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NEW ZEALAND PLANTS AND GARDENS

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No. 2

FLOWERS OUT OF SEASON

I do not know exactly where or when the idea of flowers out of season originated. I suspect it was Holland because it was from that bulb producing country that the first "prepared hyacinths" came. These were bulbs, prepared for early forcing by exposing them to temperatures that encouraged quick maturing. Under normal heated glasshouse conditions they could be forced into bloom by Christmas in North European countries. The red form of the miniature tulip 'Duc van Thol' could also be forced for Christmas and was used, with prepared hyacinths of suitable colouring, for planting ornamental bowls. The early Narcissi, such as 'Soleil d'Or,' 'Paper White Grandiflora' and 'Golden Spur' did not need special preparation. With skilled treatment they were forced into flower by Christmas, months before they flowered naturally out of doors.

Lily-of-the-Valley were literally boiled into bloom over hot water tanks in high temperatures under glass. Specially grown crowns were necessary and Berlin crowns of 'Fortin's Giant' were considered the best. Forcing was rapid and the stems were leafless. They were, nevertheless, welcome in the middle of a Northern European winter.

By virtue of our greatly varying climate from North Auckland to the Bluff, forcing is not necessary as early narcissi and other flowers can be produced freely in the open. By planting monthly batches of large flowered Gladioli in frost-free districts from July until December they will flower successively from November until April or later. But flowers out of season have taken another turn. I remember at one of the post war Chelsea flower shows, seeing an exhibit of a white decorative chrysanthemum. An exhibit of an autumn flower at a spring show did not meet with the approval of many of us plantsmen, but we dismissed it as just a passing novelty.

However, the flower buying public, thought otherwise. Today, by carefully controlled hours of daylight, temperature etc., chrysanthemum blooms of best quality are on sale at the leading florists of Britain and the U.S.A. every week of the year. The latest development comes from the Plant Industry Station of the U.S. Dept. of Agriculture at Beltsville, Maryland. There, a combination of already known cultural methods with experimental chemical treatment has made it possible to flower azaleas, presumably of the *indica* type, all the year round. We can feel assured

that similar objectives will be applied to other plants. These developments are likely to interest the commercial and retail florists only. We plantsmen can afford to look on, with a degree of interest, but a feeling of great thankfulness that the times of flowering for outdoor flowers have not changed, and we can still enjoy flowers in their normal seasons out of doors.

G. A. R. PHILLIPS,
Editor.

BANKS LECTURE 1967

THE NEW LOOK IN HORTICULTURE

R. J. Ballinger, B.Agr., Sc.

Horticulture in New Zealand is taking on a new status — a status in which people who are closely associated with this development are beginning to take pride. I am sure too that the future holds still greater promise, but to ensure this progress much work and planning will be needed. If this is carried out efficiently and vigorously, then I am sure that New Zealand as a country also will be proud of this industry called Horticulture.

In delivering this paper to you on ‘The New Look in Horticulture,’ I am going to present it in three sections:

Firstly, a consideration of the “new look” in horticulture and what has brought it about.

Secondly, a study of the various factors which could help to bring about still further progress in the industry.

Thirdly, how various sections of the industry could go about the task of putting these plans into operation.

In taking this look at horticulture, I would first like to make myself quite clear as to what I mean by this word. *The Encyclopedia of New Zealand* published only last year covers under “Horticulture” — only civic reserves, ornamental horticulture, and home gardens. This narrow image of horticulture is unfortunately held by a large percentage of the people of this country, and if progress is to be made, this restricted image must be dispelled, and the full picture of Horticulture covering vegetables, fruit, nurseries, flowers, hops, tobacco, parks and reserves, and mushrooms, must be included. To complete the picture, all levels of interest in these sections should be included—i.e. growing, processing and marketing, advisory and research, as well as education.

I know there are people here who agree with this full picture as the true image of horticulture in this country, and in fact have been working to this end. In as far as you have been successful, you have helped to create the new look that the horticultural industry has taken on.

1. THE NEW LOOK:

This new look has not appeared like a magic cloak to suddenly completely change the conception of horticulture. It has developed gradually, but also soundly that people outside the industry are beginning to take notice of this growth.

Here is an industry with a production approaching £30,000,000 and a potential which could go far beyond this figure.

Growers' organisations within the industry are organising their associations on a far sounder basis than ever before. Growers are becoming specialised in the growing of specific crops and mechanisation plays a greater role in production each year. In the processing of produce we are right up with the latest developments, and producing quality products. In marketing, this last year has seen a remarkable re-building programme of auction markets throughout the country.

Besides our considerable exports of pip fruits, further steps have been taken in the export of nursery stock, soft fruits, vegetables and flowers, and this aspect could play an important role in the future economy of the country. The advisory service keeps producers up with the latest world trends, and since World War II research centres have been established throughout the country, for the main horticultural crops. In addition, two Chairs of Horticulture have been established in our Universities, and this step perhaps more than any other, has helped to create the new look in our industry.

Steps have been made by this Royal New Zealand Institute of Horticulture to draw together the various sections of horticulture, and this is adding strength to the industry. An example of the advantage to be gained from such co-operation is shown in that excellent bulletin *Careers in Horticulture*. This publication presents the industry in its full range, covering all the horticultural crops, and demonstrates the greater impact that can be made than if each section presented its own particular facet.

These are the factors that have brought about the "new look" in horticulture. At this stage the "new look" is not world shattering, but it is of sufficient degree to establish that changes are taking place. What is more important—sufficient progress has been made to allow for the question to be asked,—“Where do we go from here?”

In presenting this paper, I do so with humility as a practical grower, but one who is proud to call himself a horticulturist. Throughout my life I have been classified as an agronomist, plant breeder, advisory officer on seed production, vegetable research officer, and commercial grower, but a few years ago I struck the word “horticulturist.” It's a good word, which I like using, and it is because of my confidence in the horticultural industry that I put forward my suggestions in the second and third part of my address. Some of the moves are already under consideration by different sections of the industry, but I hope that this paper will help to co-ordinate the various ideas so that they may be seen as a whole.

2. FUTURE NEEDS OF THE HORTICULTURAL INDUSTRY:

(1) Transport:

If horticulture is to make sound progress, it is essential that not only is quality produce grown but it is also received in the hands of the consumer in a fresh condition. To ensure this, transport must be available that uses modern equipment and is fast, regular, reliable and all handling is carried out carefully. Unfortunately these conditions do not apply in this country today. The words "fragile" and "perishable" have little meaning to those engaged in transporting freight—whether it be with those making policy or those actually handling the goods.

The Kiwi attitude that "She'll do" or "near enough is good enough" is just not good enough when it comes to handling quality produce.

A new bolt for a machine, if delayed for one day in transit may cause inconvenience, but horticultural produce if delayed for a day, misses vital markets and could be a complete loss. In my own experience in marketing *Asparagus* through the South Island, and in London, and dispatching roses to North Island markets, transport is by far my greatest problem.

The first thing we have to do is to bring home to every one handling produce at any stage, that this is fragile, and it is perishable. I will give you examples of the lack of appreciation.

A clerk weighing 13 cartons of *Asparagus* for the London market putting all the cartons one on top of the other to weigh them, so that the bottom cartons had a weight of over 2 cwt on top of them. It apparently did not occur to him to weigh three or four cartons at a time.

A second example of a consignment of asparagus being handled by N.A.C. at Wellington for transfer to London waiting inside their building and in front of large open doors with the sun shining directly on the produce and a strong northwesterly wind blowing over it. When I approached a member of the staff to ask if the consignment could be put in the shade since it was a perishable article, the reply I received was:

"Air New Zealand has to come and pick that up, it has nothing to do with us."

I quote these examples to show the need to impress upon all people handling produce that more care must be taken if the quality of produce is to be preserved. The fact that carcasses of wild pigs and deer are loaded into railway wagons with produce, and that those making the policy in types of railway wagons have not seen any need to provide refrigerated transport, go to show the lack of appreciation at all levels.

Again, a grower in this district has recently been refused permission to transport produce to Christchurch on large trucks, although he can do this more economically and efficiently than by rail, and here is the point—his produce would be fresher and better in quality when it

arrives on the market. The ruling that the Railway Department should pay was deemed more important than that the vegetables should arrive on the market in fresh condition.

With mechanisation the present trend is for growers to become specialised, and also for certain crops to be grown in large areas in a district where they are best suited to be grown. This leads to efficient growing, but it also places a greater reliance upon the transport system to be able to convey the produce to markets throughout the country quickly and efficiently.

In dispatching glasshouse roses to North Island markets, the fact that Wellington Airport is out, can bring about a far greater loss in my nett return, than a serious attack of powdery mildew on the rose crop. Last year in a recorded number of consignments by air approximately 25% did not arrive at the market at the time for which they were intended.

The importance of this problem is of direct interest to all sections of the horticultural industry. The indifference to the problem at all levels is illustrated by the lack of appreciation to implement the findings of the *Enquiry into the Transportation of Fresh Fruit and Vegetables in New Zealand* last year. If horticulture is to make sound progress, it must build its name on a quality article, and any factor which is going to affect that quality adversely must be improved. I am sure that these problems will be solved more quickly if they are approached by the industry as a whole, than if each section tries to handle them on their own.

We are already talking of jumbo jets for flying produce to different parts of the world, but if our internal transport is not efficient, then fast long distance transport loses its value.

The National Research Advisory Council Report stated that research is necessary on improving transport in this country and this is certainly true for the horticultural industry if it is to make progress.

II. Grading, Packing and Labelling:

None of us, when buying any article, whether it be a motor-car, a shirt, or a cake-mixer, like to receive something which is faulty or substandard. Similarly, when we as producers are selling our produce, we have a responsibility to ensure that nothing that is of poor quality, or is substandard, is allowed to be marketed. To do this efficiently, some standard must be set, and this necessitates grading.

The Apple and Pear Industry, selling their produce overseas and competing with growers in other countries, have found out the importance of this, and I am sure that all other sections of the Horticultural Industry must benefit from following their example. The Government attitude has tended to be, particularly with vegetables, that as long as

there are plenty of vegetables, and they are cheap to the public, then that is all that matters. This outlook I think is a great hurdle to progress, because although it applies mainly to vegetables, this attitude can spread to all horticultural produce on the local markets. It does a great disservice to the horticultural industry, in that it presents an image to the public of a cheap article where quality is not important. It encourages growers to market inferior lines, packed poorly in old banana cases, with not a label or mark on the case. The cheapness and second grade outlook continues along the line as the transport operator, the auctioneer, and the fruiterer all give it second-hand treatment. It lands up sitting in the sun at the fruiterers' before being dumped or being bought by a disgruntled housewife, who naturally takes little pleasure or pride in preparing it for the family meal.

This whole outlook that cheapness and quantity are more important than quality is a fallacy, and unfortunately it is too widespread throughout the whole horticultural industry. From the plant breeder who goes for yield without considering quality, to the commercial grower who markets every plant without leaving the inferior produce in the field, all help to spoil the image of horticulture in the eyes of the public. What is more, the public do not benefit from such a policy, since less fresh fruit and vegetables are eaten if the quality is not high. All overseas countries that have made progress in horticulture have proved that this can only be achieved by grading and packing quality produce to a standard that buyers can rely upon from day to day, and year by year.

There is a tendency to think of grading and packing of produce as something which affects only the grower and not other sections of the industry, but this is wrong. The quality of the product being received by the consumer is the final representation of horticulture in the eyes of the public. It is on this image that the standing of the whole horticultural industry will rest.

III. Marketing:

As a nation we have always been rated highly in the production that can be obtained from the land, but unfortunately we have not excelled in the marketing of our produce. Overseas we have always had established markets, but now that some of those traditional markets are falling off, we are realising that we have to learn the art of marketing. I believe that much research is needed in making market surveys, and establishing market trends, and long term requirements. In the past, if there has not been an established market in a certain country, then we have not given it another thought, but markets have to be created, and this applies for horticultural products, both here and overseas.

Again, market requirements are continually changing, and with the present trend for supermarkets to take a greater and greater percentage of horticultural production the type of produce and the way in which it

is presented is quite different than what it was ten years ago, and by another ten years time, it is almost certain that there will be still greater changes. It is therefore essential that the horticultural industry not only keeps in close touch with marketing, but also prepares for the future by making long term market and consumer surveys. After surveys have been made markets then have to be tested to find the pitfalls and difficulties in packing, transporting, presentation and acceptance. Mistakes will be made but something must be attempted if progress is to be ensured. Marketing any product on world markets today is a competitive business but it is in this field that more vigour and imagination has to be displayed.

IV. Exports:

The Apple and Pear Industry, although very efficient, has run into stiff competition in its existing European market, and if the Common Market countries continue to progress as they are, this competition could be still stronger. Surveys of other markets and alternative ways of marketing their produce are already being made.

