

DAVID ROBINSON MEMORIAL LECTURE

Top Ten Plants that have influenced Humankind

Sue Minter, Director of Horticulture,
Eden Project



21st September 2005
Salesian College of Horticulture, Warrenstown


Horticulture
IRELAND BORD BIA

David Robinson



David Robinson was a passionate horticulturist who made an important contribution to its promotion in Ireland and internationally that ranged from research and development, to training and education. He wrote numerous scientific papers and also featured regularly on radio, TV, and print media.

Born in Belfast, he studied at Reading and Cornell Universities and completed his doctorate studies in Queen's University Belfast.

He started his working career as an advisor in Co. Down and was soon appointed deputy director of the Horticultural Research Centre, Loughgall, Co. Antrim. He was later appointed research director of horticulture in Kinsealy, Dublin. It was here that he pioneered his research work on weed control.

His lifelong study on weed control gained him international recognition and tremendous pride as he managed his 3-hectare garden alone using his weed control techniques. His garden in Earlscliffe, Howth was awarded the highest accolade in the Good Gardens Guide. Earlscliffe

was also designated one of Ireland's National Plant Heritage Gardens because of the large number of rare and tender plants from the southern hemisphere, that flourished there.

On his retirement, he remained as active in the world of horticulture and was in demand both home and abroad. He was an invited speaker in all five continents and visited more than 60 countries in his capacity as a consultant or working as a host on long haul-haul garden tours.

David championed the development of horticulture through his involvement as one-time president of the Horticultural Education Association of Great Britain and Ireland and by representing Ireland on the council of the International Society for Horticultural Science. David served as a board member of the interim horticultural development board in the early nineties.

He was no stranger to receiving awards from the coveted Gold Veitch Memorial Medal from the RHS to receiving the President's medal for outstanding service to horticulture from the Institute of Horticulture. He was appointed Guest Professor in Urban Horticulture at the Humboldt University, Berlin and held that position from 1992-1997.

A true gentleman and lifetime scholar of horticulture, David will be remembered for his down to earth nature and his pen & notebook in hand, always searching for new information. His garden in Earlscliffe is a living legacy of his lifelong passion and love of horticulture.



Sue Minter



Bord Bia are proud sponsors of the David Robinson Memorial Lecture. This prestigious annual event is designed to not only remember the contributions of the late David Robinson, but provides an opportunity for young horticultural students from colleges north and south to come together to learn more about the important contributions horticulture makes to our health, environment and economy.

Sue Minter is Director of Horticulture at the Eden Project in Cornwall. She was previously Curator at the Chelsea Physic Garden and before that Supervisor of the Palm House at the Royal Botanic Gardens, Kew, during its restoration.

She read History both at Cambridge and as a Fulbright Scholar at the University of California, Berkeley, before becoming professionally qualified in horticulture.

Sue has written on historical and horticultural subjects and her previous publications include: 'The Greatest Glasshouse: the Rainforests Recreated' on Kew's Palm House; 'The Healing Garden', 'The Apothecaries Garden: a History of Chelsea Physic Garden'. 'The Healing Garden' was re-issued by Transworld Books for the Eden Project in December 2004.

THE 2005 DAVID ROBINSON MEMORIAL LECTURE

Top ten plants that have influenced humankind

This is a very hard choice! I have particular interest in plants of economic value to people and especially plants in medicine. I have chosen three industrial crop plants, one ornamental which drives a major industry, one food plant, one beverage and three plants for health. But before getting down to details, please don't forget the general 'ecosystem services' that all plants provide us with – the moderation of our climates, oxygen and water supplies. We all care for the planet if we are working in the horticulture industry.



Tulips



Tea – Camellia sinensis



Cannabis sativa (hemp)



Cotton



Rubber



Rice



Quinine – Cinchona officinalis L.



Tobacco



Yam



Opium Poppy

Number one is the tulip



Bulb Mania festival at the Eden Project

I have tried to put these ten plants in ascending order of value – though that too is very difficult and inevitably a personal choice. My number one is the tulip – because humanity does not live by bread alone. Wasn't it Confucius who mused upon the value of the loaf and a flower – the one for stomach, the other for the soul?

