The Grounds and Gardens of the University of Exeter 1969

The University of Exeter has one of the most beautiful settings of any university in England. Its estate, of some 300 acres, sweeping across hills which face south and west, contains a great range of plants and trees. Some of the property was laid out and planted by the firm of Veitch in the second half of the nineteenth century; and the arboretum includes trees from all the temperate regions of the world.

The need for an illustrated guide to the flora of the estate, long evident, has now been satisfied by this account, the work of Professor John Caldwell and others. It includes detailed descriptions of plants and trees, with supporting notes on the history of the acquisition of the parts of the estate and the University buildings, and on climate and soil. The whole is illustrated by eight colour plates and 65 black and white photographs, with eight plans.

In publishing this book on the estate, the University hopes to increase the enjoyment and satisfy the curiosity of all those who frequent and visit it.

Foreword

The purpose of this book is to give some account of the more interesting features of the University Estate, and especially of the trees and plants growing in the grounds.

The text has been prepared by Professor John Caldwell and Dr. M. C. F. Proctor, with the assistance of Mr. A.G. Crouch. Dr. Proctor was responsible for the coloured and black-and-white photographs, other than the frontispiece and Fig. 4. Mr. Crouch marked the sitings of the trees and shrubs on the sectional plans of the Estate, and produced the pen-and-ink sketch of Duryard Lodge which appears in Chapter 3. Mr. R. Fry prepared the general map of the Estate.

Professor G.K.T. Conn, acting on behalf of the Publications Committee of the Senate, gave valuable help in the preparation of the typescript for publication.

Special thanks are due to William Holford & Partners for their kindness in preparing the scale plans of the Estate and to Mr. D. Morgan of James Townsend & Sons Ltd, for the advice and help he has given in regard to the production of the original book.

The nomenclature follows the fourth edition of Dallimore & Jackson's *Handbook of the Coniferae and Ginkgoaceae* (revised by S.G. Harrison) for the conifers, and the second edition of the Royal Horticultural Society's *Dictionary of Gardening* for other plants.

A note from the Superintendent of Grounds - June 2000

During the subsequent 30 years, the university has continued its rapid expansion of both new buildings and landscaping.

Thousands of additional trees, rhododendrons, azaleas and other shrubs, with hundreds of camellias, magnolias and herbaceous plants have been planted.

This has significantly expanded the size and scope of the plant collections and added scent and colour both in the early summer and autumn.

The NCPG National Collection of Azara is sited at the university, as is a wild origin conifer collection, which is being developed with Edinburgh Botanical Garden.

The development of the plant collection and landscaping is designed to provide a botanically interesting and beautiful landscaped setting for the university, which will continue in to the 21st century.

Stephen Scarr.

From an original printed in 1969 by James Townsend and Sons Ltd

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Chapter 1 - The University

The popular enthusiasm for art and science stimulated throughout Britain by the Great Exhibition of 1851 led in Exeter to a series of developments which culminated in the establishment of the University in 1955.

The first result of this enthusiasm locally was the establishment of a School of Art in 1855 which was so successful that plans were soon being discussed for 'an institution of wider educational scope'. Indeed in 1865 the Albert Memorial in Queen Street took the form of a School of Art, a museum, a library and a reading and other rooms. For some years thereafter the Science and Art department at South Kensington and the University Cambridge both sponsored evening classes in the City. In 1893, Miss Jesse Montgomery proposed the reorganisation of this evening work and a scheme for increasing the scope of the studies by the inclusion of day classes and of a pupils teachers' course. After various developments including four extensions to the buildings at a total cost of £20,000 this resulted finally in the establishment of the Royal Albert Memorial College. During the next 30 years the curriculum broadened and the number of students continued to increase. In 1922 the College was incorporated under the Companies Act as the University College of the South-West of England. It was at that time still housed in Gandy Street in the building which had been given to the college by the City Council in 1906.

In 1922 Alderman W.H. Reed, a former mayor of the city, presented to the College the house and gardens Streatham Hall. At the same time, the first principal of the University College, later Sir Hector Hetherington, with great foresight persuaded the Council of the College to buy a major portion of the Streatham Estate. As a consequence when the University of Exeter received its Charter in 1955, it had one of the finest university sites in the country. Since first acquiring the Estate, the University College and subsequently the University have added to the area. The area of the central site now exceeds 300 acres.

Homefield, now Hope Hall, was the first house to be bought near the Streatham Estate and this was followed by the purchase of Highlands which was enlarged to become Lopes Hall named after the then Deputy President, Sir Henry Lopes, later Lord Roborough. Streatham Hall was renamed Reed Hall and had been opened as a Hall of Residence in 1925, followed shortly after by Lopes Hall. The first building put up on the Streatham Estate by the University College was the Washington Singer building. The foundation stone was laid by the Prince of Wales, then President of the University College of the South West of England, and the building was opened in 1931. In the late Twenties the College gave to the City the land on which the Prince of Wales Road was constructed by public funds in an effort to relieve unemployment in Exeter.

Reed, Hope and Lopes Halls were not, however, the first Halls of Residence used by the College. The College earlier owned Grendon Hall and Bradninch Hall as well as Kilmorie Hall, renamed Exeter Hall in 1940. The first two were

sold when Halls near the new estate were opened and as it became clear that the future development of the College should be centred on the estate. The first of the new halls so built, Mardon Hall, largely paid for by the late E. J. Martin, was opened in 1933.

The second academic building proper on the Estate was the Roborough Library so named in recognition of the interest taken in the development of the College by the first Lord Roborough, one of its early benefactors. This was completed at the beginning of the 1939 - 45 war and was opened by the late Earl Baldwin.

Just before the outbreak of the Second World War the College had bought Great Duryard House with its very attractive gardens which were to have formed the basis of a botanic garden. The outbreak of war, however, held up the development after the first stage had been started. The sighting of the Department of Botany on the Streatham Estate at a later date made it desirable to develop a botanic garden near the laboratories. Great Duryard House itself became a Hall of Residence and was renamed Thomas Hall in recognition of the generosity of the late C. V. Thomas of Camborne.

After the war various other properties were acquired, notably Barton Place, the Barton of Jane Austen's novel 'Sense and Sensibility', Crossmead, Thornlea, Spreytonway, Montefiore House, Lazenby House, St. German's House, Birks Grange (the site of the three Birks Halls) and Duryard House. In recent years and through the good offices of the University Grants Committee, the university has also acquired Higher Hoopern Farm, Lafrowda, Duryard Lea, Cumbre and various other smaller properties.

In due course building recommenced on the Streatham Estate and the Hatherleigh Biological laboratories were opened in 1952 to accommodate the Department of Botany and Zoology and, for a short time, the newly formed Department of Geology. Following the granting of the charter in 1955 a whole range of new buildings were brought into commission, namely the Queen's Building (1958). Devonshire House for the Guild of Students and the Refectory (1960), Northcote House (1960) and the Chapel, the gift of Dr E Vincent Harris (1958). These were followed by the Great Hall (1964), the Department of Chemistry (1965), the Newman Building (1965) and the Department of Physics (1967). There were also new buildings for Mathematics and Geology (1967), for Engineering Science and Chemical Engineering (1968). Streatham Court, which at present houses the Faculty of Social Studies, was built in 1967, while the Sports Hall was opened in the same year. These developments permitted the transfer of most of the activities of the University to the Streatham Estate which had been the purpose of the original purchase. The only Departments not now (August, 1969) on the Estate, are the Departments of Psychology, Law and Extra-mural Studies which, with the Institute of Education, are still in the Gandy Street building, and the Department of Education which occupies Thornlea. The number of students grew rapidly during this period, the number in 1955 been 900 and in 1968 exceeding 3000.

The Northcott Theatre (1967) was paid for by the trustees of a fund set up by the late G.V.Northcott, with the help of an additional grant from the Gulbenkian Foundation. Mr Northcott was anxious to provide an Arts Centre for use by the City and the County. The university hoped that the author of the site for such a centre on the estate could do much to bring about a close link between its members and the inhabitants of Exeter and neighbourhood.

While these developments were taking place on the central Estate, the four Duryard Halls of Residence - Hetherington, Moberly, Murray and Jesse Montgomery - were being built. These were followed by those at Birks Grange - Haldon, Raddon and Brendon - together with additional accommodation at Crossmead and the Ransom Pickard Buildings at Lopes Hall. These buildings brought the total number of places in Halls of Residence up to some 1750. Developments are planned in the vicinity of Lopes and Hope Halls and when these are completed it is hoped that there ultimately will be accommodation for an additional 1500 students in this area. It has always been the policy of the University to provide residential accommodation for us high a proportion of students as possible.

Chapter 2 - Climate and Soil

The combination of a fertile soil, a temperate climate and the varying contours of the ground makes it possible to grow a very wide range of plants and trees in the gardens on the University Estate.

The dominant influence on the climate is the prevailing air stream which comes across the Atlantic. In the Exeter District these westerlies are tempered by the high ground to the west and gales occur on not more than a dozen days in the year. Dartmoor also creates a rain shadow around the Exe estuary and the mean annual rainfall is only a little over 30 inches the year. The driest month is normally June with an average of less than two inches of rain. Autumn and winter are relatively wet while the early months of spring are usually fairly dry. The number of days on which more than 0.4 inch of rain is registered is surprisingly low, but some measurable rain, that is 0.01 inch or more, falls on about 180 days in the year. Snow falls, on the average, on less than 10 days a year and only on half of these occasions is it cold enough for the snow to lie.

Many plants, even from sub-tropical regions, will tolerate short periods of frost. The first screen frost in Exeter does not usually occur until early November and growth may begin well before April. The average of the lowest temperatures recorded an Exeter airport over the past 27 years is minus 7.7 degrees centigrade. The air temperature falls below freezing point on only about 25 days in the year and fails to rise above 0 degrees centigrade on only one or two days.

The mean average monthly temperature reaches its maximum of just over 16 degrees centigrade in June falling to 5.5 degrees centigrade in February, usually the coldest month of the year. This in itself is unusual since January is generally accepted as the coldest month of the year in Great Britain. Many

plants cease to grow when the temperature falls below 4.5 degrees centigrade so clearly plant growth can take place most of the year, though occasional sharp frosts in the early autumn or late spring can be very damaging to young growth. Warm sunny walls where they occur in the gardens provide protected sites and most plants which tolerate a moderate frost can grow and thrive.

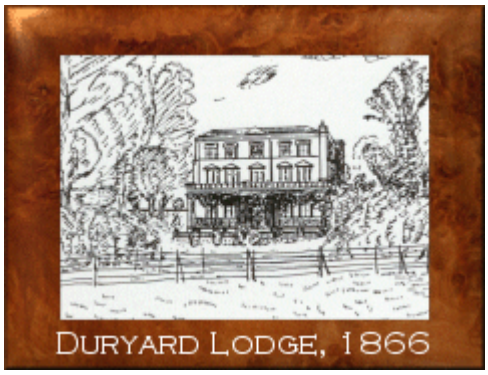
Sunshine, of course, has a marked though less direct effect on plant growth. The daily average ranges from just under two hours in December to over seven in June. In all, Exeter enjoys about 1,600 hours of sunshine per year. Air pollution reaches only low levels in this area, and consequently conifers and other evergreens are not damaged and grow remarkably well. The main climatic hazard is the dessicating east wind which occasionally blows for several weeks in the late winter and early spring.

The university property forms very roughly a semi-circle convex to the south and west. The highest part - the playing fields at the top of the central estate - is about 350 ft above sea level and lowest - the grounds of Thomas Hall - about 60 feet. In general, therefore, the slope of the ground affords a measure of protection from frost.

The soil varies in depth, being rather a thin cover on the slopes above Reed Hall but much deeper in the lower areas. The underlying rocks are Culm Measures of Carboniferous age, locally called "shillet". In the eastern part of the Estate the soils may be considerably influenced by downwash from neighbouring New Red rocks. In either case the soil is a rather heavy clay loam which is not infertile but in which it is sometimes difficult to establish young plants. It is markedly deficient in potassium and to some extent in phosphate and organic matter. The pH value lies generally on the acid side of neutral.

Chapter 3 - The Central Estate - Reed Hall

In 1866 a house on what was the original Duryard Estate, Duryard Lodge, had been sold by the trustees of Samuel Kingdon, a wealthy Exonian, to Richard Thornton West, an East Indian merchant who had lived for many years in Batavia. Thornton West had inherited over a million pounds from his uncle Richard Thornton who, it is believed, had made a fortune by blockade running in the Napoleonic wars.



Richard Thornton West, whose name is today associated with West Avenue and Thornton Hill in the City, had Streatham Hall built on the site of the original Duryard Lodge which was largely pulled down to be replaced by the Victorian Italianate house now known as Reed Hall. It is believed, incidentally, that £80,000 was spent on the house itself and £70,000 on laying out and improving the estate.

Thornton West had the grounds laid out and planted by the local branch of the firm of Veitch which had become one of the leading horticulturists in the country. A John Veitch who was born in Jedburgh about 1770 came to Devon to lay the grounds at Killerton for Sir Thomas Acland. Sir Thomas ultimately made him agent of estates and encouraged him to establish his own nursery garden at Budlake. John Veitch's son James developed a nursery at Mount Radford in Exeter while another member of the family founded the Royal Nurseries, Chelsea. The Veitches sent out collectors to many parts of the world among them Fortescue, Wilson and the Lobb brothers. Peter Veitch, a grandson of James, also visited Australasia on collecting missions.

Unfortunately, no record remains of the transactions between Richard Thornton West and the firm of Veitch but clearly the estate owes much to their skill and knowledge. The arboretum contains specimens of trees from all the temperate regions of the world. Indeed, at the time of planting, many of the specimens may well have been unique in Europe. Many of the larger specimens are certainly of the original planting but, clearly, further plantings took place from time to time.

Behind the house is a series of terraces carefully planted with trees and shrubs and traversed by balustraded stone steps. In front of these are lawns some of which have replaced a group of conservatories. Fig. 4 shows the lawns to the south and east of Streatham Hall as they appeared in 1899.

After the comparatively early death in 1901 of Richard Bowerman West, the son of Richard Thornton West, the estate had been neglected almost to the point of being derelict when it was taken over by the College in 1922. Nevertheless, the acquisition of the estate brought to the University a very fine collection of mature trees and shrubs.

The terraces below Reed Hall

Immediately opposite the south front of the house there are half-a-dozen very fine specimens of the hiba, *Thujopsis dolabrata*, a Japanese tree introduced into this country in 1853. Clearly these specimens must be older than most of the other plants of this species in this country. It is one of the arbor-vitae group and grows to a height of over 80 ft in its native land where it is a valuable timber tree. The best specimen here is just over half this height. The species is a beautiful evergreen which is hardly only in the milder, western parts of the country. It has a broad pyramidal habit with ascending branches and flat branchlets spreading horizontally. The leaves are opposite, acute, lustrous dark green with a silvery underside Fig. 6.

