

Horticulture

in New Zealand

Bulletin of the Royal New Zealand Institute of Horticulture (Inc.)



29

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HORTICULTURE

IN NEW ZEALAND

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BULLETIN OF THE ROYAL N.Z. INSTITUTE OF HORTICULTURE
NUMBER 29, SPRING 1983

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Cover photo : Chrysanthemums growing in Japan.

ROYAL NEW ZEALAND INSTITUTE OF HORTICULTURE (INC)

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EDITORIAL

Last week when I was thinking I must write this editorial, I felt sure spring had arrived in Christchurch and that by the time this edition was out it would be mid-summer. However, having just had three days of continuous rain and cold temperatures, I think we may be starting Spring Part II.

Recently Christchurch has had its Camellia Show, Orchid Show and the Spring Show. I would imagine there are a few people busy working out where they can put a glasshouse for the orchids or squeeze in just one or two more camellias or a clump of daffs. In fact this sort of thing is probably going on all over the country as people start to get out in the garden after the winter break. It's always interesting going around nurseries at this time of the year and perhaps buying something you have always wanted and never seen for sale before, or a plant you have admired in someone else's garden. The problems seem to start, for me anyway, when you get the plants home and you have to sit down and start thinking where you can fit them in.

ARTICLES, ITEMS OF NEWS please. This seems to be a permanent request from Merv and I for your help in sending in material. It does not have to be your own words, but anything you think would be interesting to readers.

My file for the next bulletin is empty so it could be a small edition without your help.



DISTRICT COUNCIL NEWS

AUCKLAND

PROGRAMME FOR BALANCE OF YEAR

OCT. 29th Saturday - Regional Conference in Logan Campbell Building at Botanic Gardens.

NOV. 12th Saturday - Bus trip to Waiuku and Pollock area. We will be visiting A private garden in Pollock, Awhitu Regional Park, Kiwi Rose Industrial Complex - here they grow 23,000 roses under glass. We hope that this trip to one of the lesser known horticultural and scenic areas of Auckland will be most enjoyable and interesting. Our guide will be our chairman Mr. Phil Jew. His knowledge of the area will help to enlighten us over some of the facts about the area.

DEC. 10th Saturday - Christmas Social Gathering at the Botanic Gardens. This will be a swept up function with caterers: conducted tours of the gardens etc.

DISTRICT COUNCIL OFFICERS ELECTED AT LAST A.G.M.

Chairman	-	Mr. Phil Jew
Deputy Chairman	-	Dr. Max Goodey
Secretary	-	Mr. Mark Tomlin
Treasurer	-	Mr. Brian Buchanan
Newsletter Editor	-	Mrs. Jean Veal
Committee	-	Miss Joan Dingley; Mrs. Susan Davison; Mrs. Joy Galloway; Mr. John Adam; Mr. Alex Tagg; Mr. David Bull; Mr. John Revell; Mr. Peter Woolley; Dr. Harold Mouat.

SOUTH TARANAKI

JUNE MEETING

We were pleased to welcome some twentyeight members and friends at Kakaramea, when an excellent display of specimens from members' gardens added to the decorations already in place for the Plunket Society's dinner arranged for the next day.

In addition to the comprehensive Report, on the recently held Annual Conference, given by our delegate, Mrs. B. Nicholas, Mr. Foster spoke on the "Art of Propagation". He illustrated his talk with blackboard drawings and with living plant material to help describe his preferred methods of carrying out this branch of gardening.

COMING EVENTS

5th NOVEMBER - Camellia Pruning, King Edward Park, 10.00 a.m.

WELLINGTON

There was a good turn out for the Annual General Meeting on a 'dirty' July night and it was very encouraging for the committee to see so many of the newer members among the familiar faces in the gathering.

In his opening remarks, the Chairman, Mr. Richard Nanson said that at the National AGM in May in Auckland, that Mrs. Shepherd had been appointed an Associate of Honour of the R.N.Z.I.H. in recognition of her unremitting work locally, regionally and nationally and it gave him great pleasure to say the honour was well deserved. Wellington will be hosting the next A.G.M. in May 1984.

Officers elected were :

Chairman	-	Richard Nanson
Vice Chairman	-	Murray Beattie
Secretary	-	Mike Oates
Treasurer	-	Marjorie Smythe
Auditor	-	Mr. Bullock. Kendon, Cox,
Committee	-	Beryl Brown;
		Errol Butcher;
		Donal Duthie;
		Derek Fry;
		Ian Galloway;
		Dennis Hicks;
		Ross Jackson;
		Kim Jarrett;
		Rob Lowe;
		Bob Lucas;
		Philip Martin;
		Diane Menzies;
		Maira Ryan;
		Winsome Shepherd;
		Rob Smith

WHANGAREI

In February Mrs. Pam Blowers spoke about the use and growing of herbs. She was a very enthusiastic and interesting speaker and recommends reading "For Goodness Sake" by Merrin Parker.

At our March meeting Mr. Rob Small entertained us with an interesting and humorous account of his visit to Denmark. He illustrated his talk with the addition of excellent slides. Mr. Small travelled overseas on a Rotary Scholarship.

At the May meeting an interesting talk was given by Mr. Cederman from Kaikohe. He discussed the growing of vegetables all the year round and not just a burst of planting in Spring and early Summer. He suggested broad beans were better planted in July.

August and sugar peas at the end of July too. He recommended Cliff's Kidney and Sutton as good potatoes for Christmas.

GARDEN TIPS

When planting new shrubs and trees don't leave staking until roots are covered. Drive stakes in first to avoid root damage. This also applies to dahlias, gladioli, lilies etc.

Put seed potatoes in a sunny place to green before planting. Complete rose prunings. Take hardwood cuttings of grapes. Prepare asparagus and rhubarb beds. Plant out cabbages, cauli, silverbeet and lettuce.

N.Z. DAHLIA BREEDER TO VISIT U.S.A.