In the soft fruits, most promising export markets are being built up in many overseas countries, and this illustrates how modern air transport has revolutionised the marketing of perishable products throughout the world. Here again the need to have quality grading of produce is brought home forcibly, for it would only need one inferior line of produce with a New Zealand brand on it on an overseas market to ruin that market for a long time.

In building up a name overseas for produce, whether it be for strawberries, tamarillos, onions, or nursery stock, it is absolutely essential that a quality grade be maintained. Vegetable markets overseas are being explored, and will develop. This should be developed with an eye to meeting the requirements of these specific markets. I do not think that there can ever be sound marketing by just spasmodically supplying markets overseas when there is a shortage, or when there is an over supply here. There must also be a far greater understanding between New Zealand and Australia on trade agreements, and quarantine regulations, since at present the latter are being used to restrict trade which might be developed. I am sure there is a future in the export of cut flowers, and I was very pleased to see a few months ago that *Chrysanthemum* blooms were at last allowed into Australia from this country. The export of nursery stock is now past its pioneering stage, and with the wealth of plant material that we have, the knowledge to propagate it, and the climate to foster it, there is every reason for this to lead to a most worthwhile export industry.

In the production of hops, plant breeders, besides meeting the requirements of the New Zealand trade, are breeding hops which will also find a market overseas when the need arises.

Our temperate climate has always served us well in the way of production of horticultural crops, but it is only in recent years that air transport has put us in a position where export of this produce is now a possibility. There is a great future here in export, but it will not fall into our lap—markets will have to be created, and then met by providing produce consistently of the highest quality.

V. Processing and Food Technology:

New Zealand, like many other parts of the world, with the raising of the standard of living, is becoming more sophisticated in its food requirements. A very large range of ready packed and easily prepared food dishes are sought after, and New Zealand is in the fore in the processing of vegetables, fruits, and fruit juices. Canning, quick-freezing, and freeze-drying of horticultural produce is now a very important industry in this country, and one which is geared to give a great boost to the export market.

Food technology has become an important science in our Universities and graduates from this course are now moving out into the processing industry and giving a new impetus to the development of a greater range and production of food lines.

We have been extremely gifted in New Zealand with a wonderful temperate climate and with this, good soil, and the technical knowledge, production of horticultural produce is not a problem in this country. If called for, I believe production in most lines could be tripled in a few short years — it is the distribution and marketing that is the big problem, and the more that processing of these lines can be increased for overseas sales the better it will be for this country. It is in the interests of everyone that in future planning, or the making of trade agreements, that processed foodstuffs should be given every opportunity to expand.

VI. Training future Horticulturists:

For horticulture to maintain future progress there must be a continual flow of highly trained people coming into the industry both as employers and employees. Over recent years the technical complexities in all aspects of horticulture have increased at an extremely fast rate, and there is no doubt that this will continue. Competition will see that only those people maintaining and applying a high technical standard of knowledge will survive.

Already there are sections of the horticultural industry, such as processing, which have to compete with industry round about them if they are to survive. They are to compete for capital, staff, and technical advisers and be ready to pay the same salary and wages, and I believe that all sections of horticulture must raise themselves to the challenging level

of industry. What industry can make progress and be efficient if it is willing to take the staff from what is left after the best has been screened off?

The training of staff is a responsibility to be shared by the whole horticultural industry if the best results are to be obtained. In the matter of apprenticeship, diploma courses, cadet and training schemes, there should be some uniformity if there is to be general recognition of standards obtained. If each organisation and society sets different standards, how is an employer going to assess the varying qualifications? In addition, employers must take a responsibility and be willing to make sacrifices in the training of future staff for horticulture, and not look upon training schemes as some cheap form of labour. It is logical that any industry can only be as efficient as the staff it is prepared to engage.

VII. Plant Breeders' Rights:

Overseas considerable progress has been made in recent years in giving recognition to plant breeders who have raised new varieties of plants, so that they may obtain reasonable return for the work which they have put into breeding over the years. As yet there is no system of plant patents in New Zealand, and many raisers of flowers and nursery stock in particular see the need of this. In the past there has been little encouragement for private plant breeders or for firms to employ plant breeders because no sooner is a new variety raised than it quickly becomes the property of competitors and the full benefit is not obtained for work put into the project. Having been associated with some of the basic work carried out in England in variety trials before it was possible to decide on which were new varieties I can assure you that it will not be an easy task to introduce Plant Breeders' Rights in New Zealand, but this is no reason why this work should not be started.

The main reason for introducing this particular section into this paper is to bring out the point that we New Zealanders are only too ready to isolate ourselves from the rest of the world and pretend certain things are of no interest to us, and that we do not need to worry about them. How wrong we are! I will give you an example in the agricultural world. Several years ago when the European or E.E.C. Seed scheme for agricultural seed was first introduced for the certification and trading of agricultural seeds, New Zealand was invited to join the scheme and help make the rules. New Zealand turned this invitation down, saying that we had a perfectly good seed certification scheme of our own, and there was no need to join any other scheme. Since that time, and because we did not belong to the European scheme, and did not have the certification rules which were recognised in the seed trade in Europe, New Zealand continued to lose trade in Europe. Last year we had to go cap in hand to ask to join the scheme and conform to the rules set out by the member countries.

However, the damage had been done and much valuable trade lost because we thought we could go it alone.

All countries more than ever before are working together in trade groups and it is impossible for any country to stand out on its own. For this reason we as a country, must prepare for Plant Breeders' Rights as it, too, is one of the planks whereby horticulture in this country will make progress.

3. WHO WILL PLAN THE FUTURE OF HORTICULTURE:

There is no doubt that in this rapidly changing world, horticulture in ten years' time will be different from what it is now. Since change will take place it is logical that this should be in the way of sound progress. However, this will not happen on its own, but will have to be planned, and to do this, organisations will have to know what actually is needed, and where they want to go.

Again, no one section of horticulture can go it alone, and get the best results. I know there are sections who think that there is no great advantage to co-operate with other sections, but I am sure that if all horticulture speaks with one voice, it will carry more weight with the Government, finance houses, and the public, than if we speak separately.

I am sure that there should be co-operation in planning the future, and this should be on a two dimensional basis.

First it should be co-operation across all the sections of the horticultural industry, that is, fruits, including tree fruits, soft fruits, and citrus fruits, vines, vegetables, plant nurseries and ornamentals, hops, tobacco, seeds and mushrooms.

Secondly, it should be in the dimension where it brings co-operation on a personal level, between those engaged in education, research, advisory, growing, processing and marketing. Here again there has been a certain amount of reticence to co-operate in this way and whether at grower level or at the research level each group is occupied too much with its own particular interest, and sometimes I think horticulture as a whole may suffer. It is most important that we each keep this full picture of horticulture before us as we plan for the future.

In this concluding section of the paper, I would like to touch briefly upon the work of the different groups, and I trust it may help by being provocative and stimulating.

I. Education:

Education is giving a lift to every country in the world today and I believe that the greatest forward move will be made in horticulture as the industry receives the young people who are taking the horti-

cultural diplomas and degree courses in our universities and other educational institutions. New technical knowledge which is abundant in the world, when applied with vigour and enthusiasm, could, and I am sure will, make sweeping changes throughout the industry. As this new blood comes into research and advisory work, marketing, processing, commercial firms, and into growing, a new impetus will be given.

The people in charge of horticultural education in New Zealand have a great responsibility, for they have the opportunity to mould the future of horticulture perhaps more than any other group. With their guidance, students may capture a vision of the great possibilities that horticulture holds for this country. Again I think this training should be on a broad basis, containing the whole of horticulture, particularly in the early stages. I know this is a specialist world, but demands are changing so rapidly that it is a bold man who will forecast exact needs for even three or four years hence. Education has a vital role to play in the future and to those engaged in this work, the rest of the horticultural industry would wish you well.

II. Research:

Research today in any industry must also hold the key to the future. In fact, the most valuable research worker is the one who can foresee the future needs, whether he is in plant breeding, crop production, pest and disease control, processing, or marketing. Plant breeding programmes starting today are going to produce fruit or vegetables that could be on London markets in under twenty-four hours. Because research workers must see into the future, it is important that they, too, see the whole picture of horticulture not only in the field of production but also in processing and all the ramifications of marketing. In fact it is in the field of research into food technology and marketing that our greatest progress may be based. Research workers, by the very nature of their work, are involved in change, and they can help the rest of the industry to prepare for changes, and then accept them.

III. Advisory:

Advisory workers in horticulture, whether they are attached to government departments or commercial organisations, play a most valuable part in passing on information from research workers to growers. In fact, because of their liaison work, they are in a better position to hold the industry together as a unit than any other group. Advisory workers too are often the mouth-piece of horticulture since they present the industry to the public through newspaper and radio reports.

As fine as this work has been it is now being realised that there are gaps, since producers do need assistance in assessing the cost of production, and in the presentation and marketing of their produce.

Only last week the *London Financial Times* criticised New Zealand policy in that, although it was known five years ago that there would be problems in disposing of our primary produce on the traditional markets, we have not sought new markets as vigorously as Australia has done. In addition, we have aggravated the position by implementing an increased production programme without giving sufficient thought as to how the produce was to be marketed. We, in Horticulture, should take heed of this warning that production is only part of the picture. Distribution and marketing is just as important.

IV. Growers:

To the Consumer, the life of a grower, whether it be in fruit, vegetables, grapes, or flowers, may seem rather simple and perhaps idyllic, but that is far from the present situation. In many crops, whether it is tomatoes, apples, or nursery plants, production is fast moving towards a factory principle where profit margins are cut to a minimum, and efficiency is necessary if a person is to remain in business.

With mechanisation, the greater use of chemicals for weed, pest and disease control and almost clinical standards for feeding and watering of glasshouse crops, any grower must become a specialist in his line to keep abreast of the latest technical advances. To cope with the challenge of the future there must be planning within growers' organisations, and co-operation in production and marketing methods. Here again the national image of the Kiwi as a "rugged individualist" is sometimes not very helpful when it comes to co-operation. He has to learn that the short term personal advantage is not always the same thing as the long term interest of the industry. I will give you an example. A flower grower asked me if he was right to take a very good set price from a florist by making direct sales of his flowers. On the price, the grower had a definite increase over auction floor prices — at least in a short term. However, his action removed one buyer from the auction and if several growers do this it weakens the whole auction floor price, so that the price falls. Since the auction, floor price is the standard price set by supply and demand, the whole price structure is weakened, and this is not in the interests of the long term outlook of the industry.

This is but one example where the personal interest is not the same as that of the whole industry. In the past many growers have looked only at their own personal interest but if progress is to be made growers will have to take a greater interest and responsibility in the welfare of the whole industry. One only has to look overseas to see that in countries like Holland and Belgium, where there is co-operation among growers, that the greatest progress has been made.

The future of growers is in their own hands, but it will not be a bright future unless a greater number take a more active interest in what their leaders are attempting to do for the industry.

SUMMARY:

This then is the position of horticulture in New Zealand today. Progress has been made, but still greater progress could be made in the future. However, this will only be attained if there is planned development — planned with sights set high if we are prepared to think big and make developments with imagination and vigour.

This future can only be built in quality — the quality of the produce we present to the consumer both here and overseas. Therefore we must proceed along every avenue that will help in raising quality of horticultural produce. This will not be easy, since for every one person who is keen to carry out a progressive programme there will be ten who want to leave things as they are. They will put up excuses and obstacles, because it is far easier to leave things as they are than to create something.

As leaders in the horticultural industry in this country you can help create this future by fostering co-operation among all sections of the industry. In addition do all you can to create a vision of this future, particularly in the minds of the young people who are being trained to come into the industry.

How much poorer the world would be today without people like Sir Joseph Banks whose name we commemorate in this lecture tonight. To him life was an adventure, and as he set out on each voyage there was no limit to the possibilities of his discoveries. He could have left things as they were, remaining peacefully at home with a good income, a comfortable house, and a very full life, but he was not satisfied with this. He accepted all the discomforts of a sea voyage at that time for the discoveries of a new world. He had a vision of what might be attained and he accomplished great things.

