

THE WINSTON CHURCHILL MEMORIAL
TRUST OF AUSTRALIA

Report of

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2001 Churchill Fellow

Project

To identify and research,
in Japan, the UK, France and the USA,
primary harvesting and distillation methods and equipment
used by commercial lavender growers
which could be adapted for Australian farmers.

Contents

| | Page |
|--|-------------|
| Introduction | 3 |
| Acknowledgments | 3 |
| Executive summary | 4 |
| The tour programme | 5 |
| Japan | 5 |
| Hong Kong | 5 |
| Rome | 5 |
| Dublin | 5 |
| The United Kingdom | 5 |
| France | 6 |
| Canada | 7 |
| The United States of America | 7 |
| The Churchill Fellowship research tour | 8 |
| Japan | 8 |
| The United Kingdom | 9 |
| France | 11 |
| The United States of America | 13 |
| Conclusions | 14 |
| Recommendations | 14 |
| Dissemination and implementation | 15 |

Introduction

From 28 May to 19 August 2001 I travelled in Japan, the United Kingdom, France and the United States of America to research machinery used by commercial growers for the production of lavender oil and allied lavender products. I also had brief stopovers in Hong Kong, Rome, Ireland and Canada to assess the range of products that could be developed for the Australian lavender industry.

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The photograph of me on the cover of this report is by courtesy of *Portland Observer & Guardian* www.spec.com.au

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EXECUTIVE SUMMARY

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Project description

From 28 May to 19 August 2001 I toured large commercial lavender farms in Japan, the United Kingdom, France and the northwest coast of the United States of America to assess machinery used for harvesting and distillation as well as mechanisation designed for stripping, drying and processing lavender. I made minor stopovers in Hong Kong, Rome, Ireland and Canada to investigate value-added types of lavender products. I also visited Churchill sites, discussed machinery ideas with designers and manufacturers, met lavender contacts and promoted Australia's lavender industry to overseas growers and consultants.

Tour highlights

Japan **Farm Tomita:** horticultural and lavender machinery, marketing, tourism presentation
United Kingdom **Norfolk Lavender Farm:** mechanisation
Botanix: handling and distillation of essential oils
Red Deer Farm: mechanisation of herb production
Parker Machinery: custom production of machines
France **CLIER:** design and manufacture of lavender machinery
Catherine Coutollenc: lavender fields and operating machinery
United States **Olympic Peninsula and Sequim Dungeness Valley Lavender Farm:** lavender production and tourism

(See pages 5–7 for a complete list of places visited.)

Conclusions

The lavender industry is expanding rapidly to cater for the worldwide demand for lavender products. Initial Australian plantings are excellent but we must strive constantly for quality as well as quantity. We must also mechanise lavender production; educate the public to the many uses of lavender; target market opportunities realistically; and promote the industry and products more specifically utilising modern technology.

I will continue to speak about, lecture on, write of and demonstrate lavender production. I will disseminate the outcomes of my Fellowship via the media and through personal presentations to many different groups, organisations and institutions.

THE TOUR PROGRAMME

Japan

- Mr Tadao Tomita, Farm Tomita, Nakafurano, Hokkaido — large lavender distillation and production tourism enterprise
- The Lavender Club of Japan — prepared a conference paper for delivery by Mr Tomita at the Club's Annual General Meeting
- Prof. Y Tochinai, The Botanic Garden, Faculty of Agriculture, Hokkaido University, Sapporo, Hokkaido — botanical gardens and herb collection
- Japanese/Australian Friendship Association — guest speaker

Hong Kong

- Mr Teddy Ho, Golden Flower Design and Business Co Ltd, Taiwan — major dried and pressed flower importer and exporter
- City — large department stores for packaging and presentation aspects

Rome

- City — lavender usage and products in department stores and boutique shops

Dublin

- City and country — assessment of demand for lavender and level of lavender sales in a country revitalised by money from the European Union

United Kingdom

- The Cabinet War Rooms, London
- Chartwell, Kent — Churchill's home
- Blenheim Palace and Blaydon, Oxford
- Dr Ray Marriott, CEO, Botanix Ltd Co-op., Paddock Wood, Kent (formerly English Hop Products) — huge co-operative enterprise for mechanised production and distillation of essential oil crops
- Dr Simon Charlesworth, Downton Nursery, Kent — lavender collection and large nursery for propagating lavender plants for export
- Royal Botanic Gardens, Kew, London — National Herb Collection
- The College Garden, Westminster Abbey, London — infirmary herb garden for the Abbey for more than 900 years
- Culpepper House, London — famous herb retail shop
- Mr and Mrs R Herberts, Red Deer Farm, Earls Croome, Worcester — large producers and processor of culinary herbs
- Graham Parslow, Stratford-on-Avon, Warwickshire — specialist consultant for herb sales and marketing