At the Eden Project we launch spring with a huge festival called Bulb Mania, inspired in part, by the Dutch bulb industry (but with due attention to the major value of Cornwall's daffodils too). The emphasis is on the return of colour to the landscape, particularly inside the Warm Temperate Biome. The tulip seems to be a flower which has the power to drive men mad – as anyone who has read Anna Pavord's book 'The Tulip' will know. In the early Eighteenth century Sultan Ahmed III literally ran his court around his obsession with the flower, hosting huge evening soirees where flowers were mirrored amid beds of candles and exotic tortoises wandered among the guests with candles strapped to their shells. Eventually it bankrupted his court and he was tried and beheaded. Particularly valued were the very long petalled forms based on *Tulipa acuminata*. Eden created a colour 'Kaleidoscope' in spring 2005 based on these key species vital to the Ottoman court. In the Seventeenth century this insanity was centred in the Netherlands. Here, between 1634 and 1637, in the world's first 'futures' market, huge sums were bid and later lost or won on the chance 'breaking' of flower colour – even though no one knew at the time that the cause of this was actually a viral disease. It became cheaper to own a Dutch master

flower painting of a tulip than the bulb itself – and so a huge artform was born. So valuable were the bulbs that they were displayed as individual specimens in beds – as now in the restoration of the palace of Het Loo near Apeldoorn – or in tall delft bud vases. The collapse of ‘tulipomania’ in 1637 eventually led to the establishment of a more rational industry based on cutflowers and massed plantings which provides useful tourist income both for the field production and at the national tulip showcase garden, the Keukenhof.

Tea is number two



The average Irish person drinks six cups of tea daily, weighing in at 3.2 kg of tea each year



The value of the horticulture industry in the UK is 3.8 billion pounds. At Eden we stretch this by showing how valuable is horticulture to the tourist industry – and also the value of agricultural crops. Crop plants are a way into people’s awareness of plants. So we start with daily life – a breakfast scene called ‘Plant Takeaway’ when all the plant-based products are taken away until the puppets Alan and Enid are left naked and hungry with their pet cat dead from lack of milk and oxygen. The renamed ‘Dead Cat’ exhibit moves everyone. Of course we didn’t want to depress people and the children’s guidebook is based on the ‘dead cat’ being resurrected and leading Alan and Enid around the project, retrieving all the plant-based products to make their lives possible again. One of the key plants at breakfast (unless you are a coffee fan) is tea.

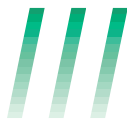
Tea is number two in my list. Tea was originally a mystery owned by the Chinese with prized medicinal benefits. It was

'sprung' from China by Robert Fortune working for the East India Company and successfully introduced in the 1850s to the Himalayas with the expertise of Chinese "manufacturers" taken along too. Fortune achieved this by sowing fresh seed in compost in the base of Wardian cases and allowing it to germinate en route. Today, tea is still picked by hand (top two leaves and a bud equals the famous "tips") and then served fresh as green tea (with many antioxidant benefits) or fermented. Tea is also grown in Australia where it is picked by a hedge trimming machine. Fortune never succeeded in establishing a tea industry in America - he tried but was interrupted by the massive holocaust of the Civil War. Today there is a budding tea industry in Cornwall at the Tregothnan Estate near Falmouth and a plantation at Eden based on the Chinese stock plants.

Number three is *Cannabis sativa* (hemp)



Courtesy of: USDA-NRCS PLANTS Database/Britton, N.L., and A. Brown. 1913. *Illustrated flora of the northern states and Canada*. Vol. 1: 634.