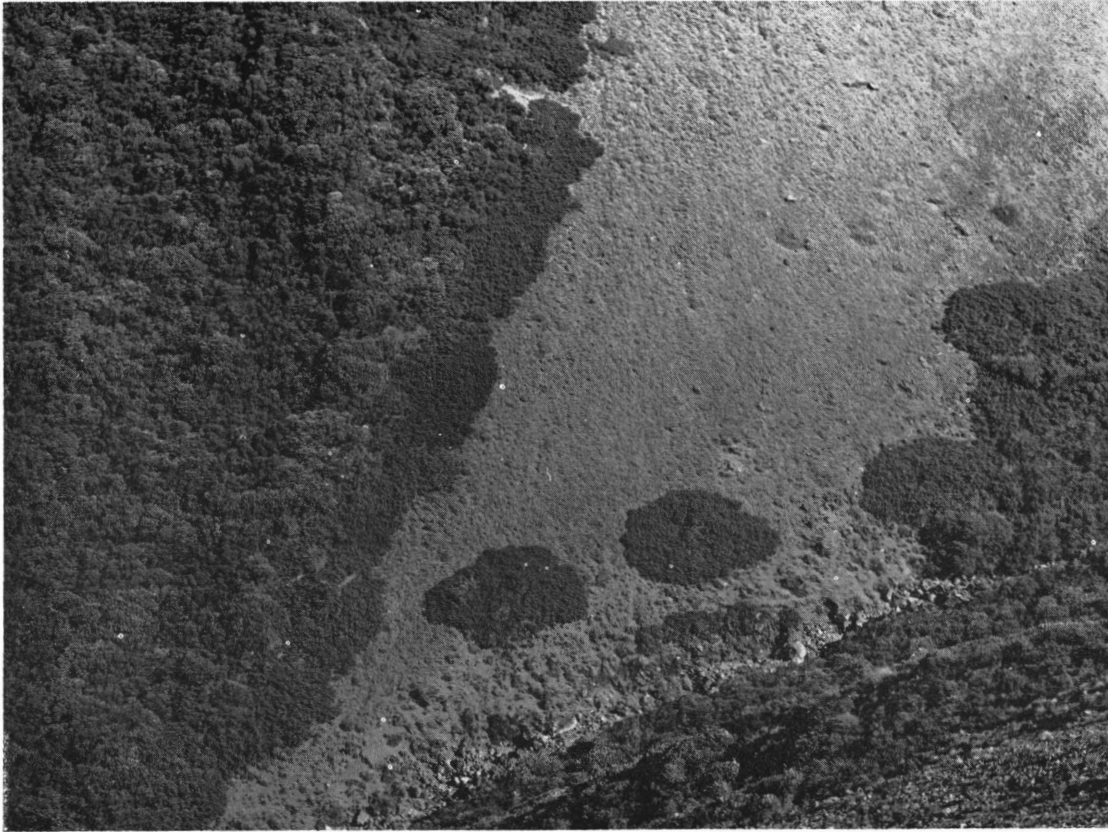
We too in our industry can follow his example, and by the co-operation of all concerned, establish an industry in which the whole of New Zealand will take pride — Horticulture.

EGMONT

The Vegetation Belts

HARRY GEORGE

Lovely, lonely and full of grandeur, Mount Egmont rises spectacularly from the sea to tower over the wide expanse of Taranaki. Lovely in its white coat of winter splendour, lonely in its isolation from other mountain chains and full of grandeur because of these this mountain helps to provide the rainfall necessary to nurture the lush pastures of this dairy-land province, the snow for winter sports, and the forest so necessary on a steep watershed.



Egmont.—A face of the Ngatoro Valley showing ring development on a shingle slide.

(photograph H. George)

Gazetted a National Park in 1900, the second established in New Zealand, Egmont National Park comprises all the land within a six mile radius of the summit and totals some 83,000 acres. The Park is administered by a Board, the members of which represent local bodies with the exception of two members appointed by the Government, one of whom is usually a biologist. Dr W. G. Mason, one of the present appointees, was nominated for the position by the Royal New Zealand Institute of Horticulture because of his interest in the mountain both botanically and as a mountain resort. To him I am indebted for much of the information in this article which is based largely on an address given by Dr Mason to the North Taranaki District Council.

We are fortunate, too, in having had Mr A. P. Druce of the Botany Division, D.S.I.R. to carry out the first real botanical survey of Egmont National Park and the information he has provided has thrown much new light on the more recent history of the mountain and the development of its vegetation.

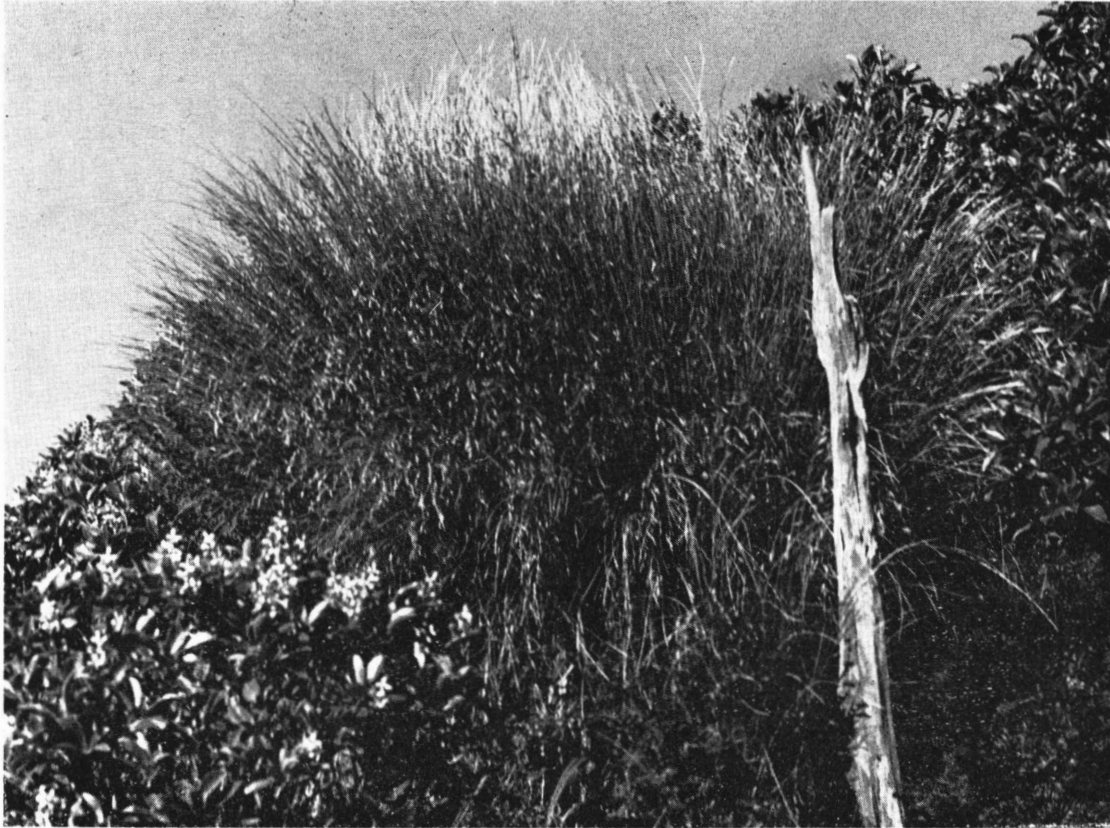
Another extremely important document completed in the last twelve months is the *Preliminary Report and Plan for Control of Noxious Animals, Egmont National Park*, prepared by the New Zealand Forest Service. This plan provides the most important working document for the Board for it is only by the control and if possible the eradication of goats and opossums on Egmont that the forest, the scrubland, the tussock and the herbfields can continue to function and grow, regenerate and increase in the way they should.

It is not my intention in this article to deal to any extent with the geology of the mountain nor to treat in any detail the history of the vegetation, but merely to detail the various vegetative belts from approximately 1500 feet above sea-level to the summit of the mountain.

The first belt as we enter the reserve is the lowland forest consisting chiefly of rimu, *Dacrydium cupressinum* and rata, *Metrosideros robusta* as the emergent species with kamahi *Weinmannia racemosa* and mahoe *Meliccytus ramiflorus* as the common under storey species. This band extends from about 1500 feet to 2500 feet and is rather surprisingly, about two miles wide. On areas covered by fairly recent ash deposits mahoe dominates; broadleaf *Griselinia littoralis* putaputaweta, *Carpodetus serratus*, *Pseudopanax edgerleyi* and kaikomako *Pennantia corymbosa* also being present. The common smaller shrubby trees in this area are pate *Schefflera digitata*, raurekau *Coprosma australis*, fivefinger, *Neopanax arboreum* and *N. colensoi*, wineberry, *Aristotelia serrata*, rangiora *Brachyglottis repanda*, and tree ferns, while ground orchids such as *Dendrobium cunninghamii* may be seen coming through the litter on the forest floor.

Upland Forest

In this sub-alpine area which extends from about 2500 feet to 4000 feet the emergent species are the kaikawaka, *Libocedrus bidwillii* and the mountain totara, *Podocarpus hallii*. These in sheltered positions are very



Egmont.—Tussock, *Chionochloa rubra*, peculiar to Egmont. (photograph H. George)

attractive in form but on the exposed surfaces of Egmont, as soon as they emerge, suffer wind damage from the icy blasts off the peak, especially from the south-east. The cutting of the new road to the television translator at the Hen and Chickens has caused even more of these trees to be exposed. All the lateral buds have been sheered off and will never develop and as the trees mature they will die back. Within this forest which has often been called the goblin forest, these trees are clothed with a draping moss, *Weymouthia billardieri*, making a fantastic sight. This is especially so in the Dawson Falls area. As we go higher up the mountain the vegetation tends to become lower and the mountain cabbage tree, *Cordyline indivisa*, becomes one of the emergent species. It is present in the forest however from about 2000 feet. In sheltered places the kaikawaka goes quite high on the mountain, and on the lea side of the Pouakai Range has been found growing at 4000 feet which is probably its absolute limit. When it does emerge it meets the wind sheer off the ridge top to suffer considerable damage and eventually die.

It seems then that these altitudinous belts are associated with the mean temperatures that occur during summer which in turn determine how much growth the plant life can actually make.

As we move up into the next belt, the sub-alpine scrub, we find the first truly alpine element in the vegetation. The totara and cedar are still evident in the sheltered valleys but on the exposed ridge faces the scrub species is characterised on Egmont, in fact dominated, by leatherwood, *Senecio elaeagnifolius*, a member of the *Compositae* or tree-daisy family. With the heavy rainfall at this level a certain amount of erosion must be expected but in these rather unstable conditions is accelerated by the lack of ground cover caused by the over-grazing by goats. To the trapper and mountaineer nothing is more difficult to negotiate without a track than leatherwood scrub. To quote Dr Mason, "It is better to try to walk on top rather than get in underneath it but either way is a painful process." For many months this scrub has to contend with freezing conditions and to do this has developed a tremendous cuticle and thick furry tomentum to protect it to some degree. Some of the characteristic species are *Senecio elaeagnifolius*, as already mentioned. *Dracophyllum longifolium* var. *filifolium*, a spiky species and a member of the southern heath family, an unnamed variety of mountain tauhinu, *Cassinia vauvilliersii* with its yellow-backed foliage, *Coprosma pseudo-cuneata*, and the less common koromiko, *Hebe stricta* var. *egmontiana*. This is not a whipcord but similar to *H. salicifolia*. Also found here are *Olearia arborescens*, *Neopanax colensoi*, and *H. cupressoides*, a whipcord type that is rather uncommon. At this level tussock is just beginning to be noticeable for Egmont probably has colder growing conditions than would be found at a similar altitude anywhere in New Zealand because of the amount of precipitation which under freezing conditions falls not as snow but as ice. Now to the tussock belt proper. The red tussock found here, an endemic species peculiar to Egmont, used to be called a *Danthonia*, but is now *Chionochloa rubra* var. unnamed. The descent of



Egmont.—Road to the T.V. translator up the face of the Ngatoro Valley.

(photograph H. George)

the tussock into the scrub belt appears to be closely associated with the maximum summertime temperature. We encounter scrub in the sheltered areas while the tussock moves in on the exposed faces. To quote Dr Mason again, "It would appear that the vegetation on the mountain is definitely moving up the faces. This is something which we can be rather happy about. We are not, however, when we are crashing through the scrub on the western side where once there was tussock about fifteen years ago. But it does mean that the stabilisation of the Burrell Ash must be proceeding fairly satisfactorily as the vegetation moves up the mountain."

(Burrell Ash is one of the youngest ash showers on Egmont and is named after Mr A. W. Burrell of Stratford who first attempted to determine its age.) On the south-western side of the mountain are tremendous areas of tussock which suffer extremely harsh conditions. To again quote Dr Mason, "If you look at a *Danthonia* leaf under the microscope it is a very rolled structure. It has a waxy sort of finish to it and actually the stomata are hidden in this rolled portion. So there is a minimum loss of moisture which is very hard for a plant in winter conditions to come by because root activity under freezing conditions is very low. The moisture intake is quite limited but the desiccation which can occur under the comparatively low humidity which occurs on the mountain under freezing conditions makes water retention very important for plants to survive at this altitude."

