. The author says that these yellows were rare, and did not do well in England or the Low Countries, owing to the moist atmosphere and long winter, but in France, Italy, Germany and Switzerland they were plentiful. The Empress Josephine had a large array at Malmaison, and the late Queen Charlotte had a superb collection at Frogmore, but this had regularly to be replenished from Germany.

Regarded as instructions for the actual growing of carnations this account is equal to anything of the present day, but for the fact that there are no directions for dealing with diseases!

The next plant dealt with is the Auricula, and this is given 45 pages and one illustration, the latter not very convincing. This is all the more surprising for Mr. Hogg was a recognised judge of Auriculas, and in some demand amongst the fanciers in the Midlands.

If you have ever studied the growing of Auriculas you will know that almost every grower has his own special soil and manure mixture. Some of these were amazing and the ingredients range from bullock's blood to goose dung and to sugar boiler's scum. Thomas Hogg has a sly dig at other writers, and says, "Weak minds are soon misled by quackery and novelty, and quackery, even in the growing of flowers, has as many followers as in any other line." The chapters on the Auricula are equal to those of the average

writer on this plant during the period of its heyday, but the account cannot be compared with Isaac Emmerton's "A Plain and Practical Treatise on the Culture of the Auricula," 1815. Even so, I must admit I learned something from Hogg's book when it first came into my hands—late is better than early repotting.



Auricula "Bartley"

—From the Royal Horticultural Society's Journal.

The Primrose and the Polyanthus are dealt with in an interesting way, but only in six pages with one illustration. After this the book tends to deteriorate in practical value. The treatment accorded the Ranunculus, Tulip,

Hyacinth, Rose, Geranium and Dahlia is very sketchy indeed, but then comes a short chapter "On the Russian or Danish Stocks," which would be worth repeating in full, though space will not permit. "Of all the flowers that have of late years been introduced into England, none seem to give greater pleasure than the different varieties of these annual or ten-week Stocks; and none are sought after at this moment with greater avidity. The colours which I have noted, and which are thus described upon some packets of seed sent from Denmark, are light-red, tile-red, dark-red or mahogany, ruby, scarlet, flesh-colour, peach-blossom, light-ash, dark-ash, lilac, blue, purple, mulberry, black, white, etc. Before the introduction of these we were acquainted only with the scarlet, the purple and the white."

STOCKS WHICH ORIGINALLY CAME FROM GREECE

These new stocks appear to have come originally from Greece, and in some instances they were referred to as Grecian Stocks. Hogg concludes with the words: "It is not, however, worth my while to cavil either about the name or origin, for I give them a free welcome to the garden; and as for their recommendation and passport, they carry them with them."

Next come nearly 30 pages upon the "Rules and Regulations of a Florist's Society," and the allocation of prizes. We are all over-familiar with these. The final chapter deals with prize gooseberries, and gives a list of the winning berries of the year in the four separate classes—reds, greens, yellows and whites. These lists are of interest in that they contain names which are still to be met with in present-day lists—Crown Bob, Lancashire Hero and Farmer's Glory to mention only three.

The literature of gardening may well be said to embody the history of gardening. This is of some practical value, even though it may not always be obvious. But the literature contains also the history of the plants themselves, and this is of ever-increasing value, so that I would judge the merits of a collection of gardening books chiefly upon the number of specialists' books it contained.

The voluminous dictionary of horticulture has its uses, even if only for pressing botanical specimens, or even if a study of a few of them serves only to provide just that special piece of information you are urgently seeking.

If you start at Parkinson's "Paradisi in Sole, or a garden of all sorts of pleasant flowers, with a kitchen garden and an orchard," published in 1629, and go right through to Bailey's massive three-volume "Standard Cyclopedia of Horticulture" (3638 pages) issued in 1937, you will find that over that long stretch of years a "complete" garden dictionary was brought out every few years.

The repeated publication of these so-called complete treatises shows not so much the need for these works, but proves that they were always far from being complete.