- Henry and Jillian Head, Norfolk Lavender Farm, Heacham, Norfolk— lavender and herb collection; large-scale grower and distiller of lavender oils with mechanised production, plus inbound tourism and export enterprise
- Joan Head, Clipston-on-Wolds, Kenworth, Nottingham — national lavender collection; editor of *The Lavender Bag*, which has worldwide distribution
- William Alexander, Broadacre, Shoreham, Kent — broad acre lavender and oil crops, co-operative member/supplier to Botanix
- National Herb Centre, Warmington, Oxford — specialist growers and guardians of many herbs
- John Pudge, Hop Packet New House, Bishops Frome, Worcester — large commercial growers and processors of essential oil crops
- Anne Ballard, Shrawley, Worcestershire — specialist in dried flowers
- Bernard Parker, Crossways, Dorchester — designer and manufacturer of machinery
- Benedictine Monks, Buckfast Abbey, Buckfast, Exeter — lavender and herbs
- Wisley Royal Horticultural Society Gardens, Woking, Surrey — beautiful display gardens of flowers, trees and herbs
- Roman Baths and Abbey at Bath — utilisation of lavender in Roman Britain
- David and Elizabeth Christie, St Brelade, Jersey — lavender production and distillation in a tourism setting

France

- Catherine Coutollenc, Le Jardin des Lavandes, Sault, Provence — well-known author and speaker on, and grower of, lavender
- The Pays d’Apt and the Huberon (Vaucluse) — machinery in operation at Apt, Caseneuve, Viens, Ste Croix de Lauze, Carniol, Largarde d’Apt, St Christol, Gordes, Roussillon, Saignon
- The Pays de Sault and the Ventoux area (Vaucluse) — machinery in operation and markets at Bedoin, Monieux, Sault, St Trinit and Aurel
- The Pays de Forcalquier and the Lure Mountain (Alpes de Haut Provence) — machinery in operation at Banon, Simiane la Rotonde, St Etienne les Orgues, Mane, Lure
- The Pays de Digne (Alpes de Haut Provence) — working lavender machinery at Digne, Mezel, Thoard
- The Pays du Verdon and the Valensole Plateau (Alpes de Haute Provence) — lavender production at Valensole, Riez, Allemange en Provence, St Jurs, Moustiers St Marie, St André Les Alpes, Puimoisson
- Elise Serin, Nyons — author of *Routes La Lavende*
- Musée de la Lavande, Route de Cordes, Coustellet — lavender museum and display of stills from the 16th century
- Yves Clier, ETS CLIER, Route de Vaison, Malaucene — machinery designer and manufacturer

- La Garde Aدهemar — herb garden and medieval village dominating la Vallée du Rhône
- Le Claux du Puits — large gas distillery for farmers of the area
- Hautes Ferrasseries — huge drying and bunching enterprise
- Mons Reys, near Sault — specialist machinery designer
- Christine Soquel, Promenade de la Digue, Nyons — ‘*Blue Provence*’ distillery, shop and workshop
- Cistercian Monks, Notre Dame de Sénanque Abbey, Gordes — lavender fields, distillation and honey
- Conservatory Herb Garden, Salagon Abbey — ethnobotanic garden and plants’ relationship to humans within their vegetal environment
- Hubert Biancalana, Plascassier, Grasse — plants and perfumery
- Lagarde d’Apt, La Distillerie des Agnels à Apt — large distillation works operating since 1895

▪ **Canada**

- Tuscan Farm Garden, Langley, Vancouver, BC — 80 acres of echinea and lavender in the Fraser Valley; B&B, gift shop and medicinal preparations; a family-owned enterprise to celebrate the partnership of people with nature.