Here, too, among the tussock on this south-western side we find magnificent stands of the spaniard, *Aciphylla squarrosa*, especially on a seldom visited area, Hughson's Ledge.

We now move from the tussock to the herffield itself. The herffield on Egmont of course, is dominated by the characteristic buttercup, *Ranunculus nivicolus*, the snow dweller, which at about 4500 feet is the harbinger of spring. It breaks into flower just as the snow recedes—in fact it can often be seen flowering through the snow. This plant with its protective hairs on the calyx and rather thick succulent leaves is nowhere so profuse as on Egmont. The common Mountain daisy in this area is *Celmisia major*. There are some unusual communities which occur within this belt, not the least interesting of which are the alpine tarns found in odd places on the Pouakai Range. Around the fringes of these and in the Pouakai swamp bog species are developing.

"One interesting development that I have noticed on the mountain," said Dr Mason, "is that as the summer temperatures seem to be warming up a ring development taking place in the tussock, is becoming an important factor in stabilisation. The Puniho mud flow from off the western face is vegetating only in the last century and here you find the mountain tutu, *Coriaria angustissima*. In the last ten years it has been discovered that this plant has the ability to fix nitrogen, just as lupins in the garden, and is thus providing a nutrient source for a nurse bed for other species. As the ring of mountain tutu expands into the herffield by



Egmont.—The Upland Forest on Egmont.

(photograph H. George)

its rhizomes, because of its greater ability to get nutrient and fix nitrogen, the fertility of this ash is rising and tussock is beginning to develop there and providing shelter for scrub species to develop in the centre."

This ring type of development is also an important factor in the revegetating of some of the moving shingle faces where large slides have occurred on the sides of the Ngatoro gorge. Now as we move from this interesting area into the true herbfield we find the species, which colonise this rather skeletal ash material, are commonly *Celmisia major* var. *brevis*, *Helichrysum bellidioides*, *Forstera bidwillii* var. *latifolius*, and *Pentachondra pumila*, one of the mountain health plants. In fact there is quite a wealth of species occurring in a square foot of this herbfield with *Lycopodium fastigiatum* emerging through the other species and *Coprosma repens* only an inch or two high on *Rhacomitrium* moss. There is also *Donatia*, a species which occurs as a complete mass in clumps on the herbfield from 4500 feet to 5500 feet.

Here, too, is found *Anisotome aromatica*, a small unbelliferous herb, and several mosses and lichens moving over the rock faces and serving as a nurse crop for other members of this community. The vegetation gradually becomes much more broken on very disturbed stone masses, not a true scree, but moving down the mountain in various places.

The last flowering plant on the mountain, the *Colobanthus* that occurs up to 7000 feet has a rhizome that creeps through the moving boulder mass. Very succulent, it has excellent water storage. However right to the summit the rock faces are clothed with mosses and lichens, the last elements of the flora to survive the extremely rigorous conditions prevailing at this altitude.

And so from our lofty vantage point we can gaze down on the various belts we have passed through; the scree, the herbfield, the tussock, the scrub, the upland forest, the lowland forest and beyond the Park boundary to the lush farmlands.

REFERENCES:

- Egmont National Park*. Published by the Egmont National Park Board. *Preliminary Report and Plan for Control of Noxious Animals, Mount Egmont National Park*. New Zealand Forest Service.
The Vegetation of Mount Egmont. By P. T. Wilson. (unpublished thesis)
Trees and Shrubs of New Zealand. By A. L. Poole and N. M. Adams.
The Vegetation of New Zealand. By L. Cockayne. (Reprint 1958).

LODER CUP (1966)

Awarded to Mr OLIVER HUNTER, of Diamond Harbour, Banks Peninsula

To the skirl of the pipes, the 1966 Loder Cup winner, Mr Oliver Hunter and Mrs Hunter were welcomed on Thursday evening, 2nd February 1967 to the Lyttelton Borough Council Chamber. Here, the Mayor of Lyttelton, Mr J. B. Collet and Councillors were associated

with the Mount Herbert County Council as hosts of a widely representative gathering of conservators and plant lovers who had assembled under the chairmanship of Mr T. C. M. Hay of the Canterbury branch of the Royal New Zealand Forest and Bird Protection Society.

In its citation for the award this society stated—"Mr Hunter was born at Church Bay, Banks Peninsula, on 13th November, 1882. He can remember the scrub, the bracken, the toe-toe and the flax that partly covered the headlands at Church Bay, where, in a cottage on the hillside, Mr and Mrs Hunter (Oliver's parents) lived at the time.

Oliver Hunter had rambles to the rocky gorge, Church Gully, near his home, where fragments of native bush, including *Corokia*, still survived and sheltered many small native birds. Seventy-two years ago young Oliver decided to create his own native forest and asked for, and was given, one acre of land from his father for this purpose. Without adequate water, Oliver realised young bush seedlings could not survive so he set to and built a water system which would have done credit to an Otago goldminer. On the death of his parents he bought their land and increased the scope of his activities and his bush reserve by systematically planting the whole gorge of some 20 acres. From then on his life has been a saga of one-man's struggle in a hostile environment to proclaim the doctrine of conservation. He became an indefatigable planter. He donated tree seeds to settlers and gave advice and wrote articles for magazines and newspapers. Twenty-four years ago the *Forest and Bird Magazine* first printed one of Mr Hunter's articles and just over six months ago appeared the Sanderson Memorial lecture given by him on 4 June, 1966. His practical outlook was—"Here are the trees, go and plant them!" Church Bay Gully which Mr Hunter established is now a living demonstration of what can be done, and groups from schools and adult enthusiasts visit this reserve each year. Today the reserve includes whav, tanekaha, puriri and Captain Cook's scurvy grass, whilst rata and kowhai have been planted along the cliffs. In 1963, to ensure its permanent security, Mr and Mrs Oliver Hunter willed the reserve to the Royal Forest and Bird Protection Society of New Zealand and for this unselfish and enthusiastic leadership to his district and to New Zealand, the Canterbury branch of the society consider Mr Oliver Hunter a worthy and fitting person to receive the Loder Cup."

In making the presentation to Mr Hunter, the Minister of Agriculture, Hon. B. E. Talboys said that no one could have done what Mr Hunter had done without a burning ideal and a very big heart. Mr Hunter's work from the age of twelve was something warming to humanity. He was sure that the example of Mr and Mrs Hunter would stir in people a true appreciation of what Lord Wakehurst (Gerald Loder) had called the incomparable flora of the Dominion. Other speakers included the Chairman, Mr Hay; the Hon J. Mathison, who was deputising for the M.P. for Lyttelton, Mr N. E. Kirk and Mr A. M. W. Greig, Chairman of the Loder Cup Committee, who read a congratulatory

message from Lord Wakehurst, the son of the donor. Also present was Mr L. W. McCaskill who had won the Loder Cup fourteen years earlier.

In his reply, after receiving the award, Mr Hunter stated that he was surprised at the lack of patriotism shown by New Zealanders in our own native plants. Seeds of native trees and shrubs should be more freely available, especially to schoolchildren and native trees should be displayed and become more appreciated by New Zealanders as well as by overseas visitors.

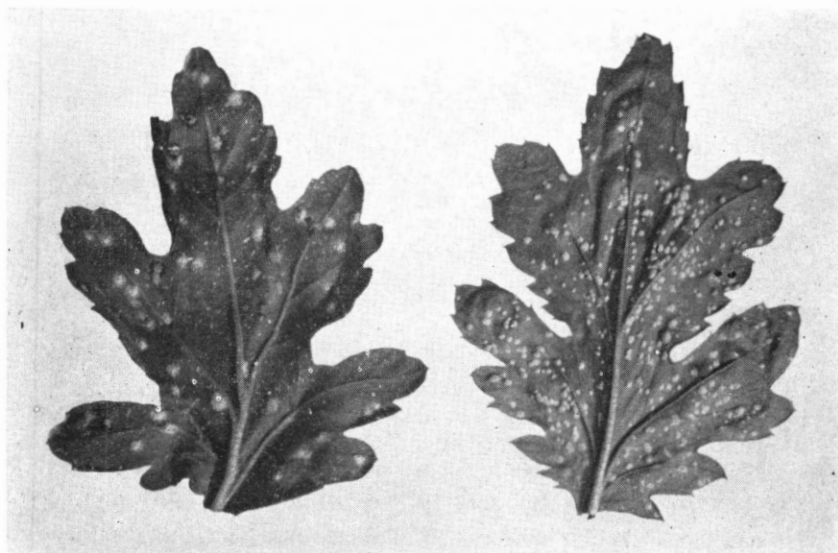
The Loder Cup was then placed on display and a most appropriate function concluded with the feeling that just across the water, the Church Bay reserve would grow and be a living memorial to Mr Oliver Hunter of Diamond Harbour.

CHRYSANTHEMUM WHITE RUST IS STILL A DANGER

A message from Mr A. M. W. Greig, Director, Horticulture Division, Department of Agriculture.

Many readers will have seen reports that chrysanthemum flowers are now being exported to Australia.

This trade has commenced after several years of negotiation with the Australian Plant Quarantine Authorities. One of the requirements for export is that the exporting property must have been free of chrysanthemum White Rust disease, *Puccinia horiana* for at least a year.



Ever since chrysanthemum White Rust was first identified in New Zealand in late 1964, the Department of Agriculture and chrysanthemum growers have made determined efforts to eradicate the disease. Some success has already been achieved. In the first season, 47 outbreaks were identified and last season this was reduced to 20 outbreaks, few of which occurred on previously infected properties.

Unfortunately this spring, chrysanthemum plants have been distributed to retail shops in the central part of the North Island and Christchurch from a nursery where white rust has since been identified and eradicated.

This disease is easily recognised as it shows as white or buff coloured raised spots on the underside of chrysanthemum leaves, and as sunken pale areas on the upper surface of the leaves. There is no spray that will adequately control the disease; infected plants must be destroyed and all the remainder adequately and regularly sprayed with a suitable fungicide such as maneb, zineb, and wettable sulphur.

Will you personally please closely examine your chrysanthemum plants, particularly those that you bought this season. If you suspect they are infected with White Rust, please contact the nearest Horticultural Officer of the Department of Agriculture.

White Rust is considered a very serious disease in all parts of the world and we are attempting to eradicate it from New Zealand. We must not jeopardise a promising new export trade and our own gardens, by allowing this disease to become established in New Zealand. Your assistance and co-operation would be appreciated by all with the welfare of New Zealand horticulture at heart.

SOME CAUSES OF POOR SEED GERMINATION

By M. J. HILL

(Department of Agriculture Seed Testing Station, Palmerston North)

There are three major factors which determine seed quality. Good seed must be of high purity, of high germination and must be capable of producing plants of good type or strain.

Of these factors, some of the problems which affect the germination of seed are of particular interest to horticulturists.

As far as germination is concerned, seed which will not germinate is of no practical value for sowing purposes. Hence, the value of a seedline is influenced not only by its purity and strain, but also by its ability to produce large numbers of healthy plants.

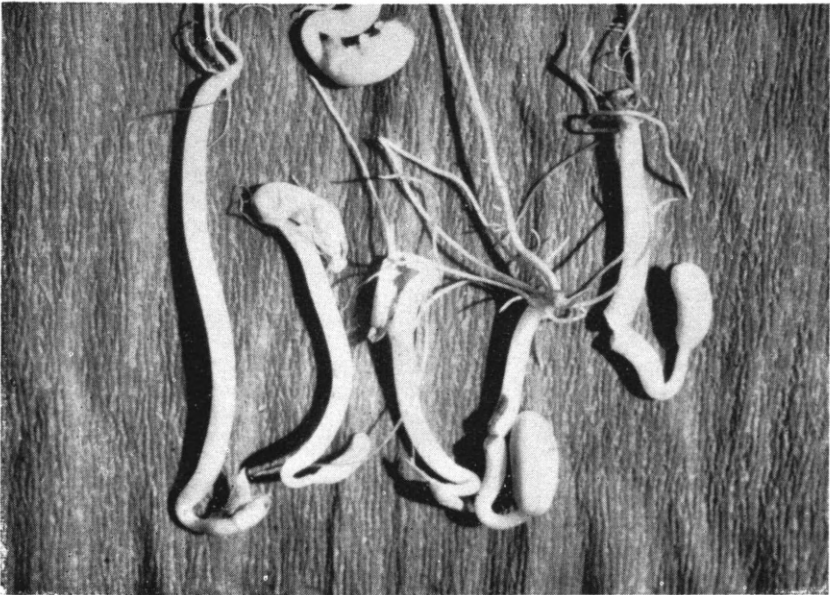
The Seed Testing Station at Palmerston North makes several different tests available to growers. One of these, the Advisory Test, is a free test carried out on seed sent to the station by horticulturists

to determine the germination capacity of the seed they may be sowing.