Number three would be *Cannabis sativa* (hemp), once a crop fundamental to the Elizabethan economy in England because it clothed people and supplied the navy with sailcloth and rope, so essential that you could be fined for not growing it. Then demonised in the Twentieth century as a Class II narcotic, it has recently begun to be rehabilitated as a source of cannabinoid drugs currently in Phase II trials for a range of conditions ranging from multiple sclerosis, to nausea in cancer chemotherapy. Our exhibit as Eden conforms to the conditions imposed by the Home Office for hemp grown as a fibre crop - it is a low THC (tetrahydrocannabinol) form and is grown behind a fence (a hemp fence obviously!) and most of it goes as

horse bedding to Hemcore, although last year we asked Serena de La Hay to incorporate some stems into her famous willow sculptures. Hemp is also a component of our 'Crops for Tomorrow's Industry' exhibit, because it is very important in biocomposite insulation – and of course in surf boards which are a common sight in Cornwall. Hemp seed oil has a great, nutty flavour and is also used in The Body Shop's range of hemp cosmetics. This was launched by Anita Roddick during my time as Curator at the Chelsea Physic Garden and I remember pleading with the Home Office to be able to show a plant, only to be told it could not be grown for educational purposes. A touchy subject at the time (Jack Straw's son had recently been arrested for possession), hemp can now be seen in the Duchess of Northumberland's garden at Alnwick and in the future may appear at Osborne House on the Isle of Wight in commemoration of Queen Victoria's use of the plant to relieve menstrual cramp. The long and extraordinary history of hemp is enshrined in the English language, although I doubt that anyone asking directions to Hemel Hempstead really makes the connection!

Number four is cotton



Number four is cotton from species or cultivars of *Gossypium*. This crop drove the need for the development of slavery in the southern states of America with all its attendant suffering and legacy in current race relations. It also has a sinister history regarding pesticides which ranges from the hilarious to the tragic. Hilariously it is linked to the design of the Cornish pasty – the crust of which was designed to be



Cotton – an important fabric for the textile industry

discarded by miners whose hands were covered by arsenic being extracted as a pesticide to destroy the cotton boll weevil. The tragic side is that one third of the world's pesticides are used in the cotton industry, that Indian farmers in debt for pesticide purchase will commit suicide if their crop fails – by drinking pesticide. The genetic engineering of cotton to need less pesticide is one of the hottest topics for discussion by the Indian government. The Bhopal disaster involved a Union Carbide factory manufacturing pesticides for cotton. There were, of course, other crops associated with slavery including indigo production and sugar. Sugar cultivation has led to deforested landscapes in areas as far apart as Queensland, Mauritius and the Caribbean. This past summer's EU subsidy reforms have left parts of the Caribbean (e.g. St Kitts) with a dilemma as to whether to bother harvesting it. With current concerns over obesity will this be a crop whose time has come and gone?

My fifth plant is rubber



Tapping the latex of a rubber tree

V My fifth plant is rubber, *Hevea brasiliensis*, a plant which made and then ruined Brazil but which, because of its use in the tyre industry, has contributed to the culture of the car with all its attendant problems of pollution, global warming and urban congestion – not to mention tyre disposal. One of the favourite exhibits in the early days of Eden was 'Rubberworld' a darkened shed full of rubber objects. Rubber has its salacious side (exploited by one of our Eden performers posed as 'Miss Whiplash') but of course it's also been essential in medical appliances and is vital in the provision of condoms in the fight against

HIV/AIDS. Nowadays a form of blood serum albumen can be manufactured from rubber latex.

Number six is rice



Rice is the main food for half the people of the world

VI

Number six is a vital food plant. I could have chosen wheat but instead chose rice because it is so essential to the economies and cuisines of Asia – the world’s fastest growing populations – and because it feeds half the world. It’s also a vital component of Britain’s no.1 dish, Chicken tikka masala! At Eden we show the amazing terraces that have transformed landscapes for wet rice cultivation in south east Asia along with a Japanese shimenawa – a kind of giant corn dolly to celebrate rice harvest. Rice is so important to humankind that the International Rice Research Institute in the Philippines curates more than 90,000 varieties, including IR8, the ‘Green Revolution’ rice which fed India, and Nerica, the so-called ‘New rice for Africa’! It will be interesting to see whether the rice genetically transformed with a daffodil gene for Vitamin A enhancement (‘Golden Rice’) is accepted by farmers in the fight against blindness. The research has been done by a humanitarian programme and is being donated.