A D.S.I.R. horticulturist, Dr. Keith Hammett, of the Mt. Albert Research Centre, Auckland, is one of two dahlia specialists from overseas invited to speak at the 1983 U.S.A. National Dahlia Show, being held in Seattle, Washington, in late August.

Dr. Hammett, author of "The World of Dahlias", published in 1980, is becoming well known in New Zealand as a flower breeder. Sweet peas and carnations are among his other horticultural interests.

This year's meeting in Seattle combines the National Dahlia Show and the annual Pacific Northwest Dahlia Conference exhibition, and many thousands of dahlia blooms will be on display.

Dr. Hammett is to take part in a seminar introducing new varieties to dahlia growers, speaking on new seedlings, propagation and plant genetics. The only other foreign contributor will be the chairman of the British Dahlia Society, Mr. Derek Hewlett.

EXPLOSIVE APPLE JUICE

According to an Adelaide paper, a local housewife got a severe shock when she took home a can of apple juice recently and it started to tick.

The police and the bomb squad, having been called, decided to take no chances and wrapped the offending ticker in blankets, took it to a deserted site and blew it up.

Probing the fragments, they discovered that a watch had been stuffed into the can. It is believed that the juice fermented with the watch making it an explosive device, a bomb squad official said. Its workings were only activated when the can was handled.

THE DAFFODILS OF HAGLEY PARK.

by

A.G. Jolliffe, MS, NDH, Dip.PRA, FIPRA

James A. McPherson, A.H.R.I.H., N.D.H., was the first New Zealander appointed as Curator of the Christchurch Botanic Gardens. He served from 1933 to 1945.

The Rose Garden, Rock Garden, original Cockayne Garden, the Azalea and Magnolia collections, were all designed and planted under his direction. However, perhaps the most important feature for which he was responsible is the planting of hundreds of thousands of daffodils in the Woodlands.

This is one of the most spectacular springtime attractions in the Botanic Gardens and one that is featured on Calendars, Travel Brochures and the like.

The Woodlands covers an area of 2 hectares between the Avon River and Christchurch Hospital. Tall oak and ash trees dominate the area providing shelter and diffuse the spring sunlight. The pasture-like grassland provides ideal conditions for the naturalisation of daffodils and other bulbs.

Planting began in the autumn of 1933 and the 1933/34 Annual Report said that the flowering of 16,000 bulbs was successful providing encouragement to continue planting.

In the 1934/35 Annual Report, McPherson writes "when 66,000 *Narcissus* bloomed in the Band Rotunda Woodland last spring it gave some indication of what can be achieved by the public in their co-operation in supplying surplus bulbs for planting. At the end of the year under review, the total number planted reached the encouraging figure of 108,000. It is anticipated that these will make a striking picture during the coming Spring."

This is the first mention of public co-operation in the project. The figures suggest 50,000 bulbs were donated and planted in 1934 to flower in September of that year. By 31 March 1935, a further 42,000 bulbs were planted.

Obviously, the people of Christchurch were completely behind the project. No wonder McPherson was enthusiastic about the anticipated flowering in Spring.

McPherson's Annual Report of the next year (1935-36) reports on the "...continued generosity of many citizens." A further 24,200 bulbs were donated making the three year total 132,440. He suggests a further 100,000 will complete the planting and that more *Narcissus* planting will be in Little Hagley Park and along the banks on the Avon facing Park Terrace. This was an ambitious and colourful plan.

In 1936/37 15,000 bulbs were added to the planting, bringing the total to 160,000. On Sunday 21 September, approximately 8000 people visited the area. Obviously at this time, four years after the first planting, McPherson's dream and vision

had been realised.

Writing in his 1937/38 Annual Report, McPherson wrote "...This area is becoming increasingly popular as evidenced by the fact that on Sunday 26 September (1933), fully 5000 persons visited the daffodils in bloom. The additional planting of bulbs during the year now brings the total in this area to 220,000. We have now reached a stage when it may be advisable to institute a "Daffodil Sunday" on similar lines to institutions overseas. If properly carried out it would certainly benefit the revenue of the City's Tramways Department."

Again, we see the foresight of McPherson in action. Not only had he added a further 60,000 bulbs in one year, he was looking into the future in promotion of this feature he had created. Further, he saw the prospect of other City Departments (Tramways) playing an important part in the promotion of the daffodils as well as a method of transport for people who could not otherwise get there.

The inaugural "Daffodil Sunday" was held on 25 September 1938 and from all accounts, was an outstanding success. It was estimated that 10,000 people visited the area on that day. McPherson called the daffodils "...one of the City's chief springtime attractions." During that year, he planted a further 46,000 daffodils, all donated.

Daffodil Sunday the following year attracted some 5,000 people and a further 6,000 people visited the daffodils the next Sunday. In that year, a further 34,000 bulbs were added to the woodland.

By March 1941, a total of 340,000 bulbs had been planted in six years. The majority, if not all of these, had been donated by members of the public. Daffodil Sunday of 22 September 1940 again proved very popular with over 8,000 people visiting the Woodland. An additional feature was a collection that was taken up. A total of £71.16.9 was added to the Board's funds. The purpose for the funds use was not given.

The next year, only 6,800 daffodils were added but 3,600 Grape Hyacinths were also planted. This is the first mention of the planting of bulbs different to daffodils. The collection on Daffodil Sunday of that year raised the sum of £41 which was earmarked to provide playing apparatus for the Children's Playground.

During the next year, an additional 58,788 daffodils were added to the Woodland. This brought the total over 8 years to 405,588 bulbs. McPherson, in his Annual Report (1942/43) "... With the natural increase it can safely be said that the Woodland contains half a million bulbs." "The original scheme is now completed and the Gardens have a magnificent daffodil woodland, a definite and very popular spring feature."

On Daffodil Sunday, 27 September 1942, over 18,000 people visited the area. The collection on that day was £250 and it was given to the Patriotic Fund.