In recording the germination of a seedline it is usual to show two figures — one stating the *interim* germination and giving the percentage of seeds germinating in a certain number of days; and a *final* germination, giving the percentage of seeds germinating over a longer period. The interim gives an indication of the speed of germination or vigour of the line, and the final indicates the total germination potential. The presence of a low interim figure may indicate that the seed is ageing, that it has been damaged during harvest, or that it has been affected by heat or some other agency in storage.

During a germination test it is possible to classify the seedlings into

1. *Normal seedlings* — those which produce all the seedling structures essential for their development into normal healthy plants.
2. *Hard seeds* — in the case of legumes only.
3. *Abnormals* — seedlings which show deformities such as the presence of cracks in the stem or roots, or which lack normal root and shoot development. Such seedlings would never reach a healthy maturity and are classed as abnormals or abnormal growths.

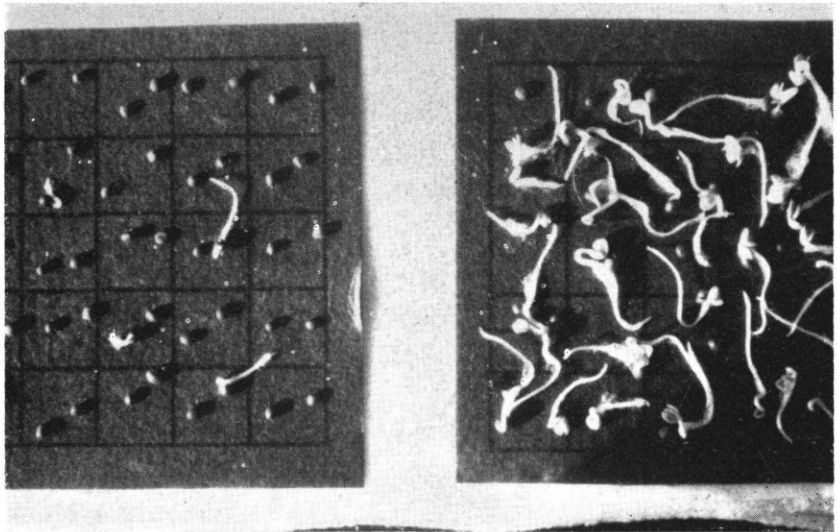


Abnormal Beans

(Photo: Mrs. S. C. Hall)

4. *Remainder* — Any seed which has not grown during the germination test and which does not come under the classification of hard seed. Seed in this category is dead.

By noting the interim germination of a particular seedline a grower can get an indication of the vigour of the line. This may be an essential factor for successful seedling establishment when seed is sown in damp, cold soils in the late autumn or early spring. Similarly, a low interim line of seed may not produce an even stand of seedlings under conditions of poor seedbed preparation. Hence the purchase of vigorous seed, as shown by a high interim germination is a good insurance for growers against poor stand development whether caused by adverse soil conditions, weather or attack by soil organisms.



High and Low Interim Germination in Brassicas

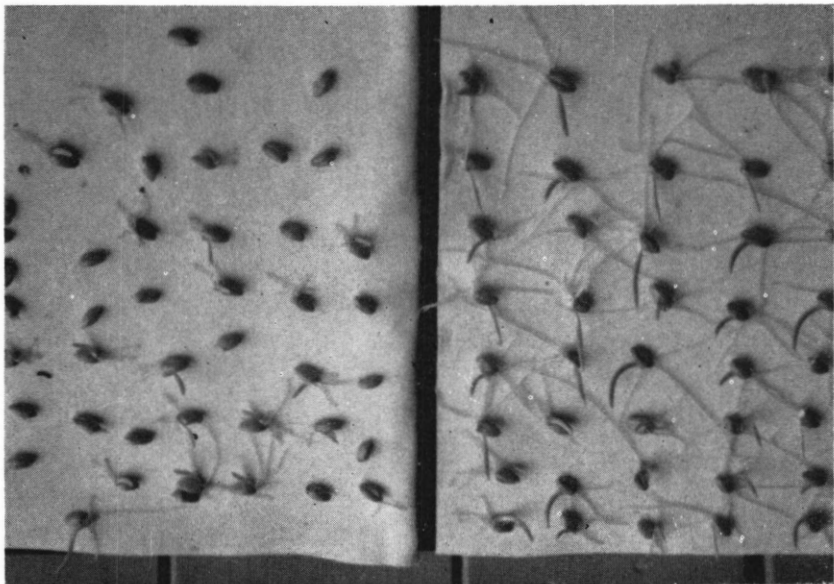
A. Some causes of abnormal seedling development

1. *Ageing* of seed is first reflected in an increase in the number of abnormal seedlings which develop during germination and in its final stages is shown by a large percentage of dead seed. Hence, the date of issue of a seed certificate should be carefully studied when purchasing seed. In most seed types the germination of a line shown on a certificate 12 months old may bear very little resemblance to the germination capacity of the seed at the time of purchase. For most vegetable and ornamental seeds a new certificate on the germination of a line can be obtained from the Seed Testing Station in 10 - 14 days. Time spent waiting for a guarantee of germination capacity of a seedline can be very worthwhile.

2. *Poor storage conditions* or the storage of seed 'out of condition' can cause a rapid reduction in the germination of seed. Under these conditions seed respiration is high. This causes a heat build-up in the seed mass which injures the germ and is reflected in abnormal seedling development when the seed is sown. An increase in the development of moulds during the storage of seed can also affect germination. Heating of moist seeds in storage allows an increase in storage moulds which cause the temperature to rise even higher, partially cooking the seed and resulting initially in a high percentage of abnormal and in its final stages in a high percentage of dead seed.

3. *Mechanical damage* of seed during harvest or dressing; or by insect attack in the field, can cause germination injury. If a large amount of damaged or broken seed is present in the seedline it can be assumed that a high proportion of abnormal seedlings will occur during the germination of the seed.

4. *Exposure of seed* to the vapours of, or direct contact with *hormone weedkillers* seriously disrupts the germination of the seed. In one instance recently, a line of lucerne seed in sacks being sent from Auckland to Palmerston North had been loaded into a train wagon and a drum of 24-D inadvertently placed on top of the sacks. The vapour from the weedkiller was sufficient to cause approximately 30% of



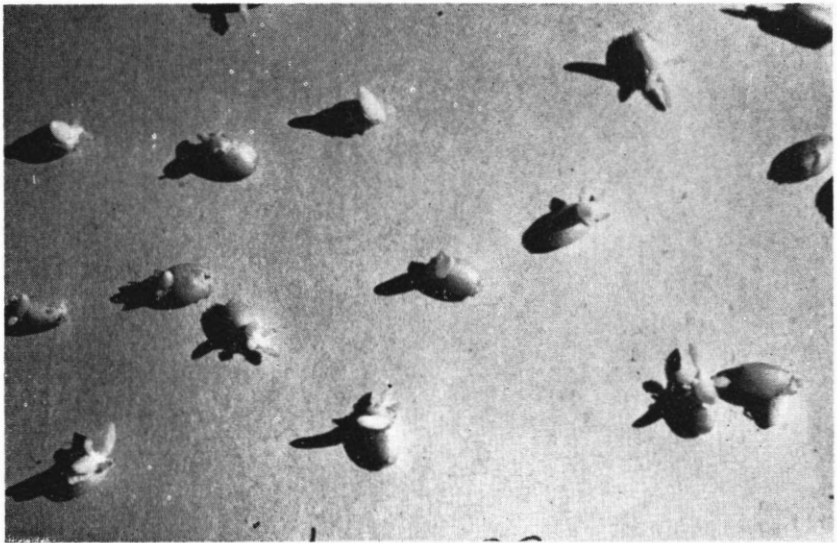
Effect of Butyl Ester of 24-D on Wheat Germination
Untreated, right — 0.2%, left.

(Photo: Mrs. S. C. Hall)

abnormal seedlings in a germination test carried out on the seed on arrival at Palmerston North.

The effect on germination is greatly increased when seed is directly exposed to liquid or hormone weedkiller. Exposure of wheat seed, for instance, to the butyl ester of 24-D at concentrations as low as 0.2% is sufficient to cause the seed which does develop to be abnormal and stunted and the majority of the seed to be killed before it germinates at all.

5. *Overdusting* of seed to control seedborne diseases or as a seed protectant in the soil can seriously affect germination. The seeds germinate normally but the roots and shoots fail to elongate. The roots become fleshy and thickened, and the shoots remain stunted and may not turn green. Organic mercury compounds such as Ceresan, Semesan and Agrosan are especially injurious to seed when applied in excess amounts. This is one reason why the recommended dosage of seed dusts should not be exceeded. If the dust application rate for a particular type of seed is not known it is generally safe to assume that the amount of dust occupying the volume of 1 seed is sufficient to safely dust 100 seeds of the type being treated.



Effect of Overdusting Wheat on Germination

(Photo: Mrs. S. C. Hall)

6. Sowing high germinating seed in *direct contact with artificial fertilisers*, e.g. raw superphosphate, can damage the germination of the seed. This damage is shown by an increase in the number of abnormal

seedlings which develop and in extreme cases complete death of seedlings can occur.

7. *Soil sterilisation* especially when chemical sterilants such as chloropicrin, vapan, or formalin are used, can cause abnormal development and death if plants or seeds are set out in treated soil before all fumes of the sterilant have disappeared. The length of time soil must be left after sterilisation depends on the method of sterilisation, soil type and on soil aeration and moisture content. Most proprietary soil sterilants indicate on the container the minimum time soil must be left following treatment. Generally, this period may be anything up to 14 days. Because of the variation in the residual effect of chemicals used as soil sterilants in different soil types it is generally advisable to set out "pilot" plants or seeds before a crop is sown or pricked out into the area. This will prevent abnormal plant development in chemically treated soil.

B. Dormancy

This condition, which can confuse growers sowing freshly harvested seed and which is responsible for low interim germinations in seedlines, is shown in seed by its unwillingness to germinate freely within a few weeks of harvest. Dormancy may persist for periods from a few weeks for some seeds to many months for others. Thus it is important for a grower to know whether poor germination has been caused by seed dormancy or by some other factor.

There are many different methods of overcoming dormancy in seed of which perhaps the most common two should be mentioned.

1. *Treatment of the seedcoat*

In some seed species the outer coat is either impermeable to water (as in the case of hard seeds in legumes) or consists of thick woody tissue which prevents the expansion of the seed during germination.

Seed which possesses an impermeable seedcoat is unable to germinate until water is able to enter the seed through a break in the seedcoat caused either by mechanical or chemical cracking or by the natural breakdown of the seedcoat in the soil. The mechanical method of reducing the hard seed content involves rubbing the seed against an abrasive material which chips the seedcoat. This process is called scarification. Chemical methods involving plunging the seed into boiling water or into liquid nitrogen are equally effective in reducing the amount of hard seed in seed types exhibiting this type of dormancy.

In the case of seeds which have a tough woody outer coat (e.g. some tree seeds) splitting the seedcoat or its complete removal will overcome dormancy. Soaking the seed in a strong solution of concentrated sulphuric acid to eat away the seedcoat is also effective in reducing this type of dormancy without injuring the embryo of the seed.

2. *Low temperature treatment of the seed*

This method is useful in overcoming 'post-harvest dormancy' — the term used to describe the dormancy of seed straight after harvest. The low temperature treatment must be carried out on a moist medium for most seed types. The most practical method for the horticulturist would be to wrap the seed in a moist piece of towelling or flannel and store it in the refrigerator for some time before sowing.

If seed which is dormant immediately after harvest is left in storage for several months this 'post-harvest' dormancy disappears. This is why it is often not necessary to pre-chill many types of herbage and vegetable seeds before germination will occur after, say April or May — assuming a December or January harvest. Some species, such as roses and some tree seeds, on the other hand, may require up to 18 months cold treatment to break dormancy. Hence it is necessary for a grower to know the length of time dormancy persists in the type of seed he is sowing before he condemns non-germinating seed as being worthless.

C. *Seedborne diseases*

Diseases capable of establishing in a crop through the use of seed carrying the causal agent of a disease are particularly important as far as the germination of seed is concerned.

One of the first problems in considering plant diseases is to distinguish those caused by physical conditions from those caused by disease organisms. Deficiencies of boron and manganese for instance can cause the development of decayed tissue on plants. This decay is not caused by a disease organism, but is due to a physiological condition which can be overcome by soil dressings of the deficient element.