Associated with these trees are some remarkable specimens of variegated weeping hollies, or *Ilex aquifolium* 'Argenteo-marginata pendula'. At the time when these gardens were being planted, the holly seems to have been particularly popular and a very wide range of different varieties of this plant is to be found in the grounds. These specimens have the characteristic red berries though there are others with yellow berries.

On the terrace below the hibas and hollies there is a well grown specimen of *Chamaecyparis lawsoniana* 'Wissellii'. This variety has reddish staminate cones and, in the spring, looks almost as if it were in flower. It is one of the many cultivars of this species. The Lawson's cypress is a native of the mountains of south-west Oregon and north-west California where it is a valuable timber tree growing to height of 200 ft. As it was introduced into this country in 1854, the two specimens at the bottom of the flight of stone steps before the West front of the house - the Diana steps - must also be among the oldest in the country. It is a widely planted decorative tree and has given rise to it great range of garden forms of which there are some half-dozen in the grounds, including 'Erecta', 'Filiformis', 'Fletcheri' as well as 'Wissellii'.

The cypresses and junipers, members of the family Cupressaceae, are very variable being trees or shrubs belonging to sixteen genera and over a hundred species widely distributed throughout the world but mostly in the northern hemisphere. They are all evergreen and the foliage has a needle shaped juvenile form and a scale like adult form, adpressed to the stem (Figs. 8 and 14). In some species, commonly known as Retinospora, the foliage retains the juvenile form and the leaves are awl-like and in whorls of three or four, not decussate. The pollen grains are not winged. The ovulate cones may be hard and woody and are shaped like small maces in the genera *Cupressus* (Fig. 7) and *Chamaecyparis* (Fig. 9), or upright like small Christmas candles in Thuja (Fig. 10). In the genus *Juniperus*, however, the scales are more or less fleshy and the cone is berry like.

On the lowest terrace, above the balustrade, there are two members of the family Eucryphiaceae namely *Eucryphia glutinosa* and *E. X nymansensis*. The latter is a hybrid between *E. glutinosa* and *E. cordifolia* and was found in the gardens of Nymans in Sussex about the time of the first World War; it is evergreen like the *cordifolia* parent. *E. glutinosa* is a deciduous shrub from Chile and is probably the hardiest of the species; it was formerly called *E. pinnatifolia*. It is a very beautiful shrub flowering in July when many shrubs are past their best. These specimens never fail to give a magnificent display with their large white flowers, each with a cluster of conspicuous stamens.

Next to the eucryphias is a Himalayan cypress, *Cupressus torulosa* (Fig. 7), a timber tree from the western Himalaya where it grows to a height of 150 feet. This tree, introduced into this country in 1824, has a graceful habit and grows well in the milder regions of the West Country. Adjacent to it on the terrace is a mountain hemlock, *Tsuga mertensiana*, a member of the Pinaceae. The species is native to the Pacific seaboard of North America and forms a large tree of 100 feet high in its native land. Again, since this species was introduced into Britain in 1854, this must be one of the oldest specimens in

the country. Though most attractive, it is exceedingly slow-growing and this specimen has reached only some 20 feet in height. Like the cypresses it has a diffuse branch system and does not develop the well-marked single stem characteristic of many other conifers.

The family of the Pinaceae, which is the largest in the Coniferales in number of species, consists mainly of evergreen trees, all native to the northern hemisphere. The most widespread of the deciduous genera are *Larix* and *Pseudolarix*. The branches are characteristically whorled, with linear leaves spirally arranged. In the genus *Pinus* the branches are of two kinds, long shoots and spur shoots. The leaves are borne on the spur shoots usually in twos, threes or fives though there are two species with respectively one and four leaves per spur shoot. The whole spur shoot and its leaves drop and are not replaced. In the genera *Cedrus* and *Larix* there are also two types of shoots but in these the spur shoots persist and new leaves develop on them. On the first-named (Fig. 58) the leaves persist throughout the year so that the plant is evergreen, on the latter (Fig. 27) they fall in autumn and the branches are bare throughout the winter.

In a corner near the *Tsuga* is one of the slowest growing trees in the garden, *Chamaecyparis thyoides* 'Andelyensis' (Fig. 8), a native of eastern North America and now only 10 feet high after nearly 100 years. This so-called white cypress, with a neat columnar habit, has for a near neighbour one of the oldest specimens in this country of the Hinoki cypress, *Chamaecyparis obtusa*, (Fig. 9), a Japanese tree which grows in that country to a height of over 100 feet. It was introduced to Britain by G. Veitch in 1861. In its native country it yields valuable timber but in this country it is slow growing and purely ornamental. In Japan it is the sacred tree of the Shinto religion, being cultivated in the monastery gardens, while the timber is used to make coffins for the adherents of the faith. It is, moreover, grown as a dwarf tree or 'bonsai', as are *Pinus parviflora* and *P. densiflora*.

On the other side of the stairway there is a specimen of the glaucous form of *Abies procera*. Every year it produces a crop of cones each a foot in height and held erect among the blue-grey foliage. This specimen was planted some forty years ago. There is a much older specimen of the same species on the south side of the rock garden in the pinetum which is among the trees originally planted by Veitch. The species is native to the Pacific coast of America and was introduced into this country by Douglas in 1830. It grows well in this country and produces large numbers of cones which are the largest of the fir cones and are very impressive. The cones of the firs (*Abies* spp.) are borne upright on the branches (Fig. 47) while those of the spruces (*Picea* spp.) are pendulous (Fig. 16), a useful character in distinguishing the genera. Moreover, when the leaves of the firs fall they leave a smooth leaf-scar, while the stem of the spruces retains peg-like projections after leaf-fall. Both firs and spruces differ from the pines, the cedars and the larches in having only long shoots. Next to the noble fir is a specimen of the west Himalayan spruce, *Picea smithiana*, first introduced into Scotland in 1818. The branches are pendulous and thus give the plant a characteristic appearance. The leaves are among the longest found in the spruces. This

tree is also about forty years old and a much older specimen of the original planting is to be found on the terrace on the east side of the Hall.

On the opposite side of the drive from these two trees there is an oval bed with three specimen Plants. The first is the Japanese cedar, *Cryptomeria japonica*, (Plate 1a) a member of the Taxodiaceae. Native to Japan, where it is used as a timber tree and may attain a height of over 150 feet, it was introduced into this country in the 1840s by Fortune. In the milder parts of the country it forms a very fine specimen tree but has not been much grown for timber in this country. There is only one species in the genus though there is a variety, *C. japonica* 'Elegans', which was introduced by Veitch in 1861. This variety retains the juvenile type of foliage which is softer and more slender than that of the type species. There is a specimen, again probably as old as any in this country, above the rock garden at Reed Hall.

Beside this tree there are two species of Viburnum, namely *Viburnum rhytidophyllum* and *V. henryi* of the Caprifollaceae. They are both evergreen shrubs from China and both were brought to this country for Veitches at the beginning of this century. The former is a hardy and striking shrub with large leathery leaves wrinkled and glossy on the upper surface and downy on the underside. Like all the *Viburnum* species it has naked terminal buds and produces flower buds in the late autumn which remain dormant during the winter. *V. henryi* is fairly hardy and has long rather narrow smooth leaves. In summer it bears large panicles of small white flowers. Close to these trees there is a small plant of *Juniperus communis* 'Oblonga pendula' which has an unusual drooping habit.

On the terrace below the balustrade and further to the south and west, there is a very fine example of the Atlas cedar, *Cedrus atlantica*, this one being the 'Glauca' form with its well-marked deposit of wax on the needles. The cedars as has been noted are evergreen conifers of the family Pinaceae and are characterised by having both long and spur shoots, the leaves being largely on the persistent spur shoots. Timber trees in their native countries, they are grown for decorative purposes in this country. There are three main species, *C. atlantica*, *C. deodora* and *C. libani*, all closely related and considered by some to be only geographical subspecies of one variable species. *C. atlantica* is pyramidal in shape when young but tends to become more flat-topped as it grows older. It is a native of Algeria and Morocco and was first brought to this country in 1844. It is quite hardy and is much grown as a decorative tree.

The immediate neighbour of the Atlas cedar is the western arbor-vitae, *Thuja plicata*, a member of the Cupressaceae. This is also a native of western North America particularly of British Columbia and Oregon where it grows to a great height - up to 200 feet - yielding a most valuable timber known as western red cedar. The wood is very durable and is used for house building and for roofing shingles. The timber is light and weathers to an attractive grey colour and requires no preservative treatment. This tree was brought to this country in 1853 by Veitch. It tends to be pyramidal in shape and to have a series of upright branches rather than a single main stem, while the leaves are pleasantly aromatic.

Further along the terrace there is a specimen of the Bishop pine, *Pinus muricata*. This is one of the two well-known Californian pines, the other being the Monterey pine, *P. radiata*. Both have a very restricted range in their native Monterey peninsula and are resistant to a high degree of salinity. The cones of both remain for many years unopened on the branches, a characteristic and diagnostic feature (Figs. 11, 12). *P. muricata* has its needles in pairs on the spur shoots while those of *P. radiata* are in threes.

Next to the Bishop pine grows a large strawberry tree, *Arbutus unedo*, a member of the heather family, the Ericaceae. A native of the Mediterranean, it is naturalised in the South West and seedlings appear commonly in many parts of the University Estate. The two specimens by the balustrade, one on each side of the Diana Steps, had attained a height of over 20 feet when the top ten feet or so of each was broken off in gales some years ago. The fruits, which are red to orange in colour, superficially resemble strawberries, hence the name of the plant. It is evergreen and the white bell-like flowers are borne in panicles from October to December as the fruits of the previous year are ripening and developing their rich colour. The fruit is much eaten by birds. Beside this particular tree is a Nootka cypress, *Chamaecyparis nootkatensis*.

The horse-chestnut, *Aesculus hippocastanum*, of the Hippocastanaceae of which a specimen is growing nearby is so well-known that it requires no description here. The horse-chestnut is not a native of Britain although it is so widely grown. Its home is probably Greece and it was introduced into western Europe, including Britain, only in the early part of the 17th century. It is highly decorative, hence its popularity, though it yields timber of no great value. Below this group of trees there are three plants of special interest. The first is *Colletia cruciata*, a Brazilian member of the Rhamnaceae with formidable thorns (Fig. 13). The second is a well-grown plant of *Oleria macrodonta* of the Compositae, one of the New Zealand daisy bushes and the third is the bay tree *Laurus nobilis*, a member of the Lauraceae. The two specimens of *Chamaecyparis lawsoniana* below the stairway have already been referred to as being among the oldest in the country. On the other side of the stairway there is the second specimen of *Arbutus unedo*, mentioned above and a tiger-tail spruce, *Picea polita* of the Pinaceae.

The lawns of Reed Hall

On the lawns at the east side of Reed Hall there are two specimens of the golden yew, *Taxus baccata* 'Aurea', of the Taxaceae. Some authorities consider that there is only a single widely distributed species of Taxus and that the varieties are mutations or geographical variants. The yew is one of the only three conifers native to Britain. It was a most valuable tree in Britain in the Middle Ages and the wood was used in making the long bow. It is believed to have been at an earlier time a sacred tree of the druids. In Christian times it has been traditionally associated with Easter, possibly because of its evergreen habit. It is one of the longest lived trees, probably the longest in this country, and some specimens are reputed to be nearly 1,000 years old. The foliage is poisonous to cattle and the toxic properties are not lost as the leaves wither. The so-called yew berries - strictly arils - are

sweet and edible and it is the seeds proper which are poisonous. It is a hardy tree and is widely distributed throughout Britain. Many garden varieties have been selected over the years and grown in gardens.

Near the yews is a specimen of the Chinese juniper *Juniperus chinensis*, a member of the Cupressaceae. This tree is a native of northern China and Japan where it grows to a height of 60 feet. Old specimens typically have juvenile needles as well as the adult scale leaves (Fig. 14). It was introduced into this country in 1804 and, being hardy, is one of the commonest junipers in cultivation. There are many garden forms.

On the other side of the lawn is another tree of the tiger-tail spruce of Japan, *Picea polita* (Figs. 15 and 16). This also is an introduction of J. G. Veitch in 1861 so that these specimens may again be among the oldest in Britain. The tree here is just under fifty feet high. This species grows very slowly and though it may attain a height of 60 feet in its native country does not do so in Britain. The tiger-tail spruce has a generally stiff habit and very sharp points on the leaves. It can readily be identified among the spruces by grasping the leafy shoot. Beside it there is another specimen of a garden form of Lawson's cypress.

The terraces and slopes above Reed Hall

Standing conspicuously between the steps and the northern end of the first terrace is possibly the most interesting tree in this collection, the bristle-cone or Santa Lucia fir, *Abies bracteata*. This is another introduction of 1853 and so this specimen and the one at the top of the drive to the Hall must be as old as any in Britain. It is native to the Santa Lucia mountains of California and is said to be becoming scarce in the wild state. It is not particularly frost-resistant but in the milder western parts of the country, as here, it makes a beautiful specimen tree with its long sweeping branches. This particular tree is supposed to be one of the finest specimens of the species in Europe and has attained a height of over 100 feet with a girth of 11 feet (Plate 1b). The cone retains its bract scales as well as the ovuliferous scales, the former forming bristle-like projections 2 to 3 inches long which, being persistent, give the cone a most characteristic appearance.

There are three shrubs of note near the Santa Lucia fir. *Cornus capitata* of the Cornaceae is a Himalayan shrub which is evergreen and produces in summer clusters of inconspicuous flowers subtended by yellow bracts and followed by strawberry-like fruits. *Crinodendrum hookerianum* of the Elacocarpaceae, a native of Chile, bears pendulous crimson flowers which gave rise to its common name - the lantern tree (Fig. 17). *Clerodendrum fargesii*, a deciduous shrub of the Verbenaceae, was first noticed in its native China by Pere Farges, a French Missionary. It is a vigorous grower and produces large numbers of suckers. The leaves have an unpleasant smell when bruised but the white flowers, borne in cymes on the ends of the branches, are very fragrant and the turquoise blue berries which are about the size of a pea are most striking as they are subtended by five calyx segments (Plate 7c).

Immediately behind the Santa Lucia fir, on the next terrace there is a specimen of the Chinese fir *Cunninghamia lanceolata* (Fig. 18) an evergreen tree native to China. It is a member of the Taxodiaceae. It can grow to a height of 100 feet but is barely hardy in this country and is easily damaged by frost. It has a superficial resemblance to the monkey puzzles and has been called the Chinese monkey puzzle.