Number seven is quinine

VII

And so onto health for Number seven. Very important medicines from plants include the antimalarial quinine from the bark of South American *Cinchona* species. Interestingly, the knowledge of this plant was spread



Quinine, once used by the pharmaceutical industry to combat the spread of malaria. *Cinchona officinalis* L.
© 1995–2005 Missouri Botanical Garden
www.illustratedgarden.org

by Jesuit missionaries and it was anti-Catholic prejudice which was responsible for Oliver Cromwell's refusal to take it when struck down by malarial ague in his fenland home, leading to his death! Quinine was moved around the British Empire by Wardian Cases and was added to tonic in the classic gin and tonic sundowner. It literally enabled the British to colonise – with all the implications that had. There were enormous squabbles over supply during the Second World War when the Japanese cut off shipments from Java. Today, quinine has been superseded by synthetic antimalarials such as Malarone, but is still a source of drugs for cramp and quinidine for the heart. Malaria is one of the world's top killers; one child dies of it every 25 seconds in Sub-Saharan Africa. The newest antimalarial crop is from *Artemisia annua*, sweet wormwood, grown in several East African countries to use in multi-drug therapy.

Number eight is tobacco



Tobacco drying in Eden's Warm temperate Biome

At number eight I have nominated tobacco. *Nicotiana tabacum* the 'evil weed' was lambasted by James I but not again until proved a carcinogen in the late twentieth century. It is a huge cost to individuals and to the NHS. Ironically, it was once thought a health product and is still an important element in the culture of North American Indian tribes. Tobacco is now in decline as a crop and new uses are being sought for it. Paradoxically it is very useful in that it is easily genetically modified and is being researched as a 'pharm' plant for the multiplication of therapeutic proteins in contained environments.

Number nine is the yam



Yam tubers were the original source of contraceptive steroids

Number ten is the opium poppy

IX

I have been very divided in the choice for number nine. On the one hand cocaine, from *Erythroxylon coca* or *novogranatense*, is a useful stimulant for alertness and resistance to altitude-sickness long used by the Inca in Peru and modern day Aymara peoples. It gave its name to one of the world's most famous drinks, Coca Cola, although it has not been contained in it since 1904. As a refined substance, however, it has caused untold addiction and crime with enormous influence worldwide. On the other is another plant of the Americas, *Dioscorea mexicana*, the yam, which was the original source of the contraceptive pill and has had a massive effect on women's ability to control their fertility. On balance, I think the yam is more important – on the grounds that development agencies agree that it is the status of women which is the key to development and women cannot become educated if they are burdened by fertility. Perhaps this is a controversial thing to say in Ireland and, of course, the contraceptive pill is now mainly synthesised. Nevertheless, the yam transformed the lives of women from the sixties onwards.

X

Finally my number ten plant would be the opium poppy, *Papaver somniferum*. The source of untold human misery through heroin addiction, it is also the source of cropped, pharmaceutical morphine, which no cancer ward would wish to be without since it rids the body of extreme pain like no other substance on earth. It is shamefully linked with Anglo-Sino relations – Britain