Marshspot, caused by manganese deficiency, is important in some crops, especially peas and beans. This physiological condition shows up in the seed as dark decayed areas on the inside of the cotyledons. Often this browning is not evident on the outside of the seed and can only be detected during germination by cutting the seeds in two. In most cases the shoot grows from the seed but may later become stunted, brown in colour and eventually die off. Marsh spot thus gives a lowered percentage of seedling emergence giving patchiness to a crop in much the same way as pre-emergence damping off and other soil-borne diseases do.

As far as the control of seedborne diseases is concerned the best method is to sow seed which has been harvested from a disease free crop. If this is not possible, however, various treatments can be used to eliminate many of the diseases carried by horticultural crop seeds.

Treatments found to be most effective are:

- (1) Dusting the seed with a fungicidal dust before planting;
- (2) Soaking the seed in a fungicidal solution.

(3) Soaking the seed in hot water.

One or other of these methods can be used, according to the nature of the disease to be controlled. The dust treatment has the added advantage that particles of the dust are carried into the soil on the seed coat and exert a protective action against possible parasites in the soil as well as a disinfecting action on parasites borne on the seed. Thus, dusted seed, if planted under unfavourable conditions, will not rot before germinating and in some cases losses from damping-off will be checked.

Seed treatments are designed to —

1. Prevent pre-emergence damping-off through destruction of seed- and soil-borne organisms by therapeutant dust or slurry treatments.
2. Prevent post-emergence damping-off to some extent, by bringing about increased vigour of seedlings.
3. Destroy seed-borne organisms by hot water treatment or by chemical steeps.
4. Destroy virus or bacterial infection by special methods of seed extraction.

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	CONCENTRATIONS OF DUSTS AND AMOUNTS OF															Organic Mercurials (Ceresan, Semesan, Agrosan, etc.)		
	Ferbam		Fernasan or Premasan			Phygon			Spergon			Thiram		A	B	C		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C			
Betroot	—	—	—	16.0	3	2	4.0	$\frac{1}{2}$	2	—	—	8.0	1	2	—	—		
Broccoli	—	—	—	16.0	3	2	—	—	—	8.0	1	2	8.0	1	2	—		
Celery	—	—	—	16.0	3	2	—	—	—	8.0	1	2	8.0	1	2	—		
Lettuce	4.0	$\frac{1}{4}$	2	16.0	3	2	—	—	—	8.0	1	2	8.0	1	2	—		
Eggplant	}	—	—	4.0	$\frac{3}{4}$	2	—	—	—	8.0	1	2	2.0	$\frac{1}{4}$	2	—		
Kale																		
Radish																		
Beans	}	8.0	$\frac{1}{2}$	2	4.0	$\frac{3}{4}$	2	2.0	$\frac{1}{4}$	2	4.0	$\frac{1}{2}$	2	2.0	$\frac{1}{4}$	2	—	—
Peas																		
Onion	—	—	—	800	158	2+3	—	—	—	—	—	400	62	2+3	—	—	—	
Pumpkin	—	—	—	4.0	$\frac{3}{4}$	2	—	—	—	6.0	$\frac{3}{4}$	2	2.0	$\frac{1}{4}$	2	—	—	
Silverbeet	16.0	1	2	16.0	3	2	4.0	$\frac{1}{2}$	2	—	—	8.0	1	2	—	—		
Spinach	—	—	—	8.0	$1\frac{1}{2}$	2	4.0	$\frac{1}{2}$	2	8.0	1	2	4.0	$\frac{1}{2}$	2	—		
Sweetcorn	—	—	—	3.0	$\frac{3}{4}$	2	2.0	$\frac{1}{2}$	2	3.0	2	2.0	$\frac{1}{4}$	2	—	—		
Tomato	16.0	1	2	16.0	3	2	6.0	$\frac{3}{4}$	2	8.0	1	2	8.0	1	2	—		
Turnip	8.0	$\frac{1}{2}$	2	8.0	$1\frac{1}{2}$	2	6.0	$\frac{3}{4}$	2	8.0	1	2	6.0	$\frac{3}{4}$	2	—		
Barley																1.0	4	
Oats																1.5-2.0	5	
Wheat																1.0	6	
Brussel - Sprouts	}	—	—	8.0	$1\frac{1}{2}$	2	—	—	—	8.0	1	2	4.0	$\frac{1}{2}$	2	—	—	
Cabbage																		
Carrot																		
Cauliflower																		
Cucumber																		

COLUMN A = Ounces per 100 lb seed.
 B = Level teaspoons per pound.
 C = Diseases and pests controlled.

No. 1 = Storage insects and some soil insects.
 2 = Seed decay and damping off.
 3 = Onion smut.
 4 = Stripe and covered smut.
 5 = Covered smut and leaf spot.
 6 = Covered smut.

5. Destroy eelworm and weevil infestation by fumigation of seeds.

Treatments are selected to give satisfactory control of harmful organisms without causing germination reduction or damage to seedlings.

The tables presented at the end of this article, which have been extracted in part from the N.Z. Department of Agriculture Bulletin 385, *Seed Disinfection*, by H. Jacks, may be useful to horticulturists contemplating seed treatment.

Seed treatment alone will not always ensure absence from disease, but it is easily done and, as an insurance, is always worthwhile.

Parasitic fungi and bacteria, as well as being carried with seed and on old crop refuse, may occur in the seedbed, in adjacent earlier planted crops, or on nearby weeds botanically related to the crop being sown. Consequently, crop rotation, weed control, seedbed sanitation and sometimes spraying must also be considered when attempts are being made to control diseases which may affect not only the germination of seed, but also the subsequent development of the crop.

SEED DISINFECTION BY STEEPING

Crop	Material	Concentration %	Duration of Steep	Diseases Controlled
All bulbs	"ARETAN"	0.25	30-60 mins	Storage rots & surface-borne diseases
Gladiolus	ACIDULATED MERCURIC * CHLORIDE	0.1	8 hours 30-60 mins	Neck rot Hard & dry rots
Hyacinth	ACIDULATED MERCURIC CHLORIDE	0.1	60 mins	Root rot
Iris, Lachenalia	FORMALIN	0.3	2 hours	Ink spot
Narcissus	FORMALIN	0.5	3 hours	Basal rot
Potato	ACIDULATED MERCURIC CHLORIDE	0.1	10 mins	Scab and Rhizoctonia
Tulip	FORMALIN	1.0	3 hours	Grey Bulb rot

* 1 gram of mercuric chloride dissolved in 2.5 mls of concentrated hydrochloric acid added to 2000 mls of water.

SEED DISINFECTION BY HOT WATER

Crop	Presoaking of Seed in Water		Steep in Hot Water		Diseases & Pests Controlled
	TIME (Hours)	TEMP. (°F)	TIME (Mins.)	TEMP. (°F)	
BARLEY	5 - 6	50 - 60	5	127	Loose smut
CABBAGE			25	122	Dry rot & leaf spot
CELERY			30	118	Leaf spot
DAHLIA			20 - 30	110	Bulb mite
GLADIOLUS			60	110	Bulb mite
HYACINTH			180	110	Eelworm
IRIS			15 - 20	110	Bulb mite
			15 - 20	112 - 120	Thrips
LILY			15 - 20	110	Bulb mite
			60	110	Bulb fly
MAIZE			10	143	Seedling rot
NARCISSUS			180	110	Eelworm
			180 - 240	110	Bulb fly
OATS			10	133	Loose smut
PEAS	18	50 - 60	20	118	Collar rot
SWEDES	15	50 - 60	50	124	Dry rot
TULIP			dip	122	Bulb mite
TURNIPS			30	122	Dry rot & leaf spot
WHEAT	4 - 5	75	10	127 - 129	Loose smut
ZINNIA			30	125	Leaf spot

NOTES FROM THE CHRISTCHURCH BOTANIC GARDENS

L. J. METCAL N.D.H. (N.Z.) (*Assistant Curator*)

In my notes in the December issue of the Journal I wrote that unless the unusual happened, the City would finish the year on a very dry note. Well, the unusual did happen and although rainfall was still light it was only $4\frac{1}{2}$ inches below average. November, which is the driest and one of the finest months in Christchurch, produced almost 4 inches of rain, and in addition to being one of the dullest Novembers on record it was the wettest since 1952. December showed little improvement and generally was a cool and unsettled month. The unsettled weather carried on into the New Year, and January was also unsettled with considerable cloudy weather. Taken generally 1966 was cloudier, drier, and slightly warmer than usual. It is interesting to find that the year started on a hot note with a temperature of 93° F. and that the winter started well with many mild, sunny days, but in both instances there was a miserable finish.

The effect of this unusual and lately, unseasonable weather on the growth of plants has been rather varied. As mentioned in last December's

notes most trees and shrubs have grown very well and some, such as the common oak, have made particularly heavy growth. In fact so much so that there have been more than the usual number of branches broken by winds. It is among the bedding displays that the adverse effects have been felt and there have been severe attacks of wilt in some of the displays of zonal pelargoniums and also zinnias.

One of the difficult times of the year in many gardens is the late summer-early autumn period. There are not many trees and shrubs which flower then, it is too early for most autumn foliage and fruits, and for colour in the garden it is necessary to lean heavily upon herbaceous plants and bedding displays. However, in wandering around the Botanic Gardens recently I was struck by the fact that there are a number of trees and shrubs which display attractive fruits during this period, and that greater use could be made of some.

The first of the *Malus* to make a showing are: *M. sargentii*, and *M.* 'John Downie' both of which display attractive crops of fruit from late January onwards. *Malus sargentii* is seldom more than a bushy shrub 8 to 10 feet in height and as such is ideal for small gardens. It has pure white flowers which liberally cover the bush and ensure a good crop of fruit. The fruits are rather small, usually about $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, and are a bright shining red so that they are quite conspicuous. *Malus* 'John Downie' is a fairly old cultivar which was raised in Scotland and is seldom seen in New Zealand gardens. Although it does not bear comparison with cultivars such as 'Jack Humm,' its great value lies in the fact that it fruits from late January until early March.

Among the smaller shrubs *Hypericum elatum* 'Elstead Variety,' is particularly attractive. This is a shrub which grows to about 5 feet in height and has abundant cymes of flowers, each flower measuring about 1 inch or more in diameter. The flowers are followed by long tapered fruits which are held erect. The fruits remain bright shining red for a long time before finally turning black. The main period of fruiting is during February and it is useful not only as a garden shrub but also for decorative work.

Although not generally held in regard for its fruit, *Camellia japonica* can be quite handsome. Not many cultivars of *C. japonica* have attractive fruits but in the Botanic Gardens we have one unnamed cultivar which has rather handsome fruits. It is a plant with single white flowers, very dark green foliage and the fruits are quite conspicuous. They measure up to 2 inches in diameter and at this time of the year resemble small, shining green apples.

Some species of *Rosa* show colour rather early. Foremost are *Rosa sweginzowii*, and *R. rugosa*. The former has bright red, bottle-shaped fruits and shows quite brilliant colouring at the beginning of February. *Rosa rugosa* does not fruit so prolifically but it has very characteristic fruits which make up for the lack of numbers. They are very bright red,

almost globular and are distinguished by the very long sepals which are up to three times the length of the fruit. *Rosa moyesi* 'Forma Rosea' which is well-known for its large bottle shaped fruits, does not get its full colour until about April but by February they are a pale, pinkish-orange and sufficiently attractive to make them worthy of note.

Of the species of *Viburnum* the only one which has an early display of fruit is *V. lantana* the wayfaring tree. It has bright red fruits and although they last longer than some others, they are still fairly quickly taken by the birds. The last tree on the list is the rowan, or *Sorbus aucuparia* which fruits in late January and into February. Strangely while some fine specimens laden with fruit may be seen in suburban gardens, those growing in the Botanic Gardens are stripped of their fruits, by the birds, within two to three days.

GALTONIA CANDICANS

W. R. SYKES, B.Sc.(Hons.), N.D.H. (Christchurch).

The Cape hyacinth used to be known as *Hyacinthus candicans* and superficially resembles species of the latter genus. However, the much larger number of seeds in the fruit capsule, which are angled or flattened and not globose as in the hyacinths, are two of the main reasons why the three of the four South African species are now considered to form the separate genus *Galtonia*. Thus the statement in the Royal Horticultural Society's Dictionary of Gardening that there are "few seeds" in the capsule would seem to be an error. *G. candicans* is probably the only species grown in New Zealand and is naturally found from the Drakensberg Mountains of Natal and the Transvaal southwards to the northern parts of East Cape Province. One of its local names, berg lily, suggests that it can be expected to be found in the mountains and thus we find that the Cape hyacinth is quite a hardy plant, especially since it is dormant in the winter. Since it comes from summer rainfall districts, moist conditions in the growing season are preferred. However, wet and cold winter weather is tolerated as long as the soil is well drained.