On the same terrace as the *Cunninghamia*, flanking the stairway, are two specimens of the white cedar or arbor-vitae, *Thuja occidentalis*, a native of eastern North America. This species differs from the western red cedar in its less vigorous growth and the uniformly green undersurfaces of the leaves.

Close to the top of the steps is a large holm oak, *Quercis ilex*, of the Fagaceae, one of the evergreen oaks of the Mediterranean region. Trees of this species have been grown in England for more than four hundred years. It has leaves of variable shape, mostly narrow and lanceolate though occasionally more or less lobed. It is popular for decorative purposes but the timber is of little value.

A few yards above the holm oak is a very interesting oak, *Quercus acuta*, which is here no more than a shrub, though in its native Japan it becomes a tree up to 40 feet high. It was introduced into this country in 1878, and this specimen was planted some forty years ago. It is evergreen and has leaves with entire margins, somewhat reminiscent of those of the cherry-laurel. It does not, superficially, resemble the oaks of the western world (Fig. 19).

Nearby is an oriental spruce, *Picea orientalis*, another member of the Pinaceae. The leaves are very small and dark coloured. It was introduced into Britain from its native Caucasus in 1839. Its neighbour, a monkey puzzle or Chile pine, *Araucaria araucana* of the Araucariaceae, is one of the conifers of the southern hemisphere. The species of this genus are dioecious, that is, the staminate and ovulate cones are borne on different trees. The ovulate cones are very large. A native of Chile, it was introduced into England at the end the 18th century. It is not much use as a timber tree in this country but has been much grown as a decorative tree because of the geometric arrangement of the branchlets. Unlike most evergreen conifers, which drop their leaves when these are two or three years old, the monkey puzzle tends to retain its leaves until the whole branch dies and falls, with the result that old trees have long bare main stems. The name monkey puzzle is said to have originated in Cornwall.

At the north end of the third terrace, not far from the monkey puzzle, is a large deodar or Himalayan cedar, *Cedrus deodara*, native to the western Himalaya where it may attain a height of 250 feet. It was introduced into this country in 1831 and grows well in the milder parts of Britain. The Atlas and Lebanon cedars are difficult to tell apart but the deodar has a distinctive appearance, in that the ends of the branches tend to be pendulous. Like the other two it has long and spur shoots and the spur shoots are persistent.

A short distance away, above the terraces, is a very large specimen of the tree of heaven, *Ailanthus altissima*, a hardwood tree of the family Simaroubaceae. This is a native of north China and was introduced into Britain about the middle of the 18th century. It has proved a useful tree for urban planting and is quick growing. Its very long pinnate leaves are somewhat reminiscent of those of the walnuts (Fig. 20). The plants are unisexual but the tree is readily propagated from suckers.

Below the tree of heaven is a small specimen of a variety of the Nootka cypress, *Chamaecyparis nootkatensis*.

Near the tree of Heaven is another monkey puzzle. Farther up the slope is a Douglas fir, *Pseudotsuga menziesii*, of the Pinaceae. A native of western North America, this species was introduced into Britain by Douglas in 1827 and has proved to be a valuable timber tree. It is, therefore, extensively grown as a forest tree throughout the country. In its native habitat it can attain a height of up to 250 feet with a girth of over 10 feet. There is another form, the Colorado Douglas fir, *P. menziesii* var. *glauca*, introduced into this country in 1884, which is grown as a decorative tree rather than for its timber (see P. 31). A characteristic feature of the Douglas fir is the persistent bract scales of the cones. These grow into three-pronged structures which occur only in this genus. In most other genera of the Pinaceae the bract and ovuliferous scales are fused.

There are two specimens of the cow's tail pine or Japanese plum-yew, *Cephalotaxus harringtonia* of the Cephalotaxaceae, one on either side of the path close to the monkey puzzle and Douglas fir. This form of the species is not known in the wild state, but has long been cultivated in Japan, whence it was brought to Europe by Siebold about 1829. The present species and *C. fortuni*, mentioned below (p. 50), are both dioeclous.

A few yards to the south-east is a wellingtonia, *Sequoiadendron giganteum*, a member of the Taxodiaceae. This Californian tree is sometimes placed in the same genus as the related Californian redwood, *Sequoia sempervirens*. The wellingtonia is an evergreen which in its native habitat may attain a height of over 300 feet. It was first introduced into England in 1853 by one of Veitch's collectors, W. Lobb. Some of the Californian specimens are over 3,000 years old and are the largest and oldest living organisms. Many have been destroyed but those that remain are now protected by Federal laws. The bark is remarkably thick and spongy. There are some very fine trees of this species on the University Estate, notably one below the rock garden at Reed Hall, and some in the grounds of Thomas Hall and of the Duryard Halls of residence.

Our largest native coniferous tree is the Scots pine, *Pinus sylvestris*. There are several specimens of this tree near the wellingtonia, and others in different parts of the Estate. It is a two-leaved pine, that is, the needle-shaped leaves are borne in pairs on the spur shoots. It can grow to a height of 100 feet. The reddish brown bark and the blue-green foliage are characteristic. This is the most widely distributed of the pines and its range extends from Scotland across Europe and Siberia. It is a valuable timber tree and yields the

soft-wood known as 'yellow deal'. It was the main tree in the old Caledonian forest which once covered much of the north of Scotland. The pine plays a part in many old legends, and in Scottish folklore was supposed to have provided the witches' broom sticks.

The Monterey cypress, *Cupressus macrocarpa*, of which specimens can be seen near the Scots pines, is a forest tree in its native California whence it was introduced into this country in 1838. It grows to a height of some 100 feet in this country and there are a number of very fine specimens on the University Estate including several in the grounds of Thomas Hall. It is a fast-growing tree which does well in coastal districts and hence in the past has often been used as a hedge plant, for which it is most unsuitable. Though it grows well in this and other countries, its native range is restricted to a few square miles in the Monterey peninsula.

Until recently there was a very fine specimen of the Mexican pine, *Pinus montezumae*, growing in this terrace. This tree is native to Mexico where it attains a height of 70 feet. It has needles which may be more than 12 inches long borne in fives on the spur shoots. It is not hardy, however, and although this specimen had been growing for almost 100 years and was some 50 feet high, it was desiccated by the east winds which struck it when the copse behind it was cut down to permit building development in the middle 1950s. Other trees which suffered similarly were the Japanese red pine, *Pinus densiflora*, and the Japanese white pine, *P. parviflora*. Specimens of *P. montezumae* and *P. densiflora* have been planted elsewhere on the Estate in more sheltered positions. Another specimen of *P. parviflora* of the original planting above Reed Hall is described below (p. 18).

Just behind the wall of the old garden of Reed Hall there is a very good specimen of the Indian bean, *Catalpa bignonioides* of the Bignoniaceae, a native of the eastern United States. One of the most beautiful of the flowering trees, it bears leaves 8 inches or so long and as much across, and the racemes of flowers superficially resemble those of the horse chestnut (Plate 3b). It is reasonably hardy, and its tolerance of urban conditions is well illustrated by the many specimens which have been planted in the London parks.

There are some interesting trees and shrubs on the lower terraces overlooking the lawns of Reed Hall to the south of the main flight of steps. Not far from the steps is a Himalayan spruce, *Picea smithiana*. This is a much taller specimen than the one in front of Reed Hall, being nearly 60 feet high. Next to it is another specimen of the wellingtonia, *Sequoiadendron giganteum*, described above and beside this is a plant of *Chamaecyparis lawsoniana* 'Lycopodiodes'. On the terraces around these trees are plants of *Gaultheria shallon*, *Rhododendron obtusum* var. *amoenum* and *R. racemosum*, all members of the Ericaceae The first of these the shallon or wintergreen, is a low-growing evergreen shrub forming a dense mat of vegetation and spreading by underground suckers. The flowers are bell-shaped and pink-flushed, the fruits dark purple berries. It was introduced by Douglas in 1826 from western North America and grows well in shade. There are specimens in

the botanic garden of an intergeneric hybrid between this genus and *Pernettya* called *X GauIthettya wisleyensis*. *Rhododendron obtusum* is another evergreen shrub introduced from Japan in 1845. The branches tend to grow horizontally and it also is tolerant of shade. In spring and early summer the branches are covered with masses of small rosy-purple flowers which make it a most attractive plant. *R. racemosum* is also evergreen, a native of western China introduced into this country in the late 19th century. This plant, and several of the same species at Lopes Hall, were grown from seed and are about thirty years old. The flowers are pale pink in colour and appear in early spring.

Associated with these plants there are others, notably bamboos and some young specimens of the Chilean fire-bush, *Embothrium coccineum*, a member of the Proteaceae. Introduced by W. Lobb from Chile in l846, when well grown this makes a most striking small tree with an abundance of brilliant scarlet flowers (Plate 4a). It is not hardy but, with protection, is well worth growing in the milder western parts of the country as few flowering trees are more impressive. There are also several varieties of *Chamaecyparis lawsoniana*, including a plant of the golden form. This is on the lowermost terrace with the Rhododendron species and near it is a specimen of the Spanish fir, *Abies pinsapo*. This plant is native to a small area in Granada and grows well on a calcareous soil. It was introduced into England in the early part of the 14th century and makes a very striking tree when young, as the branchlets are arranged with geometrical precision on the branches. Unfortunately, it tends to lose its lower branches as it grows older and mature specimens are somewhat ragged in appearance. The leaves contain a significant amount of saponin and are used as a substitute for soap by the spanish peasantry.

Above the terraces is a group of trees of the original (1867) planting. Near the path is an incense cedar, *Calocedrus decurrens* (*Libocedrus decurrens*) of the Cupressaceae. It is not properly a cedar despite its name, but when the resin is burnt it has a perfume reminiscent of incense. Yet again, this specimen must be one of the oldest in the country, as *C. decurrens* was first brought to Britain from Oregon in 1853. The tree is quite hardy and is commonly grown for decorative purposes. It has a remarkable columnar habit but is rather slow-growing. It attains a height of 150 feet in the Sierra Nevada but does not grow quite so tall in this country. The wood has no special value as timber but is very fragrant.

Near the Calocedrus is a specimen of the Atlas cedar, *Cedrus atlantica*. Above this tree and another specimen of Monterey cypress, *Cupressus macrocarpa*, and oriental spruce, *Picea orientalis*, is a purple beech, *Fagus sylvatica* 'Purpurea'. The common beech is a well-known native of this country which can grow to a height of over 100 feet and has a dense canopy of leaves in summer. The purple form has been found apparently wild in various parts of Europe. Seedlings from the coloured form may have green foliage.

One of the most interesting trees in this part of the Estate is the Japanese white pine, *Pinus parviflora*, introduced by J. G. Veitch in 1861. In its native Japan it makes a tree about 60 feet high but in this country it grows only to

about half that height. It is one of the five-leaved pines, and bears its ovulate cones in groups of three or four. These are about two inches long and persist on the branches for some years, the scales opening widely. The branches tend to grow horizontally. It is a very beautiful tree, and this specimen must be among the oldest in Britain.

Below the Japanese white pine is another Douglas fir, *Pseudotsuga menziesii*, a wellingtonia, *Sequoiadendron giganteum*, and an oriental spruce, *Picea orientalis*. Close to the last two trees is a plant of particular interest, a seedling of *Abies bracteata* which grew from a seed from the tree already noted on the lower terrace behind Reed Hall. During the war of 1939-45 it was not possible to devote much labour to grass-cutting in the ornamental parts of the gardens and many seedlings which would normally have been cut down before they reached any size grew into useful plants. As this is one of the rarer species in the collection, it has been allowed to grow and is now an attractive specimen. On the other side of the spruce is a bush of *Cephalotaxus harringtonia* var. *drupacea*. This is the wild form of the species, native in the mountain forests of Japan, and found also in central China. It was brought to Europe by Siebold at the same time as the japanese cultivated form mentioned above.

Near the path leading from the eastern corner of the lawns of Reed Hall to the Queen's Drive near Northcote House are a number of trees of the Turkey oak, *Quercus cerris*, a native of southern Europe and Asia Minor. This deciduous tree was brought to Britain in the early part of the 17th century and, being capable of growing rapidly to a great size, was widely planted. The timber is little esteemed, but there are some very fine specimens around the University Estate, notably those near Northcote House and Mardon Hall. It is, incidentally, one of the parents of the Exeter oak, *Quercus X hispanica* 'Lucombeana', described in Chapter 4.

Beyond the path there is another incense cedar and a further oriental spruce. Towards the pinetum there are two small plants of the redwood, *Sequoia sempervirens*. This tree, like the wellingtonia, *Sequoiadendron giganteum*, is a native of a narrow belt in California where it yields a most valuable timber. It is now protected by law in its native state. The lowermost leaves (Fig. 22) are markedly different from those of the wellingtonia (Fig. 21), but the upper leaves of large specimens are said to be much more like those of that tree.

The redwood was introduced into Britain in 1846. In this country it is grown mainly as a decorative tree though some commercial stands have been developed. One of its interesting features is the ability, unusual in conifers, to develop shoots from the base when the tree is cut down, a characteristic more commonly found among hard-wood trees. A tree of this species was cut down in 1952 in the grounds of Hope Hall and half-a-dozen stems have now grown from the old stump.

Nearby is another wellingtonia and then a Scots pine. Below them is a specimen of the painted maple, *Acer pictum*, of the Aceraceae. It is native to Japan and China and was introduced towards the end of last century by J. G.

Veitch. It is a deciduous tree, as are all the maples, and the leaves are highly coloured in spring and again in autumn. This specimen and one just above the pond have many adventitious shoots developing from the exposed main roots.

Above the rock garden there is a fairly large specimen of the Austrian pine, *Pinus nigra* var. *nigra*. *P. nigra* is a very variable species, which is found in various forms from Spain to the Caucasus. Plants from the eastern parts of its range tend to have stiff leaves and to be heavily branched trees with broad crowns. These include the Austrian pine, var. *nigra*, introduced by Lawson in 1835 and often planted for windbreaks and as a decorative tree but of little value for timber, and the Crimean Pine, var. *caramanica*, introduced by Lee and Kennedy in 1790. Plants of *P. nigra* from the western parts of its range have more flexible leaves and are of narrower, more erect habit, with fewer and smaller branches. They include the Corsican pine, var. *maritima*, a valuable and widely planted timber tree introduced to this country by Miller in 1759. Most of the trees of *P. nigra* on the Estate are of var. *nigra*, which is native from central Italy to Austria and Greece.

A short distance away is another purple beech. The next tree, more recently planted, is the Chilean podocarp, *Podocarpus salignus*. Although this species may grow to a height of 50 feet in its native country, it is rarely much more than a shrub in this country. It was introduced in the 1850s and is only fairly hardy, but is very attractive being evergreen with long sickle-shaped leaves (Fig. 23). It is well worth growing in sheltered areas. Near it, beside another tall incense cedar, is a small specimen of the King William pine *Athrotaxis selaginoides*.