▪ **United States of America**

- North America Lavender Conference, 21-22 July 2001, Sequim, Washington — an ‘Event of the Senses’ lavender festival organised by the Sequim Lavender Growers’ Association
- Sweetwater Lavender Farm, Couperville/Oak Harbour, Washington — plants
- Sequim Valley Ranch — 35 acres mixed crops, wholesale nursery
- Purple Haze Lavender, Sequim — classes, crafts, culinary uses of lavender, cosmetics, floristry
- Cedarbrook Herb Farm, Sequim — herbs, lavender gifts, body care
- The Cutting Garden, Sequim — farmhouse gallery, flowers
- Jardin du Soleil Lavender, Sequim — lavender products
- Olympic Lavender Farm, Sequim — lavender garden and products
- Sequim Farmers’ Market — craft items and plants
- Lost Mountain Lavender Farm, Sequim — lavender and products
- JaCyn Lavender Farm, Sequim — lavender
- The Sawmill Ballroom Lavender Farm, Eugene, Oregon — lavender products and lavender plant varieties, animals

THE CHURCHILL FELLOWSHIP RESEARCH TOUR

During my Fellowship tour of four major countries — Japan, United Kingdom, France, and the United States of America — I noted and compared many aspects of lavender production. In minor countries' stopovers in Hong Kong, Italy, Ireland and Canada, I was interested to research lavender products, prices, packaging and usage.

My main quest, however, was to identify machinery that could be utilised or adapted by Australian growers. For many years I have engaged in discussion and worked on prototype designs with a number of persons and manufacturers, so I knew, prior to my Churchill Fellowship, that the search for appropriate machinery would be difficult. I endeavoured to visit large herb establishments as well as lavender farms and specialist machinery manufacturers. Some were unknown to me before departure but my goal was to follow any leads that might result in a successful outcome.

My main research baggage involved a folio of photographs depicting various stages of lavender production — planting, pruning, harvesting, distilling and drying — showing different types of lavender and various styles of growth. As far as possible I used a tape recorder to record interviews, but I also took copious field notes and many photographs of machinery from different angles.

For the purposes of this report I will detail the mechanisation which impressed me in the major countries visited. The machines discussed will, I believe, provide great assistance to lavender growers in Australia, whether their operation is commercial or a hobby interest.

Japan

Farm Tomita, the most famous lavender farm in Japan, was established in 1958 by Mr Tadao Tomita. It is situated in the district of Furano on the island of Hokkaido. The farm has a cultivated area of over 12 hectares. It grows four main types of lavender, many herbs and colourful seed flowers.

Farm Tomita is in itself a picturesque lavender village incorporating all aspects of lavender production — seeds, plants, flowers (fresh and dried), crafts goods, perfumery, distillery, gift shop, ice-creamery, accommodation, lavender museum and exhibition areas, restaurant, tearooms, rest rooms and picnic and peace areas.

The farm is open 24 hours every day of the year. Admission is free. During the main tourist season, from June to August, more than one million tourists visit. An average of 150 buses pull into the huge car park daily.

Mr Tomita's believes that 'using lavender makes a positive contribution to the health of all people'. He says, 'It is imperative that you must not forget, "the heart" must not be left behind.'

It is no surprise that in 1990 Mr Tomita was awarded a Lavender Knighthood in Provence to honour not only his work with lavender oil, but also his pledge ‘to spread understanding and knowledge of lavender’s charms all around the world’.

Many skilled workers are employed at the Farm Tomita — their demeanour depicting the joy of lavender work — so much of the production is undertaken by hand. Machinery, however, is used in the larger fields to till the soil. I was particularly interested in a Honda tillage machine incorporating a single, front-mounted drive sprocket wheel, and back tynes with a wishbone-shaped rest to hold the machine upright when it is not in use. The benefit of this tiller over the conventional rotary hoe is its light weight, its power and its manoeuvrability to till in and around lavender bushes. It can be tilted over in sideways positions to allow close access to weeds near the base of the plant. The machine is available in different tillage widths and horsepower.

This Honda machine is not available in Australia, but I believe it could provide the answer to the necessary constant weeding of lavender plants. It could also be used in most horticultural pursuits as well as general tillage areas.

Farm Tomita has various types of distillation equipment, most already depicted in lavender texts. I was interested to see the method of vat filling, always a laborious task. A loading floor is built to the back of the vats and slightly higher than the top of the vat rim. Lavender is then unloaded, via a drive-up ‘hill’ at the rear of the distillation shed, onto this floor, then raked into the top of the vat. When the distillation is finished, the vat is simply tipped to the front and the herbage is removed.

Lavender bunches are dried on large cupboard racks. When the cupboards are closed, warm air is infused and moist air is extracted.