The plant itself has a large round bulb and from this appear the long, semi-succulent leaves in spring and, around mid-summer, the leafless flowering scape grows up to 4 feet or more in height. At the top is an open raceme of fragrant flowers which are nodding, as can be seen in the accompanying photograph. The funnel-shaped perianth is from 1 - 1½ inches long and is either completely white or else has green tips to the outer three segments. As with some liliaceous plants, the six anthers are versatile, i.e. then can move freely on a hinge. The capsule is erect and if given good conditions the black seed will germinate and produce flowering plants in the second growing season.



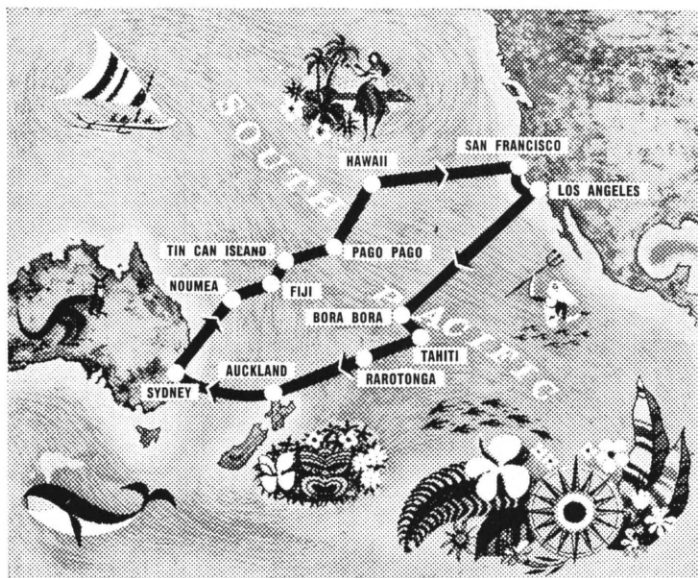
Galtonia candicans
(see page 84)



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DELPHINIUM SPECIES I HAVE GROWN

G. A. R. PHILLIPS, A.H.R.I.H. (N.Z.)

When anyone considers the modern giants of the *Delphinium* world, they may well ask how such spectacular plants could have come from unspectacular species. The modern *Delphinium* cultivar, as I have described, in my previous article (Vol. V, No. VIII, pp. 352-357), is a triumph of the plant breeder's art. No good purpose would be served in going over the same ground again. My intention here is to deal with some of the *Delphinium* species I have grown and found to be worthy of a place in the flower garden. Many species are of botanical interest only and do not come within the scope of these notes.

One of the first species that attracts, on account of its colour, is *D. nudicaule* from California. It grows to a foot high. In spring, early or late according to locality, it produces low branching stems bearing medium sized half closed florets of brilliant scarlet, shading to yellow at the base. As the colour is as brilliant on both sides of the sepals the fact that the florets are half closed does not mar the effect. It has two forms known as 'Chamois', apricot and 'Lemon Gem', clear yellow. All these have bulbous roots and cannot be propagated vegetatively. Seed is therefore the only means of propagation and seedlings come fairly true to colour. *D. nudicaule* and its forms will withstand frost moderately well. It prefers a well drained loam and a maximum of sunshine. Its greatest claim to distinction lies in the fact that it produced a mutation that eventually gave to the horticultural world the cultivar 'Pink Sensation'. This cultivar is the only one with *D. nudicaule* ancestry that can be propagated vegetatively to produce progeny true to the parent in every way.

Another Californian *Delphinium* species is *D. cardinale*, of an equally bright red colour but taller in growth, often reaching 4 feet. It did not lend itself to vegetative propagation but, by artificial means, there has recently occurred a revolutionary adjustment of the chromosomes which leave little doubt that we shall soon have scarlet delphiniums equal in all other respects to the tall cultivars grown in gardens today.

Yellow is another colour rare among delphiniums. *D. ochroleucum*, from the Caucasus, with lemon yellow florets on 2 feet stems has little to commend it from the ornamental point of view. But *D. sulphureum* is quite another matter. I was first attracted by it when Maurice Prichard & Sons, the well-known English perennial specialists, exhibited a bowl of it at the Southport flower show (late summer). Since then I have grown it successfully but, like the red species, it was not a reliable perennial in the stiff loam of Warwickshire. It produced spikes as high as 4 feet, wandlike and carrying medium sized florets of sulphur yellow with apricot centres. Being such a distinctive species I have often wondered if this could be the true *D. zalil* which I never saw exhibited in Britain except once and it was almost identical with the one I had first seen exhibited as *D. sulphureum*. Nevertheless a species,



Delphinium cashmerianum
(see page 89)

presumably the true *D. zalil*, has been given similar treatment to that accorded to *D. cardinale* and the mutations that have occurred promise large flowered yellow delphiniums equal to our modern cultivars in all respects except colour.

I first made acquaintance with *D. welbeyi* at Edinburgh where I saw it growing in one of the suburbs. It is from Abyssinia and it flowers in late summer. It produces a short flower spike 2 to 3 feet tall. The florets are small, single, sky blue with black centres. It is quite acceptable for garden planting and is a useful cut flower. What impressed me, when I first saw it, was its late flowering season and the possibilities it held for the plant breeder to evolve a race of late flowering delphiniums that would extend the season into late summer.

Among the smaller species there is *D. grandiflora* (syn. *chinensis*), from which originated the popular dwarf delphiniums such as 'Azure Fairy', 'Blue Butterfly', usually treated as annuals, coming true from seed. Then there is *D. tatsienense*, a real charmer from Szechuan. It has thin, gracefully branching stems carrying rich, dazzling blue florets, long spurred, like small butterflies on the wing. It is one of my favourites for a rock garden. It grows to a height of 1 foot. Of all the dwarf species I have grown I would give the palm to *D. cashmerianum* (see illustration). This grows to a foot high bushy plant, carrying on dwarf stems clusters of florets that vary from pale to deep blue, all with dark centres. For a dwarf I prefer it to any other species.

From Kenya comes *D. macrocentron*, a most fascinating plant growing to 2 feet or more with weird looking hairy florets of metallic tones of blue, yellow and green. Looking down upon it, it seems to me to have quite a sinister aspect, giving the impression of the head of some reptile.

Delphinium species such as I have described are difficult to obtain as plants, but seeds are usually obtainable from their country of origin. Since I used to grow them others have been brought into cultivation, including some that are claimed to be fragrant. I have heard of none likely to displace those I have included in these notes and the majority of the others are as I have stated, of botanical interest mainly and of little use to the average gardener.

DISTRICT COUNCIL REPORTS

NORTH TARANAKI

NOVEMBER

The Annual General Meeting held this month was well attended by members. The Annual Report and Statement of Accounts showed that this District Council is making steady if not spectacular progress with meetings being well attended, outings strongly supported, and finances in a satisfactory condition. Mr W. J. Messenger was elected President for a further term. Mr H. P. Thomas was again elected as secretary and Miss A. R. Young, Treasurer.

Of the many topics discussed under general business perhaps the most interesting was that brought forward by Mr A. Jellyman. He suggested that, to further the interests of horticulture in this district and to help maintain the interest of members in growing plants, trial plots be set up to determine the best varieties of plants for growing in various areas in the district. This would be something purely local. Various methods of starting such a scheme were discussed, including the use of selected plots in members' own gardens or alternatively a central plot attached perhaps to a park area. At a subsequent committee meeting a sub-committee was set up to investigate the proposal and to report back. This could develop into something quite interesting.

The final outing of the year was to gardens in the Hawera district where Mr Tom Reader had arranged extremely interesting visits. Mr Rod Syme, chairman of the Parks and Reserves committee of the Hawera Borough Council in the absence of Mr H. T. Beveridge, the curator taking place there. The idea

of part of the lake being turned into a water and bog garden appealed to our members. Mr Syme explained that many of the older roses had been replaced by newer ones, that the Ilam hybrid azaleas had been thinned to make more room for growth and many new camellias planted. This park seems to have a bright future.

Mr Don Ross, retired recently from the position of Curator of Parks and Reserves, Hawera, has continued, with the help of Mrs Ross, to build a park of his own on a section just across the road. With an intense interest in lilies, Mr Ross grows hundreds of them. Of the many other plant species growing on this small section the most appealing were perhaps the double-headed *Strelitzia*, the espalier grown fruit trees and the small rockery plants growing between the paving stones on the terraces. Altogether a most interesting garden. Of the other gardens visited that of Mr & Mrs Ron Jones showed what could be done in a short time by careful planning and layout. This garden, only five years old, was already beginning to take on an air of maturity with its concrete paths and edgings surrounding a sweep of green lawns, rockeries, rose beds, and specimen shrubs. An attractively designed front fence provided a suitable frame. In marked contrast were the gardens of Mrs Milne and of Mrs Nicholas with the beauty of age, elegance of large trees and the seclusion of high hedges. This was a most enjoyable day trip and provided an excellent finale to a really interesting year.

JANUARY, 1967

The new year has begun on a high note with a visit and an illustrated lecture on the flora of South Africa by Mr & Mrs Walter Middelmann. Mr Middelmann is a noted South African plant grower, seed exporter and nurseryman, while his wife who has worked with proteas since 1940, is an expert in this field. In addition to his many other activities Mr Middelmann is on the Council of the Botanical Society of South Africa, the body which was largely instrumental in the establishment of the National Botanic Gardens of South Africa at Kirstenbosch. In his talk Mr Middelmann first briefly described the botanic regions of South Africa and then showed slides of the area where his nursery is situated. Continuing he compared conditions in New Zealand and particularly New Plymouth with those in his part of South Africa. Because of conditions of rainfall, and soil fertility and depth, New Zealand and especially New Plymouth grew more plants of the *Protea* family than anywhere else in the world except South Africa. Most of these were produced from cuttings rather than seed. However although the seed had been obtained originally from his nursery in South Africa Mr Middelmann was able to note many variations in form and colour, especially in the *Leucospermum* group. He said New Plymouth could truly be listed as one of the *Protea* capitals of the world. Two other interesting points Mr Middelmann made were firstly that the nursery methods in New Plymouth, especially in propagation from cuttings, were well ahead of South Africa. The

second point was that New Zealand had more members in the South African Botanical Society than any other country except South Africa itself. From New Plymouth Mr and Mrs Middlemann left to visit Mr W. Stevens in Wanganui. Mr Stevens has probably the largest collection of South African flowering shrubs outside South Africa.

JANUARY TRIP

Have you ever been to Whangamomona? Have you ever had your lunch sitting on the roadside of a main street with your feet in a ditch? Have you ever travelled almost one hundred and fifty miles to visit three gardens? Our first organized trip this year provided all these and many more thrills for the forty people taking part. The main object of the trip was to travel through the rugged bush-clad hill country east of Stratford. From New Plymouth our first stop was at Stratford to visit the small but most interesting garden of Mr & Mrs Foy with its roses, sunken rockery, and soft lawns. After a morning tea of delicious scones and pikelets provided by Mrs Foy and her husband, we began the climb over the Strathmore Saddle, past the Te Wera forestry block, over the Pohokura and Whangamomona Saddles to the township of Whangamomona. After lunch (in the ditch) we retraced our tracks to the summit of Pohokura Saddle and proceeded to Matau yhere at the end of the road we arrived at the beautiful rose garden of Mr and Mrs Alex Rolfe. Some of the outstanding roses were: 'Burning Love,' a floribunda Hybrid Tea type with large scarlet double fragrant flowers—a gorgeous rose; 'Berlin', another red floribunda; Pascali, a white with a beautiful bud and some resistance to marking and 'Lili Marlene,' a large crimson semi-double, slightly fragrant floribunda. It was on the way to this garden that a well-known and esteemed member with three lady passengers in his car missed the turn off and the rose garden. They rejoined the party an hour or so later. Then on through Purangi to Tarata where Mr and Mrs Standish's garden provided a final highlight to a wonderful trip. In this garden we found a huge double-trunked kowhai: *Sophora tetraptera*, covered with Virginia creeper, *Parthenocissus tricuspidata*, a climbing rose, and a fern, *Polypodium serpens*; an extremely large specimen of the rather rare Kanaka, *Leptospermum ericoides*, a fine *Paulownia tomentosa* and many others too numerous to mention. Some fine rose beds flourished here despite the depredations of opossums or as Mr Standish explained because of the opossums for those caught were buried under the roses and seemed to provide excellent nourishment, a good top for country growers. And so following afternoon tea back to New Plymouth via Inglewood.