Above the rock garden which, with the smoke stack, is all the remains of the heating chambers and the palm house and conservatories of the original Streatham Hall there is a group of plants including *Viburnum tinus*, and rhododendrons. With them there is a specimen of the Himalayan blue pine or Bhutan pine, *Pinus wallichiana*. This was a self-sown seedling from an older tree of the original planting below the pair of Californian nutmegs mentioned below. It is a five-leaved pine with leaves up to seven inches long, which bears cones up to 10 inches long and of characteristic appearance (Fig. 24). It was introduced into this country about 1820, and is a handsome tree, quite hardy, fast-growing and bearing cones while still comparatively young. The Sitka spruce, *Picea sitchensis*, in the same area is another native of western North America which is now much grown as a timber tree in this country, particularly on wetter and poorer soils. It is fast-growing and reaches a height of some 200 feet in its native habitat. Jeffrey's pine, *Pinus jeffreyi*, is a Californian tree introduced in 1852 and is very similar to P. ponderosa. It is now widely grown in Britain and the present tree must be as old as any growing in this country. The Weymouth pine, *Pinus strobus*, was introduced from eastern North America in 1705 and is so-called in England because a former Lord Weymouth planted large numbers at Longleat. It was at one time valued as a timber tree but is now less commonly grown. As a specimen tree its appearance is spoilt by the almost invariable infestation of the Weymouth pine aphis.

A more interesting species in this group is the plum-fruited yew, *Podocarpus andinus* formerly known as *Prumnopitys elegans*. It is evergreen, growing under the best conditions to about fifty feet but more usually in this country remaining a bush. It is a beautiful garden plant and produces large seeds, which look like small plums and are eaten in its native Chile (Fig. 25). As this plant was introduced into England about 1860 by Veitch we have again two plants on this estate which must be among the oldest in Britain. It is easily grown from cuttings but it does not seem to grow easily from seed despite the good crop of seeds each year. On one of the plants in the Estate one or two of the branches bear staminate cones, the rest of the plant bearing ovulate cones on which the seeds develop. The cones are quite characteristic and the plant is a member of the Podocarpaceae.

The pinetum

In the pinetum proper, the first tree of interest is a large specimen of the red oak, *Quercus borealis*, the leaves of which, despite its name, tend to turn a bright yellow in the autumn. The plant is native of eastern North America and, with its large leaves, makes a striking picture with its autumn colour. It has been grown in England for over two centuries and many fine specimens exist in different parts of the country. Between it and the Queen's Drive there is a group of Turkey oaks, *Q. cerris*. With the red oak there are various pines, notably the Bishop pine, *Pinus muricata*, theJapanese white pine, *P. parviflora*, and the Japanese red pine, *P. densiflora*. The last is a useful timber tree in Japan and is much used for 'dwarfing' purposes in that country. It is rarely grown for timber in this country but its reddish bark, reminiscent of that of the Scots pine makes it a useful ornamental tree.

Nearby is a Colorado spruce, *Picea pungens*, a native of the mountains of western North America from New Mexico to Wyoming. It is an elegant tree, characterised by the stiff glaucous needles standing out from the shoots almost at right angles. Below it is a stone pine *Pinus pinea*, a native of southern Europe cultivated in England for centuries. The head of the latter is flat and very characteristic. The seeds have been eaten since Roman times and are much prized as 'pine kernels'. The cones are large and rounded with very hard scales. Despite this hardness they are opened by squirrels which regularly eat the seeds.

The best known of the spruces is the Christmas tree, *Picea abies*, the common or Norway spruce. Though native to central and northern Europe it is not native to this country but has been cultivated extensively for many centuries. It is an important timber tree and the wood is known as 'white deal'. Young trees are the traditional Christmas trees. The Mexican white pine, *Pinus ayacahuite*, is a five-leaved pine rather like *P. wallichiana* from which it can be distinguished by the reflexed scales of the large cones which may be more than a foot long. It makes a beautiful ornamental tree with its long thin needles and is very quick-growing. The specimen here, raised about 30 years ago from a seed from a cone of *P. ayacahuite*, is probably *P. x holfordiana*, a hybrid with *P. wallichiana*. Near by, there are two specimens of the lodgepole pine, *Pinus contorta* var. *latifolia*. This species is a native of western North

America from Alaska to California. It is a variable tree, but the short twisted needles borne in pairs, the twisted and stunted appearance of the branches and the blackish bark broken up into small squarish plates are characteristic features. Although Rather slow growing, the lodgepole pine is now widely planted for timber on poor soils in the western parts of Britain. The Aleppo pine, *Pinus halepensis*, also represented, is another slow-growing tree, with the leaves in pairs on the spur shoots. It is a native of southern Europe and Asia Minor and is the commonest pine of the Mediterranean region. It is said that the resin was formerly a major import into Egypt where it was used for embalming the dead. It is used nowadays in Greece to flavour wine. The Arolla or Swiss pine, *Pinus cembra*, has its leaves in fives and is native to central Europe while a subspecies is found in Siberia. It is hardy but of little commercial value in this country. Another European pine which does not grow to any great height, and may on occasion be almost prostrate, is the mountain pine of southern and central Europe, *Pinus montana*, or *P. mugo*. The specimen here is an upright pyramidal tree but the species is very variable and many dwarf varieties are cultivated. The maritime pine, *Pinus pinaster*, grows to a height of 120 feet. The leaves are in pairs and are the largest of any two-leaved pine. It is native to southern Europe. It is resistant to considerable salinity in the soil and will grow on dunes where it acts as a sand binder. It yields valuable resin and turpentine. There is also in this group, a specimen of the deodar, *Cedrus deodara*, which has already been described.

There are two firs in the same area. The Japanese fir, *Abies firma*, is a plant which grows to 150 feet in its native Japan. It was introduced by Veitch in 1861. It is a handsome tree and this specimen is well-grown. For some reason it has not been widely planted in this country. The other fir is the Algerian fir, *Abies numidica*, which does not grow quite so tall and in this country is usually not above 30 feet high. It is a native of Algeria and was introduced in the early 1860s so this and the Japanese fir are among the oldest of their species in Britain. Neither tree is of any commercial importance in this country. There is one other conifer in this section which merits attention though it is no more than a shrub. *Podocarpus alpinus* is a Tasmanian plant which does not grow into a tree In its native island but justifies its place in any garden as an attractive shrub. It is quite hardy though slow growing.

Below this group of trees there is another specimen of *Cedrus atlantica* and a small *Pinus ayacahuite*. The neighbouring group of trees were planted in 1960 and among them is the pencil cedar, *Juniperus virginiana*, a native of eastern and central United States and Canada. It was introduced into this country about three hundred years ago and, unlike some of the other junipers, grows into a tree. *Podocarpus macrophylla*, a small evergreen tree native to China and Japan was planted at the same time. It is commonly grown in gardens in Japan and is reasonably hardy in this country. The Japanese black pine, *Pinus thunbergii*, grows to 100 feet and is one of the most valued timber trees in Japan. It was introduced into Britain by Veitch in 1861 but has not been grown extensively in this country as a timber tree. Another tree of this planting is the Japanese larch, *Larix kaempferi*. Unlike most of the Conifers the larches, as has been noted, are deciduous but retain characteristic spur shoots on which new pale-green leaves develop in the spring (Fig. 27). This is

yet another Japanese tree introduced by Veitch in 1861. It is being extensively planted in this country as a timber tree and it should, in time, grow to a height of 100 feet.

Over the past thirty years a considerable number of broad-leaved hardwoods have been planted on the Estate. One of these is the antarctic beech, *Nothofagus antarctica*, a member of the Fagaceae. This is a deciduous tree, a native of the southern portion of South America. The genus is one of the so-called Fuegean flora of which quite a number of genera are common to South America and to New Zealand, perhaps as remnants of the large flora of warm temperate plants which in earlier geological times grew in what is now Antarctica. Though this species was first introduced into England in 1830, most of the plants in this country are from seed of a later introduction. It is an attractive tree and would be more popular as a specimen tree if it were a trifle hardier (Fig. 28). Among the more recently planted trees in this area is *Podocarpus acutifolius*, a native of New Zealand which tends to be a shrub or at most a small tree not more than thirty feet high. Its neighbour, is the jack pine, *Pinus banksiana*, of eastern North America which is widely grown on the poor sandy soils of the 'pine barrens' region of the western United States. It has been planted in Germany in some quantity but in this country has little to recommend it either for its timber or as a decorative tree.

The so-called umbrella pine, *Sciadopitys verticillata*, was an introduction by Veitch from Japan though this is a recently planted specimen. It is slow-growing and said to be hardy though it seems to do best with some protection. The leaves are peculiar in that they appear to be fused in pairs and their morphology is obscure (Fig. 29).

Below this group of comparatively recently planted specimens there is a group of trees planted by Veitch. They include the giant fir *Abies grandis*, a native of western North America where it grows into a very large tree. There are also several trees of the Austrian pine, *Pinus nigra* var. *nigra* which has been noted above, and another wellingtonia. Other trees of note are *Taxus baccata* 'Dovastoniana' and two more North American conifers, the red silver fir, *Abies amabilis*, and the western yellow pine, *Pinus ponderosa*.

Three trees in the area of the rock garden which merit attention have not yet been mentioned. One is a specimen of *Pinus nigra* of striking habit with many large ascending branches from near the base. This is the form commonly known in cultivation as var. *caramanica*, though the habit of growth seen here is not found in all specimens of var. *caramanica* which is native from the Balkan peninsula eastwards. Nearby is a large tree of the noble fir, *Abies procera*, and an evergreen specimen of the hybrid Exeter oak, *Quercus X hispanica* 'Lucombeana' which is discussed later.

The rock garden and its surroundings, Reed Pond

Around the rock garden there are a number of interesting plants. The deciduous Kentucky coffee, *Gymnocladus dioica* of the Leguminosae, in its native eastern and central United States grows to a height of 100 feet. This

specimen, though planted thirty years ago, has not yet flowered. The well-grown plant of the Chinese witch-hazel, *Hamamelis mollis* of the family Hamamelidaccae, has never failed to give a display of sweetly scented yellow flowers in January and February (Fig. 30). On a still winter morning the scent pervades the garden well beyond the rockery. It is a deciduous shrub native to China and Japan and the masses of yellow flowers on the bare branches seem to be little affected by snow or frost in the depth of winter. *X Osmarea burkwoodii* is an interesting intergeneric hybrid between *Osmanthus delavayi* and *Phillyrea decora*, both members of the Oleaceae. The shrub grows strongly and, in the spring, is covered with fragrant white flowers. There is also an example of the only close relative of the citrus fruits which is hardy in this country. This is *Pondrus trifoliata*, a member of the Rutaceae and a native of Japan and China which produces a profusion of attractive white flowers on almost bare stems furnished with formidable thorns. and are like small oranges but are hard and uneatable.

To the south of the rock garden there are three horticultural varieties of Lawson's cypress, *C. lawsoniana*, which as noted (see P. 7) has produced a great many cultivars. To the west of them is the *Pinus nigra* var. *caramanica* already mentioned. The two plants of the Californian nutmeg, *Torreya californica*, a member of the Taxaceae, are without doubt two of the finest specimens in this country. It makes a beautiful tree with its pendent branches (Fig. 31). The tree was introduced into Britain in 1851 and these specimens are about 50 feet high. The trees of this genus are unisexual and unfortunately both of these specimens are staminate. Next to them are two Japanese maples, *Acer palmatum*. Though they may have been planted simultaneously, one is 25 feet high and 30 feet across and the other, though healthy, is only about three feet high. The species is a native of Japan long cultivated in that country. There are a great many cultivars with variously coloured leaves of a variety of shapes. The Japanese hemlock, *Tsuga diversifolia*, growing next to them must be one of the oldest specimens in the country since it was introduced into England by Veitch in 1861. It grows 70 feet high in its native country. The underside of the dark leaves is heavily coated with wax which gives them a white appearance (Fig. 32).

Down the slope is a northern pitch pine of eastern North America, *Pinus rigida*. It is not a timber tree of any value and does not grow to a great size even in its native country but it is remarkable because of the curious clustering of the cones and for the unusual outgrowth of small branches which more or less cover the trunk, a feature not found in any other pine. The Yezo spruce, *Picea jezoensis*, introduced by Veitch from

Japan and Manchuria, does best in the wetter parts of Britain though it is not very widely grown. Nearby there is a specimen of the Colorado spruce, *Picea pungens*, and another Douglas fir *Pseudotsuga menziesii*. Both have been described above. There is a fine specimen of the black walnut, *Juglans nigra*, a tree from the eastern United States which grows well in this country. It has been said that the timber of trees grown in Britain is even better than that from trees in their native country. It is a beautiful tree grown as an ornamental subject and should be more widely grown as a timber tree in this country (Fig.

33). The seeds are edible as are those of the Persian walnut, *Juglans regia*, though they are much smaller. Beside the walnut is a Macedonian pine, *Pinus peuce*, a five-leaved species from the Balkans which somewhat resembles *P. wallichiana* but has shorter leaves and cones.

These trees, with a very large *Sequoiadendron giganteum*, grow in a plantation of rhododendrons which were planted when the gardens were laid out (Plate 1d). They are largely cultivars grafted, as was then the custom, on to stocks of *R. ponticum*. They are thought to be hybrids of *Rhododendron catawbiense* raised by Walters in the middle of the 19th century. More recently the species planted on the Estate have, as far as possible, been grown from seed and not grafted; the new cultivars have been raised from cuttings.

Nearer the pond, there are three trees of the common oak, *Quercus robur*. These may well have been left as specimen trees when this area was cleared by Veitch for the original planting. Below this group of oaks is a large tree of the gean or mazzard, *Prunus avium*, a native of this country. Beside it is another painted maple *Acer pictum*. Beside the pond there are a Norway spruce, *Picea abies*, several western red cedars, *Thuja plicata*, and a tree of the silver lime, *Tilia petiolaris*, with pendent twigs and leaves. The latter is a native of south-east Europe which, since its introduction into England in the middle of the nineteenth century, has been extensively planted and grows very freely. The underside of the leaves is covered with a close felt. It is a useful tree in that it flowers much later than the common lime. There is a second specimen on the opposite side of the pond. There is also on that side of the pond a pair of Yellow Nootka cypresses, *Chamaecyparis nootkatensis*, one of which is now in very poor condition. Native to western North America, this species ,was introduced into Britain about 1853 and is apparently quite hardy.