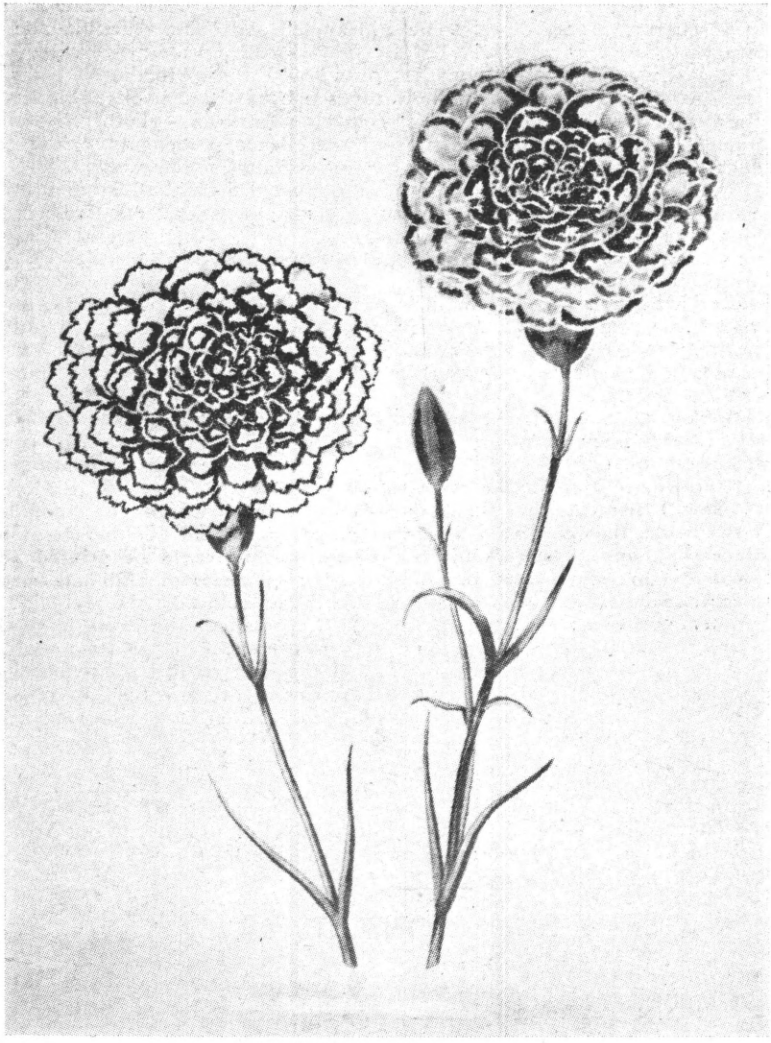
I have had opportunities of perusing many of these, often mighty tomes—I own a few myself—and I have waded through a score or more, and I can almost say with Omar, or maybe Fitzgerald, that "I came out by that same door wherein I went."

But it is when we come to consider the specialists' books, those dealing with one, or it might be a few, related subjects, that the really essential information is to be obtained. These particular books are not a modern development—that is why I went into Thomas Hogg's book in some detail—and a review of the literature shows that some of the earliest books dealt with only one aspect of gardening.

Thus in 1574 we have Reynolde Scot's "A Perfite Platforme of a Hoppe Garden," a work which went into several editions, and was good enough 80 years later to be incorporated in a series known as "The Countryman's Recreation."

In 1618 Simon Harward published "The Art of Propagating Plants." This was later included in some editions of William Lawson's "A New Orchard and Garden," as late as 1683.

Again, in 1664 John Forster wrote, "England's Happiness Increased, or a sure and easy remedy against all succeeding Dear Years. By a plantation of the Rootes called Potatoes"—doubtless the first book ever written dealing entirely with this plant.



Old-fashioned Laced Pinks

—From the Royal Horticultural Society's Journal.

And, of course, there are very many other and varied works until we come to modern times. The view which I am endeavouring to illustrate was foreseen

by George W. Johnson, editor of "The Gardeners' Almanack." Nearly 100 years ago that gentleman projected a series under the collective title of "The Gardener's Monthly Volume." After first explaining "that no work on general gardening exists containing within its pages all the information relative to each object of the art," he goes on to offer a means of remedying this deficiency. This was a series of volumes, each devoted to one or two plants cultivated by the gardener, and although only a few were published they are outstanding works. Some of the titles are "The Potato," "The Cucumber and the Gooseberry," "The Vine," "The Pineapple" and "The Auricula and the Asparagus."

The last-named devoted 90 pages (over 27,000 words) to the Auricula and 94 pages to the Asparagus. To show the scope of these books I need only mention the chapter headings of the section on Auriculas—History, Botanical Characters, Varieties, Characteristics of Excellence, Propagation, Soils and Manure, General Culture, Pot Culture, Diseases and Insects.

Up till now it will have been obvious that I have had in mind those specialists' books which are intended to be useful to the general gardener who wishes to excel with some particular plant. But there is, in addition, a wide range of books written by ultra-specialists for specialists; many of these are highly technical, so technical, in fact, that a fairly close botanical knowledge is called for in their elucidation. The perusal of a few of these works, even if they leave you staggered, is not without interest and ultimate benefit. If, as literature, they have no general appeal, they at least show that, though gardening can still be indulged in as an interesting hobby, it is fast becoming an exacting science.

For the time being I must leave this brief sketch of a few gardening books. There are very many gardeners who possess a collection of books upon certain branches of the craft, and obviously these small collections added together would form quite a comprehensive library.

Now I suggest that a New Zealand-wide catalogue be compiled of the books that gardeners would be prepared to lend to others seeking information upon special subjects. This catalogue could be printed and distributed to members of the Institute, the members of affiliated horticultural societies, and also to colleges such as Lincoln and Massey.

Many gardeners like myself, I realise, would hesitate to lend their treasured books in the ordinary way, but if we had a central library office to which readers could apply for a book, and the loan could be safeguarded in the manner adopted by large lending labraries, a great variety of books at present stored away upon the shelves of private owners could be made available to those interested.

A small annual subscription would cover working expenses, and the borrower would pay the postage to and from the central office. A scheme along these lines would serve until we manage to set up a properly-established library—The National Library of Horticulture and Botany—and would help materially in the eventual build-up of such a valuable institution.

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