In McPherson's Annual Report of 1943/44 he says that an additional 3,830 *Narcissus* and 4,000 Grape Hyacinth bulbs were planted. This brought the total to 409,418 *Narcissus* and 14,000 Grape Hyacinths.

He goes on to say "allowing for natural increases the woodland produces over a million blooms in springtime. Daffodil Sunday is now a noted feature of the city..." "This woodland is an example of what can be achieved by community effort. All bulbs, with the exception of £40 worth have been donated to the scheme by the people of Christchurch and surrounding districts."

In later years, under the supervision of succeeding Directors and Curators, additional plantings of *Narcissus* have been made. Other bulbs such as snowdrops and bluebells have also been planted to extend the flowering season.

Daffodil Sunday has not been held, as such, for many years but it may be opportune now to revive it.

James A. McPherson created many features in his 12 years of association with the Botanic Gardens. Nothing compares however, with the Daffodil Woodlands. This magnificent feature hit at the hearts of people who gladly donated 400,000 bulbs to the city.

The Woodlands is perhaps the most well known feature of Christchurch's landscape. It features in travel brochures, publications, films, videos and in hundreds of thousands of holiday snapshots.

If it had not been for the dream and vision of one man, James A. McPherson, and the help of the people of Christchurch and Canterbury, this spectacle of spring would not have been created. We owe a great deal of thanks to McPherson and all those people who donated bulbs. Without their support our spring would be a lot less exciting.

NEW ZEALAND INSTITUTE OF SURVEYORS

1983 ANNUAL CONFERENCE

Tauranga Arts Centre 15 - 19 October

This year's conference theme is 'Horticultural Land Use' A subject which is becoming more and more important as horticulture expands.

Tauranga being possibly an ideal venue for such discussion as in a decade the population has doubled and its port, Mount Maunganui, become one of the country's busiest due to the export of timber products. Much of the country's citrus fruit, kiwifruit, tamarillos and feijoas are grown in the surrounding orchards.

TREES FROM NORTHERN AREAS IN DUNEDIN

by

C.G. Donaldson

I appreciated the article in the Spring 1982 Bulletin (No.25) entitled "*Knightia excelsa* in Dunedin", by student P.B. Heenan, because it touched on two aspects of the cultivation of native trees in which I am interested. Namely - trees from warmer northern areas that can be grown in Dunedin, and native trees suitable for landscaping or specimen trees.

After seeing the variety of native trees and shrubs in the bush on the west coast of the South Island, Nelson and in some bush near Wellington, I decided I would like to try and grow some of these 'northerners' on my own one acre property. A lot of these plants already grew in the Native Plant Section of the Dunedin Botanic Gardens, so I knew some would not be difficult, and, after planting a Kauri and watching it grow so well (one foot a year in its early years), I was greatly encouraged and enthusiastic.

I have had the odd casualty, but, because I generally plant under or near taller shelter trees, the plants have done well. Of course there is a wide range of the more tried and hardy trees not normally found around Dunedin, such as *Metrosideros robusta*, *Lophomyrtus bullata*, *Dodonea viscosa*, *Pomaderris* sp., and *Sophora tetraptera* to mention a few. Other trees that have grown well are *corynocarpus laevigatus*, *Gymnelaea lanceolata*, *Weinmannia sylvicola*, *Elaeocarpus dentatus*, *Myrsine salicina*, *Alectryon excelsus*, *Metrosideros excelsa*, *M. hermadecensis*, and *Beilschmedia tawa*.

I am keeping a close watch on plants of *Meryta Sinclairi*, *Hedycarya arborea*, *Laurelia novae zelandiae*, and more recently planted specimens of *Entelia arborescens*, *Ascarina lucida*, *Macropiper excelsum*, and *Quintinia acutifolia*, but so far they have withstood quite a cold winter.

There are many other species growing well not mentioned, and many others I would still like to establish. Two of interest growing next to the Otago Museum are the North Island trees, *Beilschmedia toaiaire* and *Vitex lucens*. I am seeking a nursery that lists less common native trees and shrubs, and would be interested to know the address of any grower specialising in native plants.

I agree with Mr. Heenan that *Knightia excelsa* should be used more widely in landscaping. Even though our native trees are used more now than they were a decade ago, I still think they could be used even more for landscaping and also street planting or specimen planting.

Some of our conifers are no slower growing than a lot of ornamental exotic conifers and I have seen beautiful specimen trees in open areas of *Dacrydium cupressinum*, *Libocedrus bidwillii*, *Agathis australis*, *Podocarpus hallii*, *P. Totara*, and *P. ferrunginea*. The beeches (*Nothofagus*) all make fine specimens, even though *N. fusca* seems to be used more than the others. A number of species of

Pittosporum grow into a fine shape in an open situation, as do *Nothopanax* sp.

The *Metrosideros* group all make good specimen trees yet are not used a great deal. Others that I feel could be used more are *Elaeocarpus dentatus*, *Corynocarpus laevigata*, *Hoheria* sp, *Sophora* sp, *Myrsine salicina*, *Dodonea viscosa*, and many others.

Our indigenous trees may be slightly slower growing than the exotics, and require a bit more care to establish, but grown progressively in containers before final planting would help, and when they are really studied it will be found that there is surprising diversity in colour and form.

ANNUAL JOURNAL 1983.

The 1983 Annual Journal of the Institute is nearing completion and we expect it will be published before Christmas, or early in the New Year. The Journal editor, Mr. Mike Oates, has collated some excellent articles for this issue which will be of interest as well as educational to all horticulturists, whether they be scientists or home gardeners.

Already some 500 copies have been pre sold and we recommend that all members should seriously consider the purchase of a copy this year.

In order to finalise our printing requirements we would appreciate receiving pre-paid orders before 30th November.