The two large oaks are discussed in the following chapter devoted to Streatham Drive. Beside the larger of these trees, which is a very fine specimen indeed, there is a plant of the willow leaved pear, *Pyrus salicifolia*. This native of south-eastern Europe does not grow to a great height but is very decorative, with its whitish willow-like leaves and masses of white flowers (Fig. 34). This specimen is grafted on to a hawthorn stock. Also beside the pond is a young specimen of the tulip tree, *Liriodendron tulipifera*. Introduced from western North America it makes a beautiful tree of over 100 feet in this country and when mature produces an abundance of yellow-green flowers which are attractive but not particularly conspicuous. However, they are much visited by bees as they secrete large amounts of nectar (Plate 3c).

Between the pond and the Queen's Drive there are four trees of note. There is a small specimen of recent planting of the red fir *Abies magnifica*, from the western United States. It does best in the wetter parts of Britain and is not much planted in the south of England. There is a good specimen of the purple beech which has already been described. Next to this is a Japanese cedar, *Cryptomeria japonica*, of which there is another specimen in front of Reed Hall. A peculiar feature of this plant is the tendency for the vegetative shoots

to grow through the ovulate cones, at least for a short distance (Fig. 35). Beside it is the swamp cypress, *Taxodium distichum*, of the south-eastern United States. A very attractive tree, well worth growing as a specimen plant, it normally grows in swamps as the name implies and develops large knee-roots or pneumatophores which grow up into the air. It is also one of the deciduous conifers, losing its leaves with the spur shoots in autumn and developing a new set in the spring. The leaves turn a rich red-brown colour in autumn (Plate 2a).

At the west side of the bottom of the Queen's Drive there is a group of cultivars of *Chamaecyparis lawsoniana* and a specimen of the Stag's horn sumach, *Rhus typhitia* of the Anacardiaceae. A native of eastern North America it has been in cultivation in England since the 17th century and with its large reddish leaves it is a popular ornamental plant (Plate 5d). Next to it is a yew tree with very small leaves, *Taxus baccata* 'Adpressa'.

Chapter 4 - The Central Estate - Streatham Drive

The original avenue to Duryard Lodge seems to have followed the same line as the present Streatham Drive which was the avenue to Streatham Hall. The trees were planted by Messrs. Veitch in pairs one on each side of the drive. Many of the original trees remain though, of course, some have had to be replaced. Moreover, the construction of the tennis courts at Reed Hall, of necessity, spoilt the original symmetry. Above the Queen's Drive junction there remain only three matched pairs of trees on each side of the road.

Many of the trees have been described in the previous section devoted to Reed Hall so only those not previously described will be dealt with in detail. At the junction of Streatham Drive with Prince of Wales Road where there is a deodar *Cedrus deodara*, the first tree on the left or west side of the drive is the west Himalayan spruce, *Picea smithiana*. Then there is a pair of common limes, *Tilia X vulgaris*, one on each side of the drive. This lime is of uncertain origin and is generally considered to be a hybrid between *T. platyphyllos* and *T. cordata*. Above them is a specimen of the Weymouth pine, *Pinus strobus*, and opposite it a specimen of more recent planting of the Serbian spruce, *Picea omorika*. Native to the Balkans, it was introduced into Britain about the end of the last century. It has been planted in this country more as an ornamental tree than for timber production. Above them is a pair of deodars and then a pair of purple beeches and further up a pair of evergreen oaks, probably the Exeter oak, *Quercus X hispanica* 'Lucombeana' which is discussed below. Above them is a pair of wellingtonias then another pair of limes and two more deodars.

Only one of the next pair of trees has survived, it is a Monterey pine, *Pinus radiata*. Then there is a pair of red horse chestnut trees, *Aesculus X carnea*. It is thought that this tree is of hybrid origin though its parentage is uncertain. It apparently appeared sometime in the early part of the last century. The probable parents are *A. pavia* and *A. hippocastanum*. Bean notes that this tree is prone to suffer from witches' brooms and 'ugly eruptions' which do not seem to be associated with the presence of outside agents. It is perhaps

worth repeating that the horse chestnut, *Aesculus hippocastanum*, which is very widely grown in this country, is not native and was introduced into England in the seventeenth century.

Opposite the end of Queen's drive there is a large specimen of the holm oak, *Quercus ilex*, and there are two other of the same species, on the other side of the drive near the tennis courts. The holm oak is one of the evergreen oaks which grows to a large size and is native to the Mediterranean region, where so many of the indigenous plants are evergreen. All the oaks appear to have the same basic number of chromosomes and many species are fertile so that there is a wide range of hybrids as in the case of the hybrid swarm of *Quercus x hispanica*.

Above the holm oak, there are too more purple beeches and then a single row of trees on the west side of the avenue, the other side being taken up with two large oaks.

These two trees and are probably descendants of the original Exeter oak *Quercus x Hispanica* 'Lucombeana', a hybrid between the cork oak, *Quercus suber*, and the Turkey oak, *Quercus cerris*. The original seed was collected about 1770 by Lucumbe, a nurseryman in Exeter who noticed the remarkably quick growth of the tree which developed from it. He grafted large numbers of the shoots of this tree on to other oaks stocks and distributed them, at least till the death of the original tree in 1800. There are many of what appear to be descendants of these trees in the Exeter area and elsewhere and they vary considerably in habit. Some more less deciduous (Fig. 36) and others are evergreen. Some have bark reminiscent of the *cerris* parent, others of the *suber*. It is not certain if or where any of the original grafted specimens are still to be found though two, at least, of the Exeter oaks at Thomas Hall have been grafted on to stocks of *Q. robur*.

On the west side of the drive, above the purple beech, there is a deodar, *Cedrus deodara*, then an Austrian pine, *Pinus nigra*, yet another red horse chestnut and an oriental plane, *Platanus orientalis* of the Platanaceae. This tree, a native of south Eastern Europe and Asia minor was introduced into England four centuries ago. It is less commonly planted in England than the London planes, *Platanus X acerifolia* (p. 46, 55), which has much less deeply lobed leaves. Next to the plane is a sycamore, *Acer pseudoplatanus*, another deciduous tree which, though not uncommonly called a plane, is a member of quite a different family, the Aceraceae. Native to Europe it is probably not indigenous to Britain but it has been so long established and is so widespread that it is hard to realise that it is not native. It produces large numbers of fruits and the seeds are very fertile so that seedling plants appear round the parent trees in large numbers. The timber has many uses.

Above the sycamore there are in order, *Taxus baccata*, *Prunus lusitanica*, *Thuja plicata*, *Chamaecyparis lawsoniana* and then a Chinese arbor-vitae, *Thuja orientalis*. This tree is a native of north-west China and has been cultivated in Britain for more than two centuries, sometimes under the name of

Biota. It is characterised by having the branchlets set in vertical planes and by the curiously hooked cone-scales.

Above it is another specimen of the common yew, *Taxus baccata*, one of our three native conifers. This is a staminate plant. Then there is a specimen of the Nootka cypress, *Chamaecyparis nootkatensis*, and yet another Lawson's cypress and above it another *Thuja plicata*. Between this tree and still another *Thuja plicata* there is a Brewer's weeping spruce, *Picea breweriana*, flanked by two flowering cherries. This very unusual tree with its pendent branches is one of the rarest spruces coming from a small area in the Siskiyou mountains of north-west California and south-west Oregon. First discovered by Professor Brewer of Yale in 1863, it has been in cultivation in Britain since 1897. This specimen was given to the College in 1936 and is about 20 ft high, a good height for the species in this country (Fig. 37). Though completely hardy is very slow growing and is still comparatively uncommon.

Almost opposite on the other side of the avenue is a fir planted about the same time as the Brewer's spruce. This is *Abies delavayi* var. *forrestii*, a native of Yunnan introduced by Forrest in 1910. It is slow growing and is another unusual tree. Beside it are a wellingtonia, an oriental spruce, a Monterey pine and a Colorado Douglas fir, *Pseudotsuga menziesii* var. *glauca*.

Two trees of special interest between the tennis courts and the Diana steps are the Katsura tree, *Cercidiphyllum japonicum*, of the Cercidiphyllaceae and the fern-leaf or cut-leaf oak, *Quercus robur* 'Asplenifolia'. The former is a native of Japan and China. It has leaves reminiscent of the Judas tree, *Cercis*, hence its name. It is however, related not to that genus but to the magnolias. It is slow growing but a most handsome tree with bright yellow leaves in the autumn. The fern-leaf oak has long slender lobes on the leaves which are mostly composed of midrib. This specimen, also a very slow growing, has produced viable acorns only once on the past 30 years and on germination they, unfortunately, developed into plants with perfectly normal leaves. It has, therefore, to be propagated by cuttings.

On the west side of the drive there is, above the trees already noted, a shrub of the bay tree, *Laurus nobilis*, of the Lauraceae. This is the true laurel, the so-called victors' laurel of the Greeks. It is one of the evergreen plants of the Mediterranean region and was used for making the crowns for those victorious in the games. Many of the trees and shrubs of that region, as has been noted above are evergreen. The tendency in Britain is to call all evergreen shrubs with leathery leaves 'laurels', as with the next two specimens, the Portugal laurel, *Prunus lusitanica*, and its neighbour the cherry laurel, *Prunus laurocerasus*, which are not in fact true laurels. They are members of the Rosaceae and are of the same genus as the cherries. The former, a native of Spain and Portugal, was introduced in the middle of the 17th century. The white flowers around long racemes opening in the early summer. The latter is a native of eastern Europe and Asia Minor and was introduced into this country about the same time. The fruits of both, especially of the latter, are succulent and resemble cherries.

Above the shrubs there is another plant of the strawberry tree, *Arbutus unedo* of the Ericaceae, which has been described above. In front of this group of shrubs there are two plants of *Cephalotaxus harringtonia* of the Cephalotaxaceae. These shrubs are unisexual and there is one of each sex growing here. The staminate is a handsome evergreen and the ovulate regularly produces olive like fruits. As noted earlier, this species was introduced into Europe from Japan by Siebold about 1829.

Further up the drive there is a Spanish fir, *Abies pinsapo*, which has been described above. Then there are two Monterey pines, *Pinus radiata*, a beech and a common lime. The next tree is interesting being a cut-leaf or fern-leaf beech, *Fagus sylvatica* 'Heterophylla', an attractive sport from the common beech. Some branches are inclined to revert to normal type of leaf and should be cut from time to time. Behind it against the tennis courts is a Spanish chestnut, *Castanea sativa* of the Fagaceae. This tree can grow to a great size and produces edible chestnuts. It is in no way related to the horse chestnut. Native to southern Europe and North Africa it was brought to this country long before the other tree and, it is thought, may have been introduced by the Romans. The wood is used from variety of purposes but is not of great value.

On the other side of the drive, below the coach yard of the original house, there is a striking group of trees. There is a large *Cupressus macrocarpa* which has been described above and beside it a Roble beech, *Nothofagus obliqua* of the Fagaceae, a native of Chile which was originally introduced into England by Veitch. The specimen was planted some 30 years ago as was the neighbouring flowering cherry and the Judas tree, *Cercis siliquastrum* of the Leguminosae. The last named tree has been cultivated in this country for over 300 years having been introduced from the near East. Traditionally, Judas Iscariot is supposed to have hanged himself on a tree of this species. Other species of the same genus are to be found in North America and in China.

On the west side at the top of the drive there is a Santa Lucia fir, *Abies bracteata*, which was one of the original planting and has a markedly forked trunk. Also of the original planting are Western red cedar, *Thuja plicata*, an incense cedar, *Calocedrus decurrens* and a Western hemlock *Tsuga heterophylla*.

Chapter 5 - The Central Estate - The Memorial Avenue, the academic buildings and the plantation

In the triangle formed by Prince of Wales Road, Streatham drive and Perry Road which is the area in front of the Washington Singer Laboratories there are a number of Japanese cherries which were given to the University College of the South West by the Japanese government in 1937. They belong to the species *Prunus serrulata*. They are deciduous plants bearing large numbers of flowers of different colours, usually white or pink and either single or double. They are probably of hybrid origin and have been grafted on to a suitable Japanese stock. They make a very fine display in the spring and early summer (Fig. 38).

From the Prince of Wales Road to the chapel there is a short avenue - the Memorial Avenue. On it there are the following trees planted to commemorate the students of the College who fell in the two world wars. First, two canoe birches, *Betula papyrifera* of the Betulaceae. Above them are a pair of plants of the dawn redwood, *Metasequoia glyptostroboides*, a deciduous member of the Taxodiaceae from central China, introduced into cultivation in 1948. Then there are two indian chestnuts, *Aesculus indica*, and above them two Caucasian firs, *Abies nordmanniana*, also of the Pinaceae and native, as the name suggests, to the Caucasus and Asia Minor. At the top of the avenue there are two specimens of *Phellodendron japonicum*, a native of China and Japan and a member of the Rutaceae with pinnate leaves.

On the north side of the Chapel there are a few plants of note. One is specimen of the silver maple, *Acer saccharinum*, a native Eastern North America. Beside it is a fastigiate form of the hornbeam, *Carpinus betulus* of the Corylaceae. There are two other Maples, a red and a green form of the Norway maple, *Acer platanoides*. There is also a plant of the sweet gum, *Liquidambar styraciflua*, a member of the Hamamelidaceae from Eastern North America which is notable for its brightly coloured leaves in autumn (Plate 7a).

On the other side of the path immediately beside the Queen's Building, there is a plant of *Crateagus X carrieri*, a hybrid found in France towards the end of the last century. It is one the most colourful of the hawthorns having, in autumn, bright yellow fruits about the size of a walnut. Next to it is a specimen of the Judas tree, *Cercis siliquastrum* of the Leguminosae. On the same border there are three specimens of the Swedish birch, *Betula pendula*, 'Dalecarlica' of the Betulaceae, with pendent branches and deeply lobed leaves. Behind them are four plants of the hybrid *Escallonia* 'Apple blossom' which has masses of pink tinged flowers throughout much of the summer. Other plants of note are *Hydrangea petiolaris*, the self-clinging Hydrangea from Japan, and *Cotoneaster microphylla* from the Himalaya. There are also *Garrya elliptica*, a Californian member of the Garyaceae on which the staminate plant is more attractive than the ovulate (Fig. 39), and the passion flower, *Passiflora caerulea*, a climber with striking flowers followed by large, orange coloured fruits (Plate 3d).

Beside the pergola at the south-east corner of the quadrangle of Queen's Building is a plant of *Atriplex halimus*, a grey leaved shrubby member of the Chenopodiacaea from the Mediterranean region. Inside the quadrangle is a specimen of *Griselinia littoralis*, an evergreen member of the Cornaceae from New Zealand. It has distinctive pale green leaves, and bears inconspicuous small green flowers and the spring (Fig. 40). In New Zealand it may grow to a height of some 60 feet, but in this country it is hardy only in coastal districts and is seldom more than a shrub. Near it is a plant of a compact form of the common Myrtle, *Myrtus communis*, and specimens of *Photinia serrulata* and *Elaeagnus X ebbingei*, the last an evergreen which bears inconspicuous but very sweet scented flowers in late autumn. On the lawn on the opposite side of the path is a specimen of the Chinese 'Snake bark' maple *Acer hersii* (Plate 5b). There is also on this lawn a specimen of the iron tree, *Parrotia persica*,

the Persian member of the Hamamelidaceae which has small flowers with conspicuous clusters of red stamens in early spring and which shows striking autumn colouration (Plate 7a).