Although Farm Tomita is not overly mechanised — because people feel honoured to work on the lavender farm — there are various Honda machines to assist. Motor bikes, large tillers, mowers, spreaders and row bedders were in evidence.

The United Kingdom

Norfolk Lavender Farm, built around Caley Mill at Heacham, covers more than 40 hectares and also leases land on the Queen’s Sandringham Estate. Henry and Jillian Head have continued to enhance the early 1930s foundation of excellent lavender varieties and are now the largest lavender oil distillers in the United Kingdom. The Norfolk Lavender Farm is an exceptionally well-presented lavender enterprise, open to the public daily and incorporating gift shop, conservatory, restaurant and tearooms, specialist workshops, a distillery and packaging areas. There is also a National Lavender Collection garden set around the historic Caley Mill on the River Itch.

The farm was a sea of mauve and harvesting machinery was being overhauled in preparation for the impending harvest. The Norfolk Lavender Harvester is

extremely efficient as a one-row, hedging-type harvester. It is a self-propelled diesel machine with a central pivot steering action. The driver sits to the side of the elevator which is designed with side wings, or lifters, to draw the lavender over a straight cutting head. Binder-type beaters then turn the lavender onto a conveyor belt which transfers the lavender to a carrier cage at the rear of the machine. This harvester is the Mark III version of the original design which replaced the many hand workers necessary to harvest.

Other interesting aspects of Norfolk Lavender Farm were the large merchandise packing shed, the drying and sieving areas, and the distillery — again on the principle of steam distillation via gas-fired boilers and large vats, to be expected on a farm of this size.

I was particularly interested in the sieving process. A large CLAAS header was driven onto the car park tarmac (after closing time) and the dried lavender was processed in a manner similar to wheat harvesting here, except that the machinery was stationary. Dried lavender was picked up into the machine by 'worms' which drew the material in and then, through sieving and air blowing, winnowed the seed and dispersed clean and waste product appropriately. This is a simple but effective system for the many tonnes of lavender produced by Norfolk for the dried, loose lavender market.

From Norfolk, I drove many miles around the United Kingdom searching out the other smaller specialist lavender and herb farms as well as institutions and gardens. The complete list can be found on pages 4 and 5 of this report.

Of particular interest is Bernard Parker at Crossways in Dorchester, who designs various machines for use on herb and vegetable farms in the UK and Europe. My visit to Parker Machinery resulted in my ordering a specially designed machine for lavender harvesting. I believe this harvester could revolutionise the Australian lavender industry. Unlike the one-, two- or three-row French harvesters, either self propelled or tractor mounted, this machine is able to be used in small or large areas, is on caterpillar tracks to avoid compression of fragile soils, is very manoeuvrable and is self propelled. The body size is 2 metres by 1.8 metres. The harvester has an adjustable cutting height from 250 to 600 millimetres to allow ease of harvesting various varieties of lavender. The body base clearance is 700 millimetres. There is a double knife-cutter bar with front lifters and beaters to take the cut material up an elevator on the right-hand side of the driver to a tipper bin at the rear.

Bernard was able to design to my specialised requirements. I will have a threefold ability to cut fresh flowers at appropriate stem lengths for fresh or dried bunches, harvest flower heads for oil and also prune all lavender bushes following harvest. This machine will take many of the production and labour costs out of the industry. The machine is also very portable, so it can be hired out and transported to other lavender fields. The design and workmanship of this machine was definitely a highlight of my trip.

Another place of interest was the Botanix Ltd Co-op. farm and distillery at Paddock Wood in Kent (formerly English Hop Products). I visited a number of

farms that are contracted to Botanix and noted the upsurge in lavender plantings. Botanix has a vast distillery/processing works as well as specially equipped laboratories to ensure quality control of the many tonnes of herbs that are processed annually.

One of the large farms in this co-operative is Hop Pocket New House at Bishops Frome, which is building its own distillery. Like the Paddock Wood works, this distillery uses large, sealed, truck vats which convey the product directly from the field harvest to the distillery. Steam hoses are connected directly to the sealed truck vat and the rising volatile oils are collected by pipes at the top of the vat and piped into the condenser units in the adjacent distillery. Here the hydrosols and oils are collected, separated and stored for sale. This process of steam distillation activated in the field bins certainly reduces handling time and labour costs but vast areas of lavender would be necessary to offset the sophisticated distillation costs.