THE PRICE - \$7.50 PER COPY

 DON'T WAIT - ORDER NOW

WELCOME: to the following new members

Betts Ms. JE	Hamilton	Bushby Ms. C	Westland
Bensemann RD	Canterbury	Bartleet G	Gisborne
Broad Miss JM	Cromwell	Barclay MD	Hamilton
Bird Miss MJ	Carterton	Buckthought Ms DM	Waitara
Barnett Miss NR	Kaikohe	Beattie Mrs. M	Auckland
Chapman JW	Auckland	Clayton Ms DA	Hamilton
Clifton Miss AM	Nelson	Chalmers BL	Dunedin
Cameron Miss BJ	Auckland	Callahan JS	Wellington
Carter Miss CJ	Hawkes Bay	Crozier Miss SA	New Plymouth
Cooper Mrs. GI	Auckland	Coulston Miss JL	Tauranga
Corey DLN	Christchurch	Cook CN	Levin
Corbett GF	Auckland	Clennick Ms SG	Wellington
Campbell Mrs.WN	Okaihau	Davey Ms. LA	Auckland
Doogan FW	Auckland	De Ruyter Ms LM	Invercargill
Dance JDW	Otago	Davis RB	Northland
Dahm Mrs. VJ	Napier	Drummond Miss IA	Wanganui
Daniel RP	Waikanae	Dean JL	Nelson
Devine PT	Wanganui	Dean Mrs. SS	Auckland
Edwards Mr & Mrs DR	Auckland	Furness Ms HS	Wellington
Falls JEA	Hastings	Foon RYW	Keri Keri
Frizzell RT	Blenheim	Flook R.	Wellington
Graham Miss PK	Timaru	Gray SP.	Christchurch
Gray Miss NL	Dunedin	Gibbons Miss DA	Canterbury
Green DW	Palmerston N	Gilligan Mrs M	Kaipoi
Gatland D	Wanganui	Graham DJ	Auckland
Gielen Ms JMT	Te Awamutu	Goble DB	Wellington
Gill AS	Keri Keri	Gentry Ms. LE	Papakura
Gilbertson Miss J	Wellington	Hannay DA	Manawatu
Hunt PI	Palmerston N	Hoare Miss D	Wellington
Holm Miss JM	Waitara	Hegarty WT	Gisborne
Henderson SM	Waihi	Hardy Miss JC	Auckland
Holman NC	Thames	Hughes AD	Hawkes Bay
Hodge Miss DA	Whangarei	Hegley Mrs.J	New Plymouth
James Hargest H.S.	Invercargill	Ivory Ms.EJ	Christchurch
Johansson Miss LC	Christchurch	Jones Miss ST	Oamaru
Jones MC	Blenheim	Jarden Miss BE	Waikanae
Jenkins DL	Papakura	Kersey Miss PJ	Hamilton
Kaye SL	Tauranga	Kilgour Miss SD	New Plymouth
Kerr Miss PJ	Papakura	Kevning Miss AG	Wainuiomata
Keating N	Auckland	Kelly H.J.	Auckland
High School	Kaipoi	King A	Auckland
Leigh Miss S.	Auckland	Hull M.R.	Palmerston N
Leitch ND	Dunedin	Knowles MB	Auckland
Lawson Miss GL	Upper Hutt	Lloyd-Fitt Ms AN	Auckland
Little Miss SF	Taupo	Lee GA	Rakaia
Lenngenhager Ms K	Hamilton	Lowe M	Palmerston N.
McKay GA	Christchurch	Marshall CC	Lower Hutt
Mathew S	Wellington	McRae Miss SW	Christchurch
Mochan Miss LH	Tauranga	Morton Ms. TL	Porirua
McIntosh Miss JC	Whakatane	Muckle Miss JL	Hawera
Muggeridge LD	Waitara	McMurtry Miss KB	Christchurch
Martin AR	Auckland	McLaughlin JG	Auckland
Mahoney Ms.DC	Wellington	Miller CJC	Auckland
Malcolm SW	Auckland	Milne RW	Auckland
Maclachlan Ms KM	Christchurch	Marris W.A.	Christchurch
McVerry Mrs. P.	Hamilton	Montgomery	Auckland
Nicholson GB	Hamilton	Nisbet BG	Wellington

Orchard MJ	Wellington	Oughton C.	Mt. Maunganui
Otway Miss MR	Waitara	O'Leary Ms. TJ	Wellington
Pool NR	New Plymouth	Palmer Mrs. J.	Palmerston N.
Pack Miss JA	Wellington	Partsch Mrs. E.	Wellington
Paterson Mr & Mrs G	Queenstown	Prince Miss SG	Auckland
Queens High School	Dunedin	Robertshaw DL	Auckland
Rollo MW	Nelson	Robson AF	Canterbury
Running Miss KJ	Auckland	Read Miss JV	Rotorua
Roberts AN	New Plymouth	Robb Mrs. IM	Hamilton
Saunders PA	Taumarunui	Scott PD	Amberley
Spencer BW	Invercargill	Smyth Ms TF	Wellington
Symes RK	Wellington	Shaw Miss A	Auckland
Slow R	Wellington	Snowdon DA	Hawera
Smith MJ	Dunedin	Swney Miss VC	Morrinsville
Southern RL	Napier	Smith Miss PJ	Auckland
Shearer Miss LM	Auckland	Simmons DR	Whangarei
Steinmetz Ms NJ	Christchurch	Salton AL	Christchurch
Pharazyn C.	Upper Hutt	Shaw Mrs. E.	Christchurch
Taylor IS	Lower Hutt	Torrens B	Auckland
Van der Gulik JT	Pukekohe	Van Doorne HJ	Cambridge
Watts KRJ	Christchurch	Wedge RG	Napier
Wilson JD	Inglewood	Wareing Miss R.	Nelson
Wichers Miss CM	Napier	Worters Ms JMT	Auckland
Thomson WP	Auckland	Watson PC.	Hamilton
Ward PJ	Ashburton	Winslade Miss DJ	Otago
Woods PF	Wellington	Warnock J.	Wanganui
Watts GW	Waimate	Ward DC	Hamilton
Wood LR	Paremata	Wills JE	Dunedin
Young Mrs. RM	Canterbury		

BROADBANK NATIONAL GARDEN COMPETITION

An announcement was made in Bulletin #28 that R.N.Z.I.H. was to be associated with the Broadbank Group and T.V.N.Z. in conducting a National Garden of the Year Competition in January/February 1984. Since making this announcement, further discussions with all parties concerned has indicated that a postponement of the competition until the summer of 1984/1985 would be advisable. Such a postponement is for organisational reasons only, since it has emerged that a much longer planning period is required than is available this year. Organisation of judging on a national scale and co-ordination of T.V. coverage over the widely dispersed areas from which entries would be drawn, requires more detailed investigation and it may be necessary to limit the scope of the contest from that originally envisaged.