Advantage has been taken of the south facing walls of Northcote House to plant various shrubs some of which are not completely hardy in this part of south-west England. On the wall facing the Queen's Drive is a plant of the Chilean jasmine *Mandevilla suaveolens* of the Apocynaceae, a tall climber producing fragrant white flowers nearly two inches across. On the south side of the Senate chamber is a specimen of *Azara petiolaris*, a Chilean member of Flacourtiaceae with graceful pendent dark green foliage, and clusters of small yellow flowers in April. Next to it is a plant of *Magnolia delavayi*, an evergreen species from Yunnan with large dull green leaves and white flowers 7-8 inches across. The third plant in this group is the Australian silver wattle, *Acacia dealbata*, with silvery bipinnate leaves and bearing yellow 'mimosa' flowers in early spring. In a sheltered bay nearby is a plant of the parrot's bill or lobster claw, *Clianthus puniceus*, a member of the Leguminosae from New Zealand producing very large brilliant red flowers in early summer. A short distance away, the steps leading up to Northcote House are flanked by two vigorous and free flowering clematis species. *Clematis armandii*, from China flowers in April and May, *Clematis montana*, from the Himalaya, a few weeks later.

Nearby on the south wall of Northcote House is a loquat, *Eriobotrya japonica*, and a few yards to its right a pomegranate, *Punica granatum*. This deciduous tree, native from south-east Europe to the Himalaya, rarely ripens its fruit in this country, but produces bright red flowers through the latter part of the summer. Beside it is a plant of *Carpenteria californica*, an evergreen shrub of the Saxifragaceae from California bearing large white fragrant flowers in June and July (Plate 3a). Father along the wall there are specimens of the pineapple broom, *Cytisus battandieri*, and of *Cassia corymbosa*, both members of the Leguminosae. In front of these plants against the wall is a specimen of of Winter's bark, *Drimys winteri*, and one of the common Myrtle of the Mediterranean region, *Myrtus communis*.

Growing in the lawn beside the Refectory is specimen of *Magnolia wilsonii*, the deciduous species producing pendulous white flowers in May and June. Close to the north wall of Devonshire House there are two fine bushes of a *Camellia japonica* 'White Swan' alternating with plants of *Choisia ternata*, a Mexican shrub of the Rutaceae, which produces corymbs of fragrant white flowers in April and May.

At the bottom of the Queen's Drive there are three trees beside the Washington Singer Laboratories. The first is the Grecian fir, *Abies cephalonica*. It is a tree which grows very well in this country and was introduced from its native Greece at the beginning of the last century. Next to it is another specimen of the Redwood, *Sequoia sempervirens*, which, as we have noted, is unusual among the Coniferae in that it easily regenerates itself vegatatively if it is cut down. This specimen is liable to show signs of damage after cold winds; the species is not particularly hardy. Beside it is another

specimen of the Western red cedar *Thuja plicata*. Behind the Washington Singer Laboratories there is a specimen of the alerce, *Fitzroya cupressoides*, a native of Chile where it grows into a forest tree.

On the north side of Stocker Road, the main entrance to the estate, there are a group of science buildings (Fig. 41). Running from the the building which houses the Departments of Mathematics and Geology roughly to the junction of Rennes Drive with Stocker Road there is a small street which ultimately joins the Taddyford Brook in the deep valley which runs on the south side of the Prince of Wales Road. On each side of this small stream there was a plantation of mainly hardwood trees with a few conifers. This area of about three acres was probably planted at the time of the laying out of the original Streatham Estate. Certainly it was a stand of mature timber at the outbreak of the 1939-45 war when it was felled. Natural regeneration has since taken place and the suckering of the common elm, *Ulmus procera*, has dominated the plantation though self-sown willows such as the natural hybrid *Salix x viridis* and the common sallow *Salix cinerea* have become established in the moister areas. The silver birch *Betula pendula*, oaks and the common ash Fraxinus excelsior have also sown themselves successfully.

Shortly after the felling, European larch, *Larix decidua*, and Sitka spruce, *Picea sitchensis*, were planted. Since 1962 there has been a programme of controlled thinning to maintain a balance between the species. Very recently other more unusual trees and plants have been introduced e.g. rhododendrons, eucalyptus, camellias, various acacias and callistemons, all of which appear to thrive. The stream has been dammed and this gives areas suitable for various bog plants.

Chapter 6 - The Garden of the Department of Botany

The botanic garden

There are so many plants in the Botanic garden that it is possible to select only the more unusual for mention.

Behind the Hatherleigh Laboratories there is a row of birches, varieties of the Canadian canoe or paper-birch, *Betula papyrifera*. This is said to be the largest of all birches and has especially white bark. It is native to North America and the bark is used by the American Indians in making their canoes.

Just inside the entrance to the garden in Plot 2 there is a plant of *Cornus stolonifera*, one of the North American dogwoods of the Cornaceae. Near it is a specimen of *Hibiscus syriacus* of the Malvaceae. There are in the garden several others of the same species which, though a native of Syria, appears to be perfectly hardy in this part of England.

There is only one true palm hardy in Britain, the Chusan palm, *Trachycarpus fortunei*, the specimen here is perfectly well grown, having regard to the fact that the garden was laid out only some 15 years ago. It is a native of China and was introduced into this country in the 1840s.

The next plant of interest in this plot is the American witch-hazel *Hamamelis vernalis*, of which the clusters of fragrant flowers produced in the early part of the year are rather smaller than those of the Chinese species *Hamamelis mollis* which is noted elsewhere. Beside the witch-hazel is a plant of the wintersweet, *Chimonanthus praecox*, a Chinese member of the Calycanthaceae which produces its fragrant parchment like flowers on the bare branches in January (Fig. 42).

All along the border to the left of the path and extending to the corner of Queen's Building is a collection of species of roses from many parts of the world including China and America as well as Europe. Associated with the roses is *Rubus cockburnianus*, a native of China, one of the so-called 'whitewashed brambles' which have a deposit of wax on the surface of their stems giving them a whitewashed appearance.

Near the wintersweet is a plants of *Ligustrum japonicum* 'Rotundifolium', a Chinese relative of the privet which is so commonly planted as a hedge in this country. A few yards from it is a specimen of *Callistemon speciosus*, one of the hardier members of the Myrtaceae, a family especially characteristic of Australia. Is often called the 'bottle brush', from the striking clusters of scarlet flowers which cover the ends of the branches in the summer.

Sarcococca ruscifolia of the Buxaceae is a native of China. It has white fragrant flowers in the early spring and is decorative at a time of year when few plants are in flower. Near to it are three plants of *Maclura pomifera*, of the Moraceae. This grows into a tree and is native to North America. The common name osage orange indicates the shape of the fruit. The plant is unisexual and it is hoped that a plant of each sex may be found among the three grown here.

Gunnera chilensis of the Haloragidaceae is a Chilean plant which grows best in damp places and may have leaves up to six feet across. It is commonly, and incorrectly, called 'giant rhubarb'. There are fine groups of this plant in the grounds of Thomas Hall.

There are many species and varieties of Buddleia now in cultivation. The plant in this border is the cultivar 'Loch Inch' of *Buddleia fellowiana*, a Chinese member of the Loganiaceae. Next to it is a small plant of the Aleppo pine, *Pinus halepensis*. Beside this plant is *Yucca gloriosa*, a member of the Liliaceae native to the eastern states of North America. It is commonly called the century plant and is erroneously believed to flower only after long intervals of time. Nearby is a specimen of *Amelanchier canadensis*, a small roseaceous tree from eastern North America especially attractive in spring when the sprays of whitish flowers contrast with the copper-coloured young leaves.

Close to a second yucca is a plant of the white flowered *Cistus laurifolius* from south-west Europe, one of the hardiest species of this genus, and a dark flowered form of the common Rosemary, *Rosemarinus officinalis*. The cricket-bat willow, *Salix alba* var. *caerulea*, is much esteemed for the making of

cricket bats. Beside the two specimens near the corner of Queen's Building is a plant of *Clerodendron fargesii*, a native of China of which the striking fruits have been noted above (Plate 7c).

There are in the garden many species of Olearia, the shrubby 'daisy bushes' of New Zealand. The plant here is *Olearia albida*. Next to it is the Spanish broom, *Spartium junceum*, a common switch plant of the Mediterranean region. The next plant, *Skimmia japonica*, is a member of the Rutaceae from Japan. The ovulate plant bears large red berries but only in the near presence of a staminate plant, since this species is dioecious.

The genus Eucalyptus of the Myrtaceae includes a large number of species, all native to Australia. Many are reasonably hardy and there are some 20 species in this garden, including *Eucalyptus gunnii* and *Eucalyptus orcades* planted here. Unfortunately the hardy species are all white flowered (Plate 6a) and the more spectacular red flowering species such as *Eucalyptus citriodora* must be given the protection of at least a cold glasshouse.

Ceanothus is a genus of the Rhamnaceae native to the west coast of North America, where many in the species are useful as sand binders. Again there is a range of species and varieties in this garden of which *Ceanothus dentatus* is one. Next to this plant is *Lonicera fragrantissima*, one of the Caprifoliaceae from China. It bears sweet smelling white flowers on the almost leafless branches in the winter and early spring.

Phillyrea latifolia of the Oleaceae is one of a number of species of this genus which are native to the Mediterranean. There are all evergreen. Behind this plant there is a specimen of the weeping beech *Fagus sylvatica* 'Pendula' of the Fagaceae. There is also a antarctic beech, *Nothofagus antarctica*, (see p. 23) and a hornbeam, *Carpinus betulus*.

In the same border there is a widely used Poplar, *Populus candicans* 'Aurora', of the Salicaceae. In the summer, some leaves are almost completely pink and white and the tree looks as if it were in full flower. It grows quickly and in the spring and early summer has the 'Balsam' smell from the resinous secretion on the scales of the buds. Between it and the western balsam poplar of western Canada, *Populus trichocarpa*, there is a plant of the angelica tree *Aralia elata* of the Araliaceae, a native of Japan.

The next substantial tree is an Norway maple, *Acer platanoides*. Beside it, there is a dwarf chestnut, *Aesculus parviflora*, a member of the Hippocastanaceae native to south eastern United States of America. It is one of the shrubby members of the family as is also the Californian buckeye *Aesculus californica*.

The witch-hazel in this border is *Hamamelis mollis*, native to China and probably the best species as a garden plant. It produces its bright yellow flowers about midwinter. Next to it is *Drimys aromatica*, a shrub from Tasmania with leaves which when crushed are aromatic. This species is dioecious, and the specimen here is ovulate. There is a staminate specimen

near the *Populus candicans* noted above (Fig. 43). The genus, included in the Magnoliaceae in the order floras, is now generally placed in a family of its own. Finally in this border there is *Acer hersii* which has been noted above.

On the other side of the concrete path is Plot 11, the northernmost border. The first plants of special interest in this plot is *Escallonia montevidensis* of the Saxifragaceae, a shrub from south Brazil with striking dark green leaves and pure white flowers. Several other species of this genus are commonly cultivated, mostly pink flowered. Nearby is *Lonicera maackii*, a shrubby member of the Caprifoliaceae from Manchuria, and *Coronilla glauca* of the Leguminosae from southern Europe which flowers almost all the year round.

Caryopteris X clandonensis of the Verbenaceae is from China and Japan and, with its grey foliage and blue flowers, is a striking plant. Beside it is another snake bark maple, *Acer rufinerve*, from Japan, and the pineapple broom, *Cytisus battandieri*, a large shrubby member of the Leguminosae native of north-west Africa, which is surprisingly hardy in this country. The white beam, *Sorbus aria*, a native British member of the Rosaceae, makes a striking small tree as its leaves have a thick growth of white hairs on the underside. Nearby is a plant of *Colletia armata*, a spiny member of the Rhamnaceae from Chile.

Syringa, of the Oleaceae, is the genus which includes the lilacs and it is unfortunate that the same name is popularly used in this country for plants of the unrelated genus *Philadelphus*. *Syringa sweginzowii* from north-western China makes a useful shrub with fragrant lilac coloured flowers in the early summer. Next it is *Buddleia davidii* 'White profusion'. Other shrubs of interest in this border include the south European bladder-nut, *Staphylea pinnata* of the Staphyleaceae, and the Brazilian shrub *Feijoa sellowiana*, a member of the Myrtaceae producing flowers with pink petals and conspicuous purple stamens which unfortunately tend to be hidden among the evergreen leaves.

Across the path, in Plot 12, the first plant of interest is *Hymenanthera obovata*, a rigid evergreen shrub from New Zealand. It is a member of the Violaceae, though very unlike the familiar herbaceous European members of the family, and bears rather insignificant yellowish flowers in April and May (Fig. 44). Nearby is *Sophora tetraptera*, the kowhai of New Zealand, a member of the Leguminosae which produces masses of yellow flowers in the spring (Plate 6c). Next to the *Sophora* is *Cassania fulvida*, a shrubby member of the Compositae, also from New Zealand. Behind these plants is one the Japanese Maples, *Acer palmatum*, which are particularly striking because of their brilliant coloured foliage in the autumn. *Photinia villosa* of the Rosaceae has leaves which similarly become brightly coloured in autumn. The photinias are also characterised by the bright colours of the young leaves in spring. Unfortunately they are liable to damage by late frosts. The neighbouring plant, *Viburnum odoratissimum*, is an evergreen shrub of the Caprifoliaceae from China and India. It has large leathery leaves and produces flowers in late summer. It requires some protection as it is sensitive to frost.

Azara dentata, the Chilean member of the Flacourtiaceae, grows into a large evergreen shrub as do other species of this south American genus. In the

early summer it bears an abundance of very fragrant yellow flowers in small branched corymbs (Plate 6b). This beautiful shrub should be much more generally grown. Behind it is a specimen of *Eucryphia cordifolia*, and one of *Azara petiolaris* (Fig. 45). *Bupleurum fruticosum*, of the Umbelliferae (a family the members of which a characteristic herbs, is a native of southern Europe and appears to be quite hardy in this country. It produces masses of yellow green flowers in summer. Next it is an aromatic undershrub, *Helichrysum angustifolium* of the Compositae. This too is native to southern Europe and the smell of the crushed leaves has given rise to the common name 'curry plant'.