On many farms and machinery places visited in the UK, I saw three-row lavender planters (similar to our tree-planting machines) but these require quite intensive labour as it is necessary to have at least two persons to continually place the lavender plant pots in the revolving planter.

Another machine of special interest for drying bunched lavender was a Hunter dehumidifier unit to heat air and extract moisture from a sealed darkroom, a quicker and more efficient drying system that allows almost total colour retention.

Dr Simon Charlesworth's Downderry Nursery at Aylsford, Kent, 'where lavender comes to life', is an excellent example of a successful propagation venture in a small area. This is the premier lavender nursery in the UK, where Simon propagates more than 200 lavender species and cultivars, sending plants all over the world. The hot houses, tunnels and growing-out areas are all thermostatically controlled to enhance maximum growing conditions despite the cold winter. The well-laid-out nursery inside the walled garden, incorporating a National Lavender and Rosemary Collection, is very attractive.

France

France is extending its lavender growing so there were fields at various stages of growth. I saw a variety of machines in use and a wide range of lavender products displayed for sale. The experience of travelling through and staying in Provence at the height of the lavender harvest was wonderful. The accommodation base at Sault, an historic small village set in the High Alps was ideal for visiting the major lavender farms contained in the hundreds of acres of lavender growing all through the area. It was easy to drive daily from Sault and be involved immediately in lavender operations. Madame Catherine Coutollenc at Le Jardin des Lavandes in Sault is considered an expert on lavenders of France and was also able to assist with machinery options.

To see all the machinery ‘working at the task’ was very beneficial to my research. Generally, large machines — single-, dual- and triple-row harvesters of the CLIER design — were evident, although some of the older tractor-trailing machines were in use. There was also some hand harvesting.

CLIER have been successfully designing and making harvesting machinery for many years and the factory manager was very helpful in his advice when I visited the factory at Malaucene. The typical CLIER machine is built on a Fiat tractor base and has the driver seated over the back wheels on a platform, giving high visibility and putting all the hydraulic controls within easy use. There are two pickers (or lifters), on a moveable, parallel underframe, which hold the stalks against the cutter. Stalks are gathered by two rubber-edged chains which withdraw when they pass over the cogwheel. The cut flowers are fed up the conveyor belt into a mobile hopper. It is also possible to use this machine as a binder for lavender bales and there were a number of farms which used a loose binding system. These loose bales were then packed into the still vat, in a similar way to the loose-cut lavender.

CLIER also had a simple harvester/conveyor machine which could be side mounted or back trailed, relying on the power take-off of the tractor.

It was not unusual, on the broad-acre fields, to see the harvester working amid a steady procession of filled field bins being trucked away to the distillery whilst empty bins were being returned to the harvester — a hive of machinery and action, rather like our wheat fields at harvest time.

Hand harvesting, for bunching lavender, involves many field hands scything lavender flowers, banding them and then placing the bunches on the bushes for collection by the trailer to take them to the drying racks in portable sheds. Drying frames are mobile and bunches are placed over central rods. Frames are filled and either left like ‘train carriages’ in the sun or pulled into huge, temporary, white-mesh tunnels before finally being towed into the packing sheds when sun dried, or finished off inside by an exhaust system process. Vibrator sieves of different mesh size are used to winnow and clean the loose lavender which is then hessian bagged and placed on conveyor belts for storage in lofts.

The distillation systems are large, modern constructions to service many growers and this improved technology has speeded up the process and enables many tonnes of lavender to be processed daily. The new design stills are built in a two-level manner with the fresh lavender being tipped into the vat mouth at the top, compressed by weight and then processed via the boiler, condensation and oil separation unit — the total extraction process — on the lower level. The resulting herbage is then hydraulically lifted out of the vat at the top level, placed into trucks and removed.

The best system for loading fresh lavender and extracting distilled waste herbage is by using circular mesh bottom ‘plates’ with low mesh rims, attached — by evenly spaced chains — to a gamble. At the end of the process an electric winch (or some hydraulic attachment) is then reattached to the gamble and the huge ‘cooked’ herbage waste is lifted out intact – certainly much easier than pitchfork

removal! These modern distilleries have large dams for water supply and cooling ponds for used water, which can be recycled when cooled. Special attention needs to be given to this process to avoid legionnaires disease, especially in a closed area.