In the meantime organisational planning will continue and it is hoped that a further announcement on this competition will be made early next year.



Photo: Auckland Institute & Museum

Leonard Cockayne in his Tarata Experimental Garden, New Brighton, probably in 1890s.

"The Life and Correspondence of Leonard Cockayne" will be published in July 1983. An outline of Cockayne's life is presented including a broad survey of aspects of his contributions. The booklet is printed by Caxton Press, Christchurch and is the full version of a paper presented to the first History of Science in New Zealand Conference at Wellington in February 1983. It is a pipe-opener to the full biography. The booklet is demy-octavo of about 54 pages of text and 12 pages of illustrations, including a frontispiece. Much of the data comes from information in the Cockayne letters and from his unpublished autobiographical notes and gives for the first time an account of Cockayne's formative years. The illustrations complement the text and most are published for the first time. The price is \$5.00 (post free) and can be obtained from Dr A.D. Thomson, Botany Division, DSIR, Private Bag, Christchurch, New Zealand.

STUDENT SECTION



Urtica ferox
(Tree Nettle)

Once again spring is upon us. Whether its just human nature, the warmer weather, blossom, my spirits always seem a lot lighter this time of year. The winter can definitely be a temporary setback if our horticultural interests lead to the outdoors. Nevertheless the weather is more pleasant now and study will soon be over.

Not so good news on the editing front, unfortunately. I must say I have been very disappointed at the lack of interest shown by students in this section of the Bulletin, especially with the poor response to the "Write for Cash" competition. The success of the student section is largely dependent on contributions from its readers. Unless we are aware of the horticultural issues that interest you, by feedback and contribution we can hardly be expected to piece together an interesting and original student section. How about some support and interest! Send in those articles and comments.

Good luck with your approaching exams. You could do well to refer to the article "Examination Technique" appearing in the Spring 1982 edition of this Bulletin for a timely reminder that there's more to sitting exams than just knowing the answers.

- Merv Spurway

GENETIC ENGINEERING — THE NEW TECHNIQUES AND THEIR POTENTIAL

(from 'Australian Horticulture', April, 1983)

In one sense, genetic engineering of plants is really nothing new. Since the beginnings of agriculture, when crop species were first domesticated, people have modified plants to suit their needs. In saving seed from only their best plants, ancient farmers practised genetic selection. Systematic and scientific plant breeding began about 200 years ago and has evolved into a powerful technology. Crop plants are now deliberately improved through controlled pollinations to achieve defined objectives. But although genetic engineering is in a way as old as agriculture itself, in current usage the term refers collectively to a number of very new techniques for changing plants genetically - techniques that do not rely on pollination, but instead involve genetic manipulations at the cellular and molecular levels. This technology promises to be a powerful adjunct to modern plant breeding.

History

The history of the new technology is very brief, beginning around 1970. At about that time plant protoplasts were shown to be capable of regenerating entire plants. Other aspects of plant cell and tissue culture, such as mutant selection and protoplast fusion, were also developing rapidly, and plant scientists were beginning to recognise the potential of cultured plant cells for genetic research.

Simultaneously, breakthroughs in molecular biology led to the development of recombinant DNA techniques by which a gene could be isolated from one kind of organism and introduced into another organism, permanently changing the genetic makeup of the recipient. Within the last few years, plant molecular biologists have been able to isolate specific important plant genes and study their structure and regulation. Research with several plant pathogens has contributed significantly to the development of techniques for transferring genes into plant cells. The simultaneous advances in all these areas are rapidly bringing together the components necessary to genetically engineer crop plants.

Great Savings

But what does the new technology offer that existing plant breeding technology does not? In quantitative terms, great savings in time and space are foreseen. It will become possible to engineer, in one step a specific genetic change that would require several generations in a breeding program. Whereas existing breeding programs commonly require considerable amounts of land for planting and evaluating the progeny of each cross, plant scientists employing the new technology can grow and evaluate 100 million cells, each a potential plant, in a single small flask.

Impressive as all these new techniques are, they are not likely to replace conventional plant breeding. They will instead be combined with the existing methods in an integrated approach to crop improvement, each technique being used when it is the most effective and economical means to an end.

Herbicide Tolerance

Isolation of mutants tolerant or resistant to herbicides may become a valuable application of cell culture techniques. Every herbicide is restricted in use by the number of crops it damages or kills. Tolerant mutants of various plant species could broaden the usefulness of currently available herbicides. The advantages of searching for this kind of mutant using cell cultures are (1) accuracy and uniformity of herbicide exposure in culture, (2) the ease with which billions of cultured cells may be screened for ability to grow in the presence of the herbicide, and (3) the potential (as yet unrealised for most crop species) for easy isolation of recessive mutants using haploid cell cultures.



Paraquat-tolerant mutants of tomato were isolated using an interspecific hybrid strain called L2. This plant had 25 per cent cultivated and 75 per cent wild tomato ancestry and was selected for the wild tomato traits of rapid callus growth and efficient plant regeneration. When callus cells of this hybrid were placed on agar medium containing a lethal concentration of paraquat, spontaneously occurring presumptive mutant callus clones that could grow under these conditions appeared at a frequency of one out of four billion cells tested.