The plots in the middle of the garden are numbered from 3 to 10. A striking shrub in plot 10 is *Photinia serrulata*, another Chinese member of the genus noted above. Near it is *Baillonia juncea*, the Chilean member of the Verbenaceae with pale lilac flowers. *Abutilon vitifolium*, a member of the Malvaceae also from Chile, makes a large shrub and when in full flower in the early summer is very impressive. The flower in different specimens varying in colour from white to pale lilac. Also nearby is the Cornelian Cherry, *Cornus mas*, which produces a wealth of small yellow flowers on the bare stems in early spring. Behind this plant is one of the largest Eucalyptus in the garden, a specimen of the hybrid *Eucalyptus pauciflora X coccifera* now nearly 30 feet high. The tree has attractive scaling bark and abundant cream coloured flowers in the early summer (Plate 6a).

One of the most pleasant scents in the garden is that of the leaves of the lemon verbena, *Lippia citriodora*, a deciduous shrub of the Verbenaceae. It is a native of Chile and survives the winter here though it is not particularly hardy. The abelias, members of the Caprifoliaceae, are mainly from eastern Asia though the species here, *Abelia floribunda*, one of the most colourful with its large trumpet shaped flowers, is from Mexico. This plant, again, is not entirely hardy.

On the support behind these plants is the climber *Campsis radicans*, from the south eastern United States. A member of the Bignoniaceae, it produces scarlet trumpet shaped flowers about 3 inches long which are very impressive. Unfortunately the flower buds are produced late in the summer and are liable to be hit by early frosts. Beside it is a variegated plant of the common elm, *Ulmus procera*, and another shrubby honeysuckle, *Lonicera syringantha*, a Chinese plant with small lilac coloured flowers. Next to these plants is a small specimen of *Podocarpus totara*, an important timber tree in its native New Zealand. In this part of the country it is liable to be damaged by long continued east winds in the early part of the year which tends to restrict its growth.

The madrona, *Arbutus menziesii*, from western North America, is a handsome species of the genus which includes the strawberry tree, *Arbutus unedo*. The smooth reddish bark tends to peel off in large flakes. *Clethra delavayi* of the Clethraceae is a somewhat tender deciduous shrub from China bearing racemes of white flowers in late summer. *Glycyrrhiza glabra*, a Mediterranean species of the Leguminosae, is of some commercial value, being the source

of liquorice which is obtained from the roots. Next to it is an interesting shrub from south eastern Australia, *Grevillea rosmarinifolia* of the Proteaceae, which produces masses of carmine flowers from November to May (Fig. 46). From western China there is *Sorbus hupehensis*, a tree of the Rosaceae with white berries which tend to become pink as they ripen, and *Itea ilicifolia*, an evergreen shrub of the Saxifragaceae with long drooping racemes of greenish white flowers.

On the other side of the grass path, in Plot 9, the first plant of interest is the Korean fir, *Abies koreana* (Fig. 47). There is also another species of Abelia, namely *Abelia triflora* from the Himalayas, which bears small white flowers in terminal clusters. Beside it, the Chilean potato bush, *Solanum crispum*, bears masses of blueish purple flowers resembling those of the potato. On either side of the Solanum are two plants of *Eucryphia lucida*, a slender erect growing species from Tasmania with small, simple, entire leaves. Next is *Stranvaesia davidiana* var. *undulata*, an evergreen shrub of the Rosaceae from China which bears white flowers followed by very red berries. *Callicarpa giraldiana* of the Verbenaceae is another Chinese shrub. It bears unusual lilac-blue berries in clusters and is much hardier than *Callicarpa dichotoma* which has larger and more striking berries but which requires the protection of at least a cold glasshouse. Finally, in this plot there is a specimen of *Exochorda racemosa*, a handsome member of the Rosaceae from China bearing erect racemes of white flowers in May, and a plant of the Chilean fire bush, *Embothrium coccineum* (Plate 4a).

In Plot 7 there is *Buddleia alternifolia* of the Loganiaceae, a deciduous Chinese shrub with small purple flowers closely clustered in long panicles which make it a most striking plant when in flower. Its neighbour, *Stewartia sinensis*, is a Chinese member of the Theaceae. It is a deciduous tree, and may reach 30 feet in height, bearing white fragrant flowers two inches across. Near to it, on a support, is the Banksian rose, *Rosa banksiae* from China, which was long a popular climbing rose in the cottage gardens of this country though it has now gone out of fashion. This is the single flowered yellow form though the double-flowered was perhaps more usually grown. Beside it is the New Zealand lace-bark tree, *Hoheria lyallii*, a member of the Malvaceae which bears large numbers of white flowers in the early summer, and *Buddleia salvifolia*, a South African plant with rather unusual pale lilac and orange flowers. The latter is generally considered to be only fairly hardy, but in this garden it has survived some cold winters. A few yards away is a specimen of the New Zealand shrub *Pittosporum ralphii* and an unusual conifer, *Keteleeria fortunei*, a member of the Pinaceae from China. Beside them is a small plant of *Acacia melanoxylon*, one of the Australian wattles. This species has pinnate juvenile foliage which in the course of the first year or so of growth gives way to the simple adult 'leaves' formed from the flattened petioles (phyllodes), and all gradations between the two types of leaves can be found on a single plant. Near the middle of the plot is a plant of *Eucryphia X nymansensis*, which has been noted (page 8), is a vigorous hybrid between the two Chilean species *Eucryphia cordifolia* and *Eucryphia glutinosa*. There is also a specimen of *Azara microphylla*, the most commonly planted member of the genus. The small yellowish flowers which appear in spring are

inconspicuous but fragrant. Behind the Azara is a plant of *Robinia hispida*. This species is closely related to the false acacia, *Robinia pseudacacia*, but has bristly young shoots and pale purple flowers in place of the white flowers of the latter. Both have pinnate leaves and are members of the Leguminosae.

Near the Robinia is another madrona, *Arbutus menziesii*, and a plant of *Clematis orientalis*. This is the the 'orange peel' clematis of the Himalaya and produces striking and curious flowers with thick yellow sepals in late summer (Plate 4b). This particular plant is the offspring of a plant from seed of Ludlow and Sherriff's collection (no. 13342), and is the seed parent of the new yellow clematis raised in this garden which has been called *Clematis x hatherliensis*. The pollen parent was *Clematis tangutica* var. *obtusiuscula* from north-west China. The hybrid has larger flowers than either parent and is a very vigorous grower.

Corokia virgata is a member of a genus of New Zealand shrubs of the family Cornaceae. It has small leaves but bears a large number of bright yellow flowers in early summer. Quite near is another species, *Corokia cotoneaster*, which has slightly smaller leaves but similar yellow flowers. Between them is *Osmanthus forrestii*, a Chinese member of Oleaceae which grows into an evergreen shrub with fragrant white flowers like those of other species of the genus. Another evergreen plant is *Eucryphia X intermedia*, a hybrid between *Eucryphia glutinosa* (page 8) and Eucryphia lucida. Also in this plot is another specimen of the kowhai, *Sophora tetraptera*, and a plant of *Caesalpinia gillesii*, also of the Leguminosae. The latter, probably native to the Argentine, is only just hardy in the open in this country where it flowers occasionally but does better if kept in a cool glasshouse.

The first plant of note in Plot 8 is the Indian bean tree, *Catalpa bignonioides*, already noted (page 17). It is a handsome tree with large leaves and large panicles of pleasantly scented flowers. Next to it is *Weinmannia trichosperma*, a Chilean member of the Cunoniaceae with pinnate leaves and whiteish flowers borne in loose racemes in early summer (Plate 7b). There is also a Japanese loquat, *Eriobotrya japonica*, a member of the Rosaceae. Despite its name this plant is of Chinese origin. It only occasionally produces fruit in this country. The common Persimmon, *Diospyros virginiana*, is an American species of the Ebenaceae, a mainly tropical family. So far the specimens in this garden have not flowered. Next to it is another of the abelias, *Abelia grandiflora*. Finally, there is a plant of the Chilean tree-myrtle, *Myrtus luma* of the Myrtaceae. This plant, which is only fairly hardy in Britain, grows into a small tree, unlike the common myrtle which is shrubby.

Plot 6 is one of the largest plots in the garden. The first plant to note is *Fatsia japonica* of the Araliaceae, the so-called 'castor oil plant' - a complete misnomer, as it is not related to the true castor oil plant, *Ricinus communis*. *Fatsia japonica* is one of the parents of the bigeneric hybrid *X Fatshedera lizei*, of which there is a small plant in one of the bays between the glasshouses. *Dichotomanthes tristanicarpa* of the Rosaceae is a Chinese shrub related to the cotoneasters with small white flowers. Behind it is *Fothergilla monticola*, a member of the Hamamelidaceae from south-eastern

North America, which produces most striking white flowers in the late spring (Fig. 48).

Nearby are plants of *Syringa reflexa*, a Chinese lilac which has long pendulous panicles of pink flowers. The Chinese holly *Ilex pernyi* is a compact shrub with small and particularly spiny leaves. Not far from it is another plant with holly-like leaves, *Osmanthus ilicifolius*, a member of the Oleaceae from Japan. Also from eastern Asia is *Thea* or *Camellia sinensis*, the tea plant of the family Theaceae. Beside the tea plant is a specimen of the Chilean cedar, *Austrocedrus chilensis*, which is native to a narrow belt near the border of Chile and Argentina where it may be nearly 80 ft in height.

Almost opposite the plant of the *Acacia melanoxylon*, noted above (page 42) two more Australian wattles can be seen growing together. Acacia dealbata has juvenile type leaves throughout its life (Fig. 49), while in *Acacia decurrens* these are replaced by phyllodes after the first 18 months or so, though the leaves may occasionally revert to the juvenile form at the tips of some of the branches.

Cornus capitata, an attractive member of the Cornaceae from the Himalaya, is not very hardy, but when it can be established it produces a wealth of flowers subtended by cream coloured bracts and followed by masses of purple strawberry like fruits. *Elaeagnus umbellata* is a more-or-less evergreen shrub from eastern Asia which bears creamy white flowers in the early summer. Behind it is *Zelkova carpinifolia*, a Caucasian member of the Ulmaceae, the deciduous Japanese *Magnolia kobus* and a small tree of the American walnut *Juglans nigra* (p. 26). Nearby is a specimen of *Veronica elliptica*. These shrubby flowers of the genus from New Zealand, of which a number or commonly cultivated, are often assigned to a separate genus *Hebe*.

Towards the middle of the plot is a specimen of the maidenhead tree, *Ginkgo biloba*. This gymnosperm is thought to be extinct in nature and to have survived only because it has been commonly cultivated in the monastery gardens of China. It is the only living member of the family Ginkgoaceae, which were abundant and widespread during Mesozoic times, and is a species which has persisted substantially unchanged since the Cretaceous (Fig. 50). Next to it is another Chinese gymnosperm, the dawn redwood, *Metasequoia glyptostroboides*, which, though it was thought to be extinct, was found to be still surviving in central China by a Chinese foresters in the the early 1940s. It is a member of the Taxodiaceae and one of the few conifers which are deciduous. As in the case of the swamp cypress, *Taxodium distichum*, of the south-eastern United States (p. 27), the whole of the short shoot, which bears the leaves, drops off in the autumn. The plant has pleasant light green foliage in spring and the leaves turn red before being shed. Also in this plot is *Magnolia wilsonii*, a beautiful deciduous species from China (Fig. 3). The cup-shaped pendulous flowers are up to four inches across and pleasantly scented, and are followed by purple fruits.

Near the bottom corner of Plot 6 is a plant of *Phillyrea decora* (Fig. 51), a member of the Oleaceae from western Asia which is one of the parents of the

bigeneric hybrid *X Osmarea burkwoodii*, of which there are several specimens in different parts of the garden. Near the Phillyrea is a small plant of another bigeneric hybrid, *X Gaulthetta wisleyensis*, noted above (p.17). There is also a plant *Nyssa sylvatica*, a deciduous shrub of Nyssaceae the leaves of which are very brightly coloured in the autumn. It is a native of the south-eastern United States.

Eucryphia X intermedia has already been noted (p. 42). Beside it are two other hybrids, *Ceanothus X veitchianus*, one of the many introductions of the firm of Veitch, and *Viburnum X burkwoodii*, an excellent garden plant with its clusters of fragrant pinkish flowers in spring. The handkerchief or ghost tree, *Davidia involucrata*, is a Chinese member of the Nyssaceae which bears conspicuous white bracts, hence the name. These are produced only after the tree has attained some maturity.

A Chilean member of the Solanaceae is *Cestrum parqui*, the hardiest species of a genus which, in this country, is not particularly hardy. It produces large numbers of fragrant yellow flowers in the summer. Beside it is a tulip tree (see p. 27) and another bottle brush, *Callistemon speciosus*. Near the tulip tree is a group of herbs and shrubs. The birthwort, *Aristolochia clematitis*, is a European member of the Aristolochiaceae which was cultivated in earlier times as an abortifacient and is occasionally found apparently wild in Britain. *Lomatia tinctoria* of the Proteaceae is a native of Tasmania, producing racemes of sulphur yellow flowers. *Melianthus major* of the Melianthaceae is a native of South Africa and India and is a only just hardy in this country. It produces very attractive glaucous foliage and, in a warm summer, racemes of brownish flowers. In this part of the plot there is also a small plant of *Ribes laurifolium*, an evergreen relative of the currants from China.

The first plant of note in Plot 5 is a young specimen of the Nikko fir, *Abies homolepis*, a Japanese member of the Pinaceae. Next to it is *Idesia polycarpa*, a member of the Flacourtiaceae from China which grows into a small tree bearing pendulous panicles of greenish flowers. The Indian chestnut, *Aesculus indica*, is a member of the Hippocastanaceae from the Himalaya and is useful in an ornamental tree since it bears its spikes of pinkish flowers when quite young. *Salix matsudana* 'Tortuousa' is an interesting Chinese willow with twisted leaves, twigs and branches. *Acacia rubida* is one of the wattles in which the bipinnate juvenile leaves are replaced by the adult phyllodes at an early age. The so-called London plane, *Platanus X acerifolia*, is hybrid of unknown origin between *Platanus orientalis* (p. 30) and the American *Platanus occidentalis*.

The manna or flowering ash, *Fraxinus ornus*, is a south European member of the Oleaceae. Unlike the common ash, *F. excelsior*, it bears fragrant flowers with small white petals. In front of it, *Fuchsia gottinghamii* is an attractive member of the Onagraceae with very small flowers and leaves. The fuchsias are found in South America and in New Zealand, and form a part of the so-called Fuegean flora.