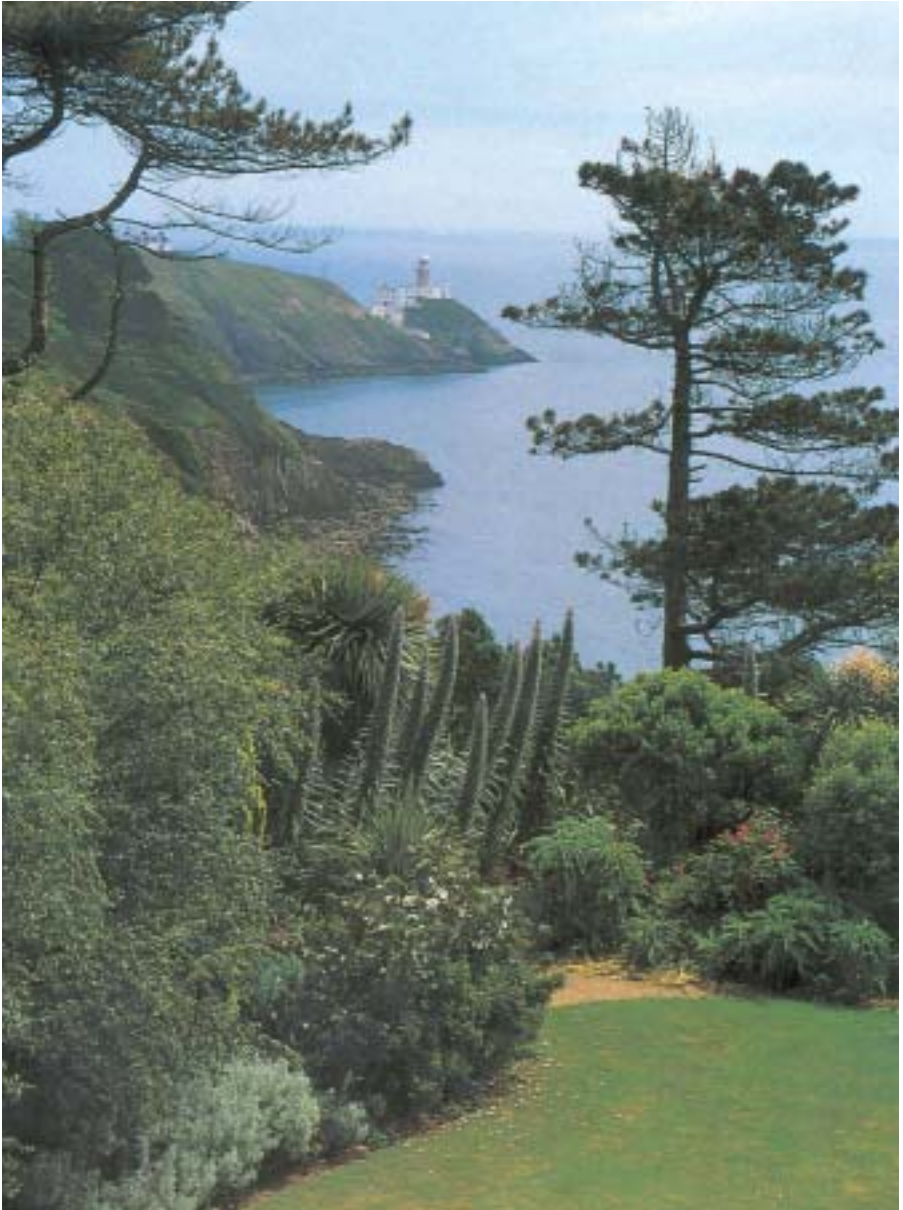
*The most Janus-faced plant –
the opium poppy*

encouraged the import of opium into China and fuelled addiction in order to obtain trade benefits for the East India Company in the mid-nineteenth century. Now cropped by Glaxo Smith Kline in Tasmania, it is mercifully present in a more benign guise.

Nearly all the plants one to ten have important human knowledge about their cultivation and use attached to them – people and plants indeed. This is crucial to Eden’s mission and was also behind a leaflet I wrote with Education Officer Dawn Sanders at the Chelsea Physic Garden entitled ‘Rare Plants, Endangered peoples, Lost knowledge’. It is crucial that we retain knowledge about useful plants.

There is a massive problem, worldwide, with over collection of medicinal plants from the wild. But many pharmaceuticals, including morphine, are field cropped in a sustainable way. Morphine is now being extracted for British use by McFarlane Smith in Edinburgh, based partly on crops from Oxfordshire, with Hampshire and Wiltshire supplied by a farmer-owned company called United Farmaceuticals. Eden is planning an exhibit for 2006 based on this ‘new industrial crop’ which is extracted from the dry poppy straw. In Tasmania, a new form is sown which can be extracted for pharmaceutical use but not be processed for heroin or abuse.

I am also aware that most of the plants I have mentioned have been Janus-faced in that they have potential for benefit or harm to humankind. The Eden Project is based on the firm belief that there is an optimistic future for humankind if we properly curate useful plants for our benefit.



David Robinson's garden, Earlscliffe, Howth, Co. Dublin www.homepage.eircom.net/~earlscliffe



Horticulture
IRELAND BORD BIA

Clanwilliam Court • Lower Mount Street
Dublin 2 • Ireland
Telephone 353 1 668 5155 • Facsimile 353 1 668 7521
E-mail: info@bordbia.ie
Website: www.bordbia.ie