Diploid plants were regenerated from 10 of the 22 clones isolated. Although some of these plants were normal in appearance, others were abnormal (leaflets smaller and thicker than normal) with reduced vigor and fertility. New callus cultures initiated from the regenerated plants typically had at least a 30-fold increase in paraquat tolerance relative to normal callus of strain L2. Paraquat tolerance was transmitted to sexual progeny in each of the three clones tested, confirming the hypothesis that the paraquat tolerance resulted from a mutation.

Eventually, herbicide-tolerant tomato mutants are likely to have agronomic applications. The greatest weed problems of tomato in California for example, are the closely related nightshades, which are sensitive to the same herbicides as are tomato cultivars. Paraquat-tolerant tomato mutants, however, may be useful only as a model system, because the high human toxicity of this herbicide will restrict the times at which it can be safely applied, even to a tolerant crop of a species grown for edible fruits or foliage. Further experiments may produce tomato plants that tolerate other herbicides, perhaps achieving effective weed control together with the flexibility to choose compounds that pose the least risk to the environment.

Propagation

Genetic engineering and cell and tissue culture have already begun to influence the breeding and vegetative propagation of superior rootstocks and woody perennial trees for efficient forestry systems and urban plantings. Hard-to-root biomass species such as Douglas-fir, white spruce, and jack pine have been cloned through micropropagation. The American elm had been propagated from cell suspension cultures. With similar methods being used fruit and nut trees, valuable root-stocks of *Prunus* and *Pistacia* species are at the point of being cloned and modified to capture the maximum genetic variation available. Currently, a considerably smaller proportion is obtained through conventional selection and breeding.

Problems with woody species based on their large size, age, complex natural products, and elusive reproductive processes are being bypassed with invigorated tissues, which may double the genetic gains affecting productivity. Gains being sought through selection, propagation, and engineering include resistance to insects and disease, production of pathogen-free stocks, rapid growth of wood-producing tall trees, and inhibited wood production in small fruit trees to foster precocious fruiting and convenient mechanical harvesting. In cloning experiments, searches are made for trees less dependent on nitrogenous fertilisers, more responsive to cultural practices, and able to grow in poor and saline soils, on steep slopes, and in dry and harsh climates.

Some, but not yet all, of the superior trees can now be propagated independently of the constraints of natural climatic cycles. Cherry, almond, and pistachio trees and tissues are being reduced to cells so that multiple copies of each variety are available on a massive scale for performance tests in many environments. This technique permits us to estimate the total available genetic variation and to sort out interactions between genetics and environment. Early screening to certify new varieties for quality and trueness to type is becoming more efficient. However, problems with the control of growth and maturity of tissues still limit approaches to tree improvement.

Now that cell suspensions of many woody species can be established, application of recombinant DNA technologies to protoplasts is being evaluated.

Genetic engineering promises to be a powerful adjunct to modern plant breeding, involving new techniques which do not rely on pollination but involve genetic manipulations at the cellular and molecular levels.

POMADERRIS APETALA IN CULTIVATION

by

P. B. Heenan, N.D.H. Student

Pomaderris apetala or tainui, is an endangered plant from Taranaki. It is a plant of a coastal habitat.

The leaves are 60 - 80mm long and 20 - 30mm wide. The upper surface is dark green and wrinkled while the lower surface is covered in white hairs. The leaves have a somewhat similar colour and texture to *Viburnum rhytidophyllum*. The inflorescence of tainui is a large corymb which is made up of individual flowers 6mm across. These flowers give the inflorescence a greenish to yellowish colour.



In Dunedin I grow two plants of tainui. The first of these has been growing for 18 months in a clay loam on a bank exposed to the wind. This plant took several months to become established but it is now growing well. It has grown 1.5 metres in the 18 months. The second plant is growing in a slightly more sheltered situation and in a loamy soil. In the last 12 months it has grown 2 metres. Both plants have been able to tolerate the strong cold southerly wind and the strong warm north westerly with very little leaf damage. It is readily propagated by seed or cuttings.

The wind tolerance and quick growth of *Pomaderris apetala* make it an ideal species for coastal plantings.

Its quick growth would enable it to be used as a primary shelter species while slower growing slightly more tender species become established.

If a good form, and plants of known provenance of tainui were used by Parks and Recreation Departments in their landscaping projects, this plant's future could be assured, if not in the wild, then in cultivation.

WRITE FOR CASH COMPETITION

There was a very disappointing response to this competition with only a few entries in Section A and none for Section B.

Congratulations to the following Section A Prize Winners :

First Prize (\$20) - "The Taxing of a Non-Taxonomist"
by W.T. Wright.

Second Prize (\$10) - "A Student's Thoughts for the future in
N.Z. Horticulture" by C.M. Wilton.

The winning entry appears in this bulletin and other entries will appear in future issues.

THE TAXING OF A NON-TAXONOMIST

by

W.T. Wright, Invercargill

I get a constant stream of shocks from plant names. They keep changing - as if they had a rapid divorce rate; but I understand it is a change by deed poll.

The deed appears to be the culprit mentioned in the T.C.I. Nursery Crop Botany Assignment 1, page 12 "In the years following the publication of Charles Darwin's 'Origin of Species' in 1859, the doctrine of evolution gradually replaced the previously accepted concept of special creation". and page 13 "Phylogenetic systems are attempts to use morphological or other distinctions as evidence of genetic origin and ancestral relationship".

I am not impressed with these attempts to prove evolution - for it would appear this is the only conclusion one can come to when puzzling through these name changes which frustrate us all. Surely, it would not affect the activities of any sphere of horticulture if the plant names were all different (presuming none to be related); the only important practical knowledge whether the names are related or not, is whether the plants will hybridise, will reject grafted material, will reject or accept outside plant material (or chemical material), will require certain exercises in husbandry, etc.