WAIKATO

At the October meeting the annual President's Evening was held; this normally takes place on the last meeting of the year but was brought forward because of other arrangements for the November meeting. One competition for a floral hat resulted in some most attractive examples of millinery cum horticultural art. As the rules were that the components had to be from the entrants own garden one competitor had included snail shells! A film on "Ikebana," made in Japan, was shown; this is technically a very good film and should be of considerable interest if shown to floral arrangement groups. This 16 m.m. film is obtainable in New Zealand from the National Film Library, Wellington and is in colour, running for nineteen minutes.

The November meeting was run in conjunction with the Waikato Rose Society, who during the day staged a show of Floribunda roses, which despite the inclement weather this season were of a very high standard. For the evening meeting the tables on which the roses were staged were placed around the side of the hall, together with the plants brought by members for the identification table. A most interesting talk on the varieties of Floribunda roses and their growing was given by the President of the Waikato Rose Society, Mr W. R. Metherell. The Waikato District Council of the Institute is most grateful to the Waikato Rose Society for their willing co-operation in this show and meeting, which ap-

peared to be most popular with the many members of both organisations, who were present. It is hoped that during the coming season further such shows will be arranged with other specialist societies.

It is discouraging to report that the Green Memorial, a tribute erected by the District Council to the late Mr A. W. Green has been damaged by vandals. The memorial, which was in the form of a seat in a paved area had been handed over to the Hamilton City Council but to assist them in defraying the cost of repairs a contribution was made.

The President of the District Council, Mr R. T. Fear, who is a member of the Mangakawa Scenic Reserve Board reports that steady progress is being made with the Gudex Memorial Park, at Mangakawa, near Cambridge. Access has been improved and a considerable amount of cleaning up has been done. An arrangement has been made with a local nurseryman to obtain and grow a number of trees and shrubs which will be planted out later. This was decided as larger plants will have a greater chance of surviving, and also those not too easy to obtain will be on hand when required. The development of this area in memory of the late Mr M. C. Gudex will naturally be a long term project but when completed should result in a park set in the beauty of the surrounding Scenic Reserve. Exotics as well as natives will be planted, and although at present the emphasis is on trees and shrubs it is later hoped to include such plants as bulbs which will grow in the conditions it is hoped to create.

WHANGAREI

A large number of members and friends attended the November meeting of the District Council to hear Mrs Reynolds speak on her recent brief visit to America, on her way to England. First stop, Honolulu, gave her her first impressions of a tropical region, with *Pandanus* (Screw Pine) at the airport. The New Zealand member of this important family is the well-known KieKie, *Freycinetia banksii*. The streets were lined with palms, mainly cocoanut palms, *Phoenix dactylifera*, and these were very handsome. In bloom she saw the Queensland Umbrella tree *Schefflera actinophylla*, a relative of our pate, one of the seven-finger trees, *S. digitata* being a handsome and common Northland plant. Colourful foliage was to be seen on every side, mainly *Acalypha wilkesiana* with coppery leaves, and the wonderful crotons, *Codiaeum variegatum*. Many street plants were of *Nerium oleander*, flowering abundantly, and the common pink and red *Hibiscus*—Mrs Reynolds did not see the large and beautiful *Hibiscus* flowers until she visited the tropical house at Kew, where these and *Bougainvillea* were magnificent. Other notable species were the Royal *Poinciana delonix* 'Regia' and dwarf *Poinciana* (*Caesalpinia Pucherrima*). Every where in Honolulu the sweet-scented frangipanni (*Plumeria acutifolia*) was at its best, the blooms being in white, pink, yellow and red. They were to be seen in private gardens, street plantings and in the parks. The handsome yellow *Allamanda cathartica*, a climber, was in bloom there and also in Miami. The Wood Rose, *Ipomea tuberosa*, is more distinguished for its brown wood rose, much used by florists when dry, than for its fresh yellow flower. *Petrea volubilis* and some of the bignonias were other creepers seen here. There are several tree members of the *Bignonia* family growing in the Foster Gardens — *Jacaranda* and the African "Tulip" *Spathodea campanulata*.

Mrs Reynolds said she was very impressed to see *Vanda* orchids (variety 'Miss Joachim') growing as a common border plant, considered, and rightly so, very choice by N.Z. orchid experts, and difficult to flower. Here in Hawaii they are grown in home gardens and also by the acre as a *Lei* flower and for export to the mainland, under conditions that suit them so well they are almost ever-blooming. At Bishop Museum their receipt from the receptionist was a *Vanda* buttonhole each. Some of the tropical gingeres are dramatic and spectacular, especially the torch ginger *Phaeomeria magnifica*, from Indonesia. These and

Anthurium, the Flamingo Flower, bucketsful of them, were the main flowers in the florists shops, and were so warm in texture, so rich in colour, pink and crimson, that they looked artificial. Foster Gardens in Honolulu were most impressive; sweeping lawns and huge trees, including Banyan, Chewing-gum tree (N.Z. relative is the Tawaapou) sausage and cannon-ball trees made a wonderful sight, with groups of palms and *Pandanus*, ferns and cycads, as well as coloured gingers, frangipanni and crotons. The orchid houses were extensive and very fine. Of particular interest was a new piece of landscaping incorporating a natural orchid garden. This was of great interest in its half-completed state. When finished it will be very fine indeed, as the planners have made full use of contours, rocks and vistas. A Bromeliad garden, raised, and again making good use of contours, separates the parkland area of big trees from the orchid garden. Here tropical house bromeliads grow in the open, *Cattelya* orchids climb on tree trunks, and when Mrs Reynolds saw it, vandas, odontoglossums and dendrobiums were all happily blooming in the open. This brief glimpse of Hawaii was complemented by an equally brief visit to Florida.

Here, in Miami, City of Royal Palms, *Roystonea regia*, the Reynolds visited Seaquarium, famous for its trained porpoises and the Fairchild tropical garden where everything was wonderful and the palms and cycads particularly impressive. Some of these were heavily in fruit, but notices prominent everywhere, informed visitors that a large fine (50 dollars) would be imposed on those who helped themselves, so Mrs Reynolds had to keep her hands behind her back! In the 'Everglades' were seen the tropical mangroves, the swamps and wildflowers, and some of the creatures of the region, including an alligator! The small regional museum—information bureaux of the different wildlife regions of America—they found particularly helpful. These tantalising glimpses of the country made the visitors long to explore further and, they agreed with the late Dr David Fairchild, who said "I do not know how anyone can be content until he has experienced the wonder of the tropics."

Sandwiched in between the time spent in Hawaii and Florida were the days in San Francisco, America's lovely "air-conditioned" City, where many lovely gardens were seen, including the famous Golden Gate Park and the Redwood Forest, and the days spent in Tucson, Arizona.

This was the highlight of the trip, said Mrs Reynolds, for their host and hostess were Mr Watson Smith and his wife, Dr Lucy Cranwell Smith, formerly botanist at the Auckland Museum, a close friend and one who taught Mrs Reynolds a great deal of her botanical knowledge. The fact that their guides in this intensely interesting region were both trained scientists made the maximum of every seeing moment spent there. The "Living Desert" as Walt Disney so aptly named his film of the area, was all around. This is a scrub desert, not a waste of sand as the name "desert" implies, and specially adapted plants and creatures abound there. The perspectives were immense and the colours—soft buffs, rose and gold, infinitely beautiful. The temperature, which ranged from 90 degrees F to 130 degrees F, was found to be quite bearable as it was not humid, and after 3 or 4 hours' sightseeing, the swimming pool in the garden provided welcome and gracious relaxation. Mrs Reynolds imagined she would never tire of watching humming birds in the garden, or roadrunners and red cardinals (a pair of each was nesting) or perhaps a jack-rabbit with its enormous ears, or cheeky squirrels. They were told black widow spiders, scorpions or rattlesnakes were easily found, but they preferred to view these, behind glass, in the regional museums.

A drive one day took them from Tucson 3000 feet to the summit of Mt. Lemmon, and found it particularly interesting as they ascended to watch the transition from scrub desert to cactus forest to maintain shrubland and herb field, to, finally, the forest of spruce, pine, oak and fir. Arizona showed another mood that day in a tropical downpour and the most spectacular electrical storm ever experienced, lasting in all about $\frac{3}{4}$ hour. Near Phoenix in Arizona are millions of

acres of irrigated land under cultivation where cotton, maize, sorghum (flaunting handsome red tassels) and sugar cane were grown.

The Reynolds came back with the feeling that the palms, frangipannis and other splendid tropical plants are the most rewarding for tropical areas; that the tamarisk (a handsome grey-foliaged one native to Arizona) mesquites, occitillos and cacti are for the desert regions of America, particularly the wonderful giant Saguaro, State Flower of Arizona, so immense that it can weigh as much as 50 tons, and very handsomely grotesque. We in Northland, while continuing to cultivate the great range of plants from all over the world, should make more of our own very beautiful natives.

Mrs Reynolds showed some wonderful coloured slides of the places she had visited, including the leaping porpoises in the Seaquarium, and ended with a series on our native flowers, so exquisite they could hold their own in any company. She was thanked by the President, Mr O. Blumhardt, for one of the most enjoyable evenings we have spent.

DISPLAY TABLE

Although the quantity of flowering shrubs is becoming less, some of the later blooming rhododendrons were to be seen on the table. Mr Blumhardt brought the unusual red hybrid 'Kaka,' also an old favourite, 'White Pearl,' a little later than 'Pink Pearl.' From Mrs Wright's garden came a beautiful pink named 'Alice' and 'Purple Splendour.' A really royal-sized flower of *Protea cynaroides*, the king protea, also the striking bird of paradise, a *Strelitzia regina*, were brought by Mr Cates, and the lovely native regina lily, which should be in every garden, with its dainty grey and white flowers on tall stems, and handsome wide leaves. The real 'Pride of London' was shown by Mrs McInness, hard to come by these days, smaller and more dainty than the saxifrage often called 'London Pride.' There was a good display of geraniums and pelargoniums, many of the latter being in wonderful colours and of large size. The exquisite *Vanda* orchid was, as usual, from the collection of Mr Waterhouse, and Mrs Reynolds stated that, although she had seen many hundreds of these while in the tropics, none could compare for size and beauty. The late-flowering *Magnolia sieboldii* was also on the table. The shrub is inclined to be wide and somewhat straggly, but careful pruning can keep it shapely. Some special hebes, a beautiful collection of Russell lupins from Mrs Dent, and a large, frilly white opium poppy *Papaver somniferum* completed an interesting display, described by Mrs Reynolds and Mr Blumhardt.

QUESTIONS

Question: How to plant a *Macadamia* nut to get it to sprout?

Answer: File a small slit on one side, and plant.

Question: What causes small round holes in peach tree leaves? The cure.

Answer: Caused by a fungus called "Shot-hole." Spray with Captan, which is also effective against brown rot.

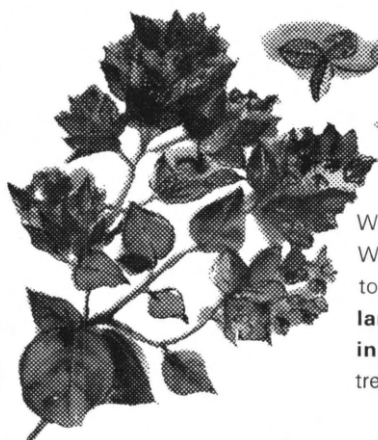
Question: Our clay soil lacks organic matter. We have been given a load of farmyard soil—what is the best way to use it?

Answer: It was suggested that spread over as a mulch would be most beneficial, with sawdust added in case it is too rich.

Question: Why should the tips of *Magnolia sieboldii* wither in spring?

Answer: This shrub needs plenty of humus deep down to keep roots from ever drying out, and a mulch also. There is a possibility of grass grubs on the roots also. If suspected, spray with Kalthane. This often applies to plants such as ivies or crotons in pots.

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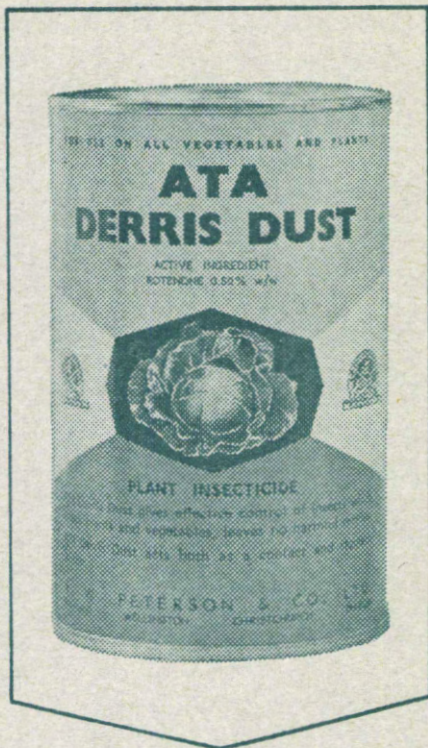
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