The United States of America

As a lavender-grower of some years' experience, it was very interesting for me to visit the newly established lavender farms of the Olympic Peninsula and the Sequim Dungeness Valley on the northwest coast of Washington State, and around Eugene in Oregon. I experienced wonderful hospitality and saw magnificent scenery. I believe that, within the next decade, some interesting developments should occur in this area. Tourism is already showing up as an important factor. The Lavender Festival of Sequim, held in July of each year, attracts many thousands of visitors from the USA and Canada. Most of the farms I visited were attractive, cottage-type enterprises, with local lavender crafts and value-added products on display. I had hoped to see some innovative, small machinery that might be of assistance to Australian small-acreage growers, but no relevant machinery was evident.

There was much to compare between this lavender area and its rapidly growing industry, and the development of our Australian industry. Of particular note, was the presentation and promotion of lavender as a valued, health and lifestyle essential, as well as a beautiful multi-faceted herb. It was also important to note the regional government support of new and established growers through financial aid, and the adoption of lavender as the symbol of the area. The enthusiasm and vitality of the growers is boosting creative research and development of many value-added products.

CONCLUSIONS

I was well aware that lavender was increasing in popularity and market demand had risen accordingly. I was not aware, however, of the effect that farm subsidisation has had on overseas producers. It was incredible to see the huge growth in lavender hectares, particularly in France, and the monetary assistance to potential growers in the northwest states of the USA. Because of Australia's 'level playing field' policy, that is, no subsidies or tariff protection, I believe it will take at least a decade for Australian lavender farmers to produce enough lavender to get a real foothold in European countries.

Asia, however, is a different market in which Australia needs to make serious inroads through education about, and promotion of, the lavender herb.

I also believe that the domestic market here in Australia should be educated about the quality of the locally grown product. We need to publicise our quality while increasing our quantity

My continual search over recent years for machinery in Australia proved most beneficial as I was able to critically evaluate machinery I saw on my travels and relate it to the Australian lavender environment. I reaffirmed my belief that Australians should be designing and manufacturing a range of innovative and versatile machinery to suit our many horticultural needs.

Without a doubt, the essential lavender oils of Australia and the varied lavender products compare vary favourably with northern hemisphere products. We have appropriate lavender varieties, suitable growing areas and conditions, and relevant knowledge and skills. Unfortunately, labour availability is low and costs are high so profits are lean

The small Australian population, compared with the more developed countries, encourages many cottage-type ventures and I am sometimes concerned with the lack of 'quality control', especially on stalls and in markets. If the Australian lavender industry is truly to become a viable industry, quality systems and checks should be commonplace, and innovative, excellent products should be the goal.

RECOMMENDATIONS

Lavender producers need a realistic monetary return for effort. To achieve this outcome I recommend that we outlay some effort and expenditure to:

- educate the public about the many and varied uses of lavender
- target specific, realistic market opportunities
- promote the product more actively
- invest in more appropriate machinery to offset labour costs
- increase the size of lavender plantings.

The skilled use of machinery and technology will be, I believe, the catalyst for a sustainable lavender industry in Australia, with satisfactory markets both here and overseas

Dissemination and implementation

Since becoming the foundation Vice President and then the President of The Australian Lavender Growers' Association (TALGA), formed more than seven years ago, I have worked tirelessly to promote a sustainable lavender industry for Australia.

I will continue this work through speaking engagements, media releases, interviews, conference sessions and workshops. Since my return to Australia at the end of August, I have spoken at the 6th International Lavender Conference at Wagga Wagga, NSW, given radio interviews, written articles for newspapers and for the Australian lavender quarterly magazine, been guest speaker at Rotary Clubs, CWA, Red Cross, Probus, garden clubs and various other groups. I have many engagements booked ahead and will continue this promotion not only of lavender, but also of Churchill Fellowships.

From a personal perspective, I have already ordered machinery suited to Australian conditions and will be demonstrating this equipment as soon as it arrives. I trust this will assist other machinery designers and manufacturers to proceed with Australian-made products.

I have also commenced preparing further acreage to extend my lavender fields and I intend to pursue other avenues of marketing lavender.

I am very proud to have had this wonderful opportunity to travel as a Churchill Fellow and the visits to all the Churchill sites in the UK have strengthened my resolve to highlight not only the work of the Churchill Trust but also the great wealth of experiences that Fellows bring back to Australia. I will continue these proud traditions and I look forward to extending the range of opportunities for promoting Churchill and lavender.