It is generally accepted that even though certain plants are "closely related" they will reject one another's cells and must have a sandwich of other material which is mutually compatible with both portions of the graft. Does this mean they are therefore not closely related at all? I consider the relationship is neither of practical, scientific, or theoretic importance, and if all the names were left as they stand, we would all know the plant by it's one name, and it's associated differences would be accepted by all, and taken into account in propagation, breeding, husbandry, etc.

I read with great interest the story of an orchid, *Angraecum sesquipedale* which Charles Darwin, who was studying the fertilisation of orchids by insects, predicted that in Madagascar there must be a moth with at 10"-11" (260mm) proboscis capable of reaching nectar at the bottom of the tube and fertilising this flower. Many years later such a moth - the night flying *Xanthopan morgani praedicta* - was found. An interesting story surely, but definitely not as it was proposed; to prove evolution. All it proved was Darwin was an excellent observer. Surely the difficulties of believing; that these two, the plant and insect, evolved together through changes - each beautifully balanced with the other - without either lagging and therefore both suffering and dying out, over thousands of years; are beyond our ability to presume, or the bounds of reasonable possibility, and therefore an acceptance of creation, or at least a non-evolutionary stance is more sensible? And scientific.

Phylogenetic systems are only frustrations in the way of those who wish to communicate with their fellows, using commonly accepted botanical names. Morphological and other distinctions should be used to identify plants and therefore their names, and these names if left standard, without changing the name because the plant appeared different under laboratory investigation, would clear the lines of communication. Laboratory investigation into morphological and other distinctive properties of plants should continue as this adds to our scientific awareness of plants, aids us in identification, in plant husbandry, plant breeding, propagation. If science continued this direction and stopped meddling with plant names no degree of scientific discovery or stance would be damaged save that of those who wish to improve the dogma that evolution is true.

It appears to me from the number of missing links in the evolution argument that we have less than a doctrine of evolution, less than a theory of evolution - for each time we need those facts to clinch the debate, the facts just don't seem to appear. Perhaps at best, we have a remote possibility that all things accidentally happened to take their present form and behaviour? If this is the case then we are far too shaky in our knowledge at this stage to continually shift plants about (changing their names more than once, perhaps, in the process) trying to fit them into the possibilities of their parentage.

I would contend that until all the homework is done, till, without a shadow of doubt, the evolutionary fable is proved true; till all those scientists who know about these things

agree on the exact ancestral relationships of all plants, that the names of plants should be left as they are. Then when all shadows of doubt are overcome with proof and agreement, then, and only then, we shall rename, reclassify, all plants, and in that momentous change continue communication, with plant names, so that all horticulturists understand, without puzzlement, when plant names are quoted.

But, as for me I shall continue to fumble through all those bracketed names, changes of families, etc. as I search for the new name for the plant I used to know the name of; and believe the possibility of a Creator who had a purpose both for plants, and me.

MICROWAVE COOKING RETAINS FOOD NUTRITIONAL VALUE

(from Hort. Science Vol. 17 Number 6)

Gertrude Armbruster, nutritional sciences researcher at Cornell University, New York, reports that in general the nutritional value of foods cooked in microwave ovens is higher than when cooked by other methods, because fewer nutrients are lost or damaged during the shortened cooking time.

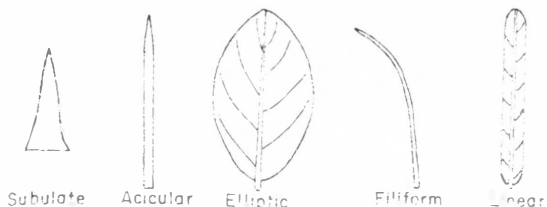
In studies examining Vitamin C, one of the vitamins most susceptible to destruction by cooking, up to 50% less vitamin C was lost from fruits and vegetables cooked in microwave ovens, compared with traditional baking and boiling methods.

Studies have also shown that the protein content of flour-based foods was higher when baked in microwave ovens, because fewer proteins were damaged during the shortened cooking time.

Armbruster concludes that microwave cooking saves time and energy and retains the nutritional integrity of foods better than other cooking methods. In addition, the quality of food cooked in microwaves is very high - the food's texture is changed less, the food looks good, and equally important, it tastes good.

(So for all you horticultural people who grow your own fruit and vegetables traditionally or by organics, to retain its goodness you should cook it in a microwave oven!)

Leaf Morphology



THE IMPORTANCE OF PLANT BREEDING

b.j

Mrs. J. Amos, N.D.H. Examiner

Good cultural techniques enable a plant to achieve its maximum potential; but that potential is limited by its inherent characteristics - its genes.

These are determined by the genes and chromosomes of its two parents when those of the pollen parent unite with those of the seed parent.

Plant breeding aims to combine in the seed and in the resulting plants, the more desirable characteristics of both parent plants or ultimately of several closely related plants in the course of several generations.

The breeding of pasture plants and fodder crops to improve production of primary produce in New Zealand (on which so much of our overseas income depends) is obviously important to the national economy.

Fruit cultivars which are best suited to N.Z. growing conditions, resistant to pest and disease; and which meet the specific requirements of overseas markets (in shape, colour, quality, harvest dates, storage qualities) are important economic objectives in breeding.

New varieties of ornamental plants have an economic as well as an aesthetic value.

The demand may be for a few plants of a novelty which will win awards on the show bench, but there are hundreds of enthusiasts willing to pay for these. New Zealand bred varieties of ornamental plants have won premier awards overseas. They include iris, lily, dahlia, rose, camellia, narcissus and many other genera. They are bred by enthusiasts who know and aim at the specific requirements, the ideal, which judges look for.

Commercial growers and dealers are also interested in novelties which are suitable for their trade, and which can be supplied by the thousand. There is scope for garden plants of all kinds, and to a lesser extent for cut flowers and pot plants. New Zealand-bred lilies and roses are well known internationally. There is keen interest in some other genera at present, where our hybrids are superior to those bred overseas.

Sometimes, in pursuing a definite objective, there are unexpected results as when the late Arthur Farnell was breeding gerberas, aiming to produce plants resistant to white rust disease. He noticed that one cross produced seedlings all of which were doubles. This was the basis of the world famous 'All Double' strain of gerbera seed.

Plant breeding is a long-term project, expensive in terms of time or money or both. A large proportion of the ornamentals bred in this country has been the result of the work of

enthusiasts devoting time and money to their hobby. They have been aided by specialist horticultural societies, which organise shows and provide information to encourage the cultivation and breeding of plants. Nurserymen, some being themselves plant breeders, assist with trade exhibits and by the introduction of new species and varieties. Individuals also introduce and exchange pollen, seed and plants.

Botanical exploration continues, and new species (and genera) are still being discovered and introduced. They bring a new dimension into the breeding programmes of that genus, as with *Rhododendron yakusimanum* which passes on to its hybrids the beautiful leaves and compact habit of growth of the species. Malesian rhododendrons, orchids and miniature camellia species are other examples. Plants from higher altitudes of tropical and subtropical countries are of particular interest. Smaller-growing ornamental plants with flowers and leaves in proportion, are in strong demand. They are being produced in lilies, roses, narcissus, camellias and no doubt many other plants, using suitable dwarf species for breeding.

The importance of preserving ancient species as a source of breeding material for the future is now acknowledged. Species which have been bred and cultivated for many years may be vulnerable when new pests and diseases appear in the growing area, or when growing conditions change. There are inherent characteristics in the wild species, the 'weeds' which have allowed them to survive for centuries. One day they may be needed.

It is possible in New Zealand to grow a great variety of plants from both Southern and Northern hemisphere. Many can be grown and hybridised in open ground, with limited facilities. Information on genetics, chromosome counts and breeding methods is more readily available than in the past. There is still plenty to be discovered and many opportunities for those who concentrate on their chosen plants. Above all there is a need for reliable attractive plants which require little or no maintenance.

Review the literature. Has the plant been cultivated and hybridised for a long time? If so, there is likely to be less room for improvement unless new species have been introduced, or parent plants collected from different areas, more suited to cultivation here, maybe more hardy.

Collect or observe as many species and hybrids as possible, as genetic material to breed from; and for comparison. Choose possible parents according to the breeding objectives. Make some preliminary crosses to find out the characteristics they pass on to their first and second generation progeny. Make reciprocal crosses. Results are not always the same. Pollen can be stored if necessary. It can be exchanged with other breeders. Difficulties of breeding due to ploidy, length of style etc. can often be overcome.

The enthusiast is prepared to have a go at 'impossible' crosses, and sometimes makes a breakthrough which opens up a whole new field of breeding, and the combination of a whole new group of genes.

It's still fun to cross pollinate a few flowers in the garden, sow the seed, and wait to see the results.

N.D.H. ORAL AND PRACTICAL EXAMINATIONS

A copy of the 1981 N.D.H. (First Schedule) Oral and Practical I was printed in the Winter 1982 edition of the Bulletin as a guide to students sitting their first Oral and Practical examination.

A copy of the 1982 N.D.H. (Fourth Schedule) Oral and Practical II is printed in this edition for students sitting the more advanced examination.

As with your first Oral and Practical examination, it is divided into two papers, morning and afternoon, each 3 hours long. Approximately half an hour is allowed for each question. Similar type examinations are set for the other Schedules.

The examiners are looking for good craftsmanship, so be efficient and tidy with your work and don't be afraid to discuss your techniques with them. A more advanced knowledge and experience will be expected than for your previous Oral and Practical. Don't forget to take your diary along.

Finally, best of luck with your exam; try to relax and have an enjoyable day.

NATIONAL DIPLOMA IN HORTICULTURE

SCHEDULE IV - NURSERY MANAGEMENT

SUBJECT NO. 14 - ORAL AND PRACTICAL II

Morning Paper

Time allowed - 3 hours

-
- NOTES :
- (a) All questions to be answered.
 - (b) If you require materials or tools not provided, ask the Examiner for these items.
 - (c) BRIEF details are sufficient when giving written answers to the questions. Practical work carries more marks than written answers.
 - (d) In all cases, your code number only and question number must be clearly attached to all work areas (plots), groups of plants and any written replies submitted.
 - (e) Students must be prepared to answer any oral questions which may be put to them by examiners during the examination period.
-

1. Identify the weeds and grasses in the area indicated. Use botanical names where possible. On paper briefly state how you would control these :
 - (a) In the short term
 - (b) In the long term (20 marks)
 2. Identify and then discuss with your examiner the use and values of the manures, fertilisers and media material on display. (20 marks)
 3. Demonstrate to your examiner the technique of budding using the material indicated. Answer questions put to you concerning this method of propagation. (20 marks)
 4. Pack the plants provided for transit by air (group a) and by rail (group b). Complete a consignment note for one of the packages. (20 marks)
 5. Prepare TEN (10) cuttings of each of the groups of material provided and insert them in a container of your choice. Assuming several thousand of each is required, state on paper the rooting medium you would use and the growing conditions required for successful rooting to take place. (20 marks)
-

SUBJECT NO. 14 - ORAL AND PRACTICAL II

Afternoon Paper

Time allowed - 3 hours

6. Identify any FIFTEEN (15) of the specimens on display. Give their botanical name (including cultivar if any) and their normally accepted common name. State the particular merit or use of each and their normal ultimate dimensions. (20 marks)
7. Plant up the THREE (3) different plant containers with the plant material supplied. (20 marks)
8. Answer questions put to you by your examiner about the tractor, rotary hoe and motorised spraying unit. (20 marks)
9. Discuss with your examiner the use and operation of the items on display. (20 marks)
10. On your plot, plant out the plant material and give it any appropriate treatment. (20 marks)

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