Rhus cotinus is sometimes separated into another genus as *Cotinus coggygria*. It is a member of the Anacardiaceae which is found in southern Europe and right across Asia. The plumose fruiting panicles have given rise to the common name of the 'Smoke bush'. Near it is *Saxegothaea conspicua*, a Chilean member of the Podocarpaceae called Prince Albert's yew in honour of the Prince Consort. *Olearia argyrophylla* is another species of the genus of shrubby Compositae from New Zealand commonly called daisy bushes. *Desmodium tiliifolium* of the Leguminosae is from the Himalaya. *Acacia baileyana* is another of the Australian wattles which retains the juvenile pinnate leaves throughout its life.

Paulownia tomentosa from China is remarkable in that it is a member of the Scrophulariaceae which grows into a substantial tree about 50 feet high. it produces spikes of violet-coloured flowers, like those of the foxglove, at the ends of the branches. Unfortunately, the buds are formed in the autumn and may be damaged or even killed by cold winds during the winter. Near the *Paulownia* is a specimen of *Pittosporum tenuifolium*, an elegant evergreen shrub from New Zealand with pale undulate leaves and almost black twigs, and a plant of the charm bush *Kolkwitzia amabilis*, a member of the Caprifoliaceae from China which bears a profusion of pinkish flowers in the early summer.

Several plants in Plot 3 merit attention. *Koelreuteria paniculata* of the Sapindaceae grows into a small tree bearing large panicles of yellow flowers in late summer. It is a native of Korea and Japan and is commonly called the golden rain tree. Winter's bark, *Drimys winteri*, is a south American plant of the same genus as *D. aromatica*, noted above (P. 38). Introduced into cultivation in this country in 1827, it has been known since 1578, when the aromatic bark was brought back by Capt. Winter in one of Drake's ships from the Straits of Magellan. Nearby is another south American plant, the conifer *Fitzroya cupressoides*. Another conifer in this plot is the Dahurian larch, *Larix gmelinii*, which comes from Siberia and is, like all larches, deciduous.

The Exeter elm, *Ulmus glabra* 'Fastigiata', of which there is a specimen near the middle of the plot, is of special focal interest since it was introduced commercially in 1828 by one Ford who had a nursery near what is now Longbrook Street at Hill Court. It is said to be resistant to Dutch elm disease and is much esteemed by the Dutch forestry service. At the bottom edge of the plot, *Olearia solandri* is a New Zealand daisy bush with very narrow leaves. A plant of similar habit is *Leptospermum flavescens* var. *obovata*, an Australian shrub of the Myrtaceae. Finally, *Caragana arborescens* from eastern Asia is a yellow-flowered member of the Leguminosae.

At the entrance to the garden in Plot 17 the first plant to he noted is *Rosa chinensis* 'Viridiflora'. The China rose, *R. chinensis*, is the species from which many of the roses in cultivation have been developed. In the form growing here the petals are replaced by leaves. The Carolina allspice, *Calycanthus floridus* of the Calycanthaceae, is a native of the south-eastern United States but seems quite hardy in this garden (Plate 6d). The next group includes a specimen of *Cotoneaster salicifolia* a Chinese member of the Rosaceae and

another specimen of *Olearia albida*. *Rhodotypos kerrioides*, a member of the Rosaceae also from China, has attractive white flowers followed by aggregations of black drupels. *Pinus ayacahuite* has already been noted as a five-leaved pine from Mexico. The next plant, *Salix daphnoides* of the Salicaceae, is found wild in Europe and in central Asia. There is near it a plant of *Atriplex halimus*, a member of the Chenopodiaccae from southern Europe with striking grey foliage. in front of it, close to the path is a specimen of *Pernettya mucronata*, a Chilean member of the Ericaceae. *Clethra alnifolia* of the Clethraceae is a low growing shrub from the eastern seaboard of North America. It yields a nectar which makes a distinctively flavoured honey. *Euonymus alatus* of the Celastraceae is a small shrub from China closely related to the European spindle tree. *Syringa pinnatifolia* is one of the Iilacs from western China. Next to it is a *Rhus continus* 'Atropurpurea' the purple form of the smoke tree referred to above. Near this plant is a specimen of the Japanese maple *Acer palmatum* of which the leaves become brightly coloured in autumn. Beside the path is a very attractive shrubby member of the Compositae, the daisy bush *Olearia gunniana*, again from New Zealand (Fig. 53). *Corylopsis spicata* of the Hamamelidaceae is a shrub which produces pendent groups of yellow flowers in the spring making it a most attractive plant (Fig. 54). The genus *Sophota* of the Leguminosae has already been noted. The present plant is *Sophora japonica*, a native of Korea and a near relative of the kowhai of New Zealand. It grows into a fair-sized tree. Next to the meteorological enclosure are plants of *Buddleia davidii* 'Royal Reel' of both the variegated and the green form. The former is probably the more striking as the dark-coloured flowers show up against the yellowish leaves much better than they do against the green leaves of the ordinary form.

Many of the cultivated plants of gardens have double flowers and sometimes the single form has been displaced or is less commonly grown. This can be unfortunate and the single flowers of the Chinese shrub *Kerria japonica* of the Rosaceae (Fig. 55) are more pleasing than those of the double-flowered form.

Next to the path on the north side of the meteorological station is a bush of the alpine currant, *Ribes alpinum*. Beside it is a plant of *Cotoneaster pannosa*, a member of the Rosaceae native of China which grows into a large semi-evergreen shrub. Next to these is *Rhamnus alaternus* 'Variegata', a variegated form of a plant native to the Mediterranean region. *Prunus serrulata* of the Rosaceae grows into a tree up to 70 feet high and is native to Japan and China. Near the *Prunus* is a specimen of the lantern tree, *Crinodendron hookerianum*, already noted (p. 13). In front of it is a specimen of *Ceanothus rigidus*, a species with neat stiff greyish leaves. At the top of Plot 13 is a plant of *Olearia macrodonta*, another New Zealand member of the Compositae. Then there are two Chinese shrubs, *Akebia quinata*, a member of the Lardizabalaceae, a more or less evergreen climber with purple-coloured flowers, and a white double flowered form of *Deutzia scabra* of the Saxifragaceae. Further down the border is *Osmaronia cerasiformis* from western North America, a member of the Rosaceae which, though deciduous, produces its leaves and racemes of fragrant white flowers very early in the year.

A New Zealand shrubby *Veronica* of interest is *V. cupressoides* which has foliage resembling, superficially, that of the cypresses.

In Plot 14 beside the glasshouses there is a group of *Sarcococca humilis*, an evergreen shrub of the Buxaceae from China. Its small fragrant white flowers open in the early months of the year. Behind the Sarcococca is *Leycesteria formosa*, a Himalayan member of the Caprifoliaceae which produces in summer pendulous spikes of white flowers with purple bracts, followed by purple berries in the autumn. Near the entrance of the glasshouses *Indigofera gerardiana*, a Himalayan member of the Leguminosae, produces in late summer an abundance of small pink flowers in axillary racemes. In the shadier areas there are a number of cultivars of Camellia japonica, a member of the Theaceae native to China and Japan. Introduced into this country over two centuries ago, it is very widely grown in the milder areas and many cultivated varieties have been developed. There are also plants of the small-flowered *C. cuspidate*. Finally, there are several plants of the scented rhododendrons, probably cultivars of the Himalayan species *R. edgworthii*.

The Glasshouses

There are four parallel ranges of houses running east and west, connected on the east side by an unheated corridor in which are grown plants requiring only a small amount of protection, since, in the main, they come from temperate climates. The corridor also serves as a protected area along which tropical plants can he brought in cold weather from one tropical section to another and from the potting shed to the heated houses. The glasshouses are arranged at right angles to the corridor like the teeth of a comb and there are therefore three bays which are protected from the east and north and are flanked by the heated houses on two sides. In them it has been possible to grow a series of plants which are normally too tender to be grown outside. Examples are *Cassia corymbosa* from tropical America, a member of the Leguminosae with yellow flowers, and various species of *Hedychium*, tropical members of the family Zingiberaceae. A somewhat tender hybrid of local interest is the Exeter hybrid acacia, raised by Veitch (Fig.56). Its parents are believed to have been *A. verticillata* and *A. riceana*.

There are about a thousand different species of plants in the nine sections of the three main ranges of the houses. The first section in each range is used for tropical plants from many parts of the world and the temperature is maintained by thermostatically controlled oil heating at a minimum of 65F (18C). Three sections are devoted to plants from warm temperate zones and, of the other three, one is used for a collection of ferns, mosses and allied plants, one for cacti and other succulent plants and one for slightly tender flowering plants. The fourth range is given over to propagating frames and houses used to grow disease-free plants for the research work in the Department of Botany.

To the west and south sides of the range of glasshouses there is about half an acre of garden planted with a variety of herbaceous plants which are used for both teaching and research.

One other tree in the neighbourhood of the Hatherly Laboratories deserves special note. This is the specimen of the Cedar of Lebanon between the building and the Streatham Hall farm house (Figs. 57, 58). This Cedar, *Cedrus libani*, is rather less commonly grown in this part of Britain than is the Atlas cedar, *Cedrus atlantica*. Between the cedar and the farm house there is a plant of *Cephalotaxus fortuni*, a native of China introduced by Fortune in 1848.

Chapter 7 - The Grounds of the Halls of Residence

Thomas Hall

The Manor of Duryard is mentioned in Domesday Book. It was acquired and owned for several centuries by the City of Exeter which ultimately sold it in lots towards the end of the 17th century. The main house on the estate when it was broken up was Great Duryard House, built by Sir Thomas Jefferd about 1690. This house still stands and, although considerably altered in Victorian times, is the very attractive building known since 1936 as Thomas Hall. In addition to Great Duryard House, there were in the middle of the 19th century at least two other houses of distinction in the vicinity, namely Duryard House built in 1700 and Duryard Lodge, already noted as being on the site on which Reed Hall was built.

Thomas Hall is in a particularly beautiful setting with a stream running through the grounds. A very pleasant bog garden has been made containing many waterside plants such as Rogersias, primulas and Japanese irises. One of the outstanding features of the gardens is some splendid groups of *Gunnera chilensis* which has leaves six feet across with stalks of appropriate size (Fig. 59). Near the bog garden are half-a-dozen plants of the Chusan palm, Trachycarpus fortunei, about 20 ft high (Fig. 61) and a large bed of bamboos.

There are some very fine trees in these grounds. Of the two Monterey pines, Pinus Radiata, the one in the north-east corner is over 100 ft-high and has a girth of more than 14 feet. There are three fine specimens of the Atlas cedar, *Cedrus atlantica*, the tallest nearly 70 ft high; one is the attractive 'Glauca' form. Two trees of *Cupressus macrocarpa* are over 100 ft high with a girth of 17 ft; the smaller tree on the north-east boundary is outstandingly well-shaped (Fig. 62).

There are several fine wellingtonias and, near the bridge, an Eastern hemlock, *Tsuga canadensis*.

There are also three Exeter oaks, *Quercus x Hispanic ' Lucombeana'* which are more or less evergreen in habit, more like the *Quercus suber* parent in this respect though the bark is similar to that of *Quercus cerris*. The special interest of these specimens, however, is that they have clearly been grafted on to *Quercus Robur* (63). It may well be that these are from the original tree raised by Lucumbe as all the plants of this hybrid that he distributed were grafted.

In front of the house there is a row of six trees. At each end of the balustrade there is a round headed Californian buckeye chestnut, *Aesculus californica*. The paper bark maple, *Acer griseum* (Plate 5a), which is attractive at all times of the year, grows between the two buckeyes together with a snowdrop tree, *Halesia monticola*, which flowers in May, and next to it there are a spindle tree *Euonymus europaeus* and a specimen of autumn flowering cherry *Prunus subhirtella 'Autumnalis'*.

The east side of house is covered by a large leaved vine, *Vitis coignetiae*. In autumn the very fine colouring of the leaves makes a magnificent sight against the grey walls of the house. Close by there are two good specimens of the laurel magnolia, *Magnolia grandiflora*. Though its natural home is Florida and the cream petalled flowers 10 inches across are bourne throughout the summer months in this country and have a characteristic scent.

In the grounds, incidentally, is one of the few walls of typical Devon cob that the University owns.

The Duryard Halls

Duryard House was built some 10 years later than Great Duryard but the style is completely different. Today it is the focal point of the Duryard Halls - Hetherington, Murray, Jesse Montgomerie and Moberly. The original house has been carefully restored in many cases using the original bricks, and the conservatory has also been incorporated into the building as the Astor Library.

The lay-out is a fine example of landscaping for a new road was cut through the grounds and the levels of the land were altered. By this means and by staggering the buildings, uninterrupted views of the old house were retained. In effecting this, the architect has been able to leave in situ some specimen wellingtonias (Fig. 64).

The site of the Duryard Halls is sheltered since it stands a little above the frost pocket formed by the River Exe. The buttercup bush, *Cassia corymbosa*, is to be found growing against the walls together with *Cestrum newellii* and the night scented *Cestrum parqui*. In the shelter of the building, there is a specimen of the Brazilian shrub Puya alpestris of the Bromeliaceae. There is also a representative collection of hydrangeas and of Penjerrick hybrid rhododendrons. In the grounds of the Duryard Halls are some of the trees planted by members of the Exeter University Club in memory of students who died in the two world wars.

Barton Place

This house was built by a Mr Merrivale in 1797 near the site of an old farmhouse, of which the kitchen, the dairy and old courtyard are still to be seen. The house commands views of the Exe and the Creedy valleys and was originally approached by an avenue of elms from the direction of Stoke Woods. Most of these trees have been felled in recent times and their stumps

can still be seen. There are still a few standing behind the house and they make a noteworthy group being the smooth leaved elm *Ulmus carpinifolia*, seldom seen near Exeter, though it is a native of these islands and common in the eastern parts of England.

The original owner and his bailiff laid out and maintained the gardens and most of the mature trees still standing were probably planted during their lifetime. The bailiff's name has been perpetuated as the road on the southern boundary of the grounds is known as Wreford's Lane. In 1829 the entrance was altered and a road was constructed from the front running in a north-westerly direction. The arrival of the railway in Exeter in 1843, however, prompted the family to make a further entrance in the direction of Exeter and this is the one in use today.

The Merrivale family remained in Barton Place until 1911 and the house was bought in 1916 by Lord William Cecil, Bishop of Exeter. From 1935 it was the home of Principal Murray. It was sold to the College in 1948 and was used as a hall of residence for women until 1965. Since then it has been a residence for male postgraduate students.

Of the trees at the Wreford's Lane entrance, the first specimens of note are a fine holm oak, *Quercus ilex*, on the east side of the drive, and another evergreen oak, probably *Quercus X hispanica 'Lucombeana'*, to the West in the field in front of the house. Around this field are several large London planes, *Platanus X acerifolia* (Fig. 65). The beech trees at Barton Place are among the best on the University Estate and are excellent specimens, though this is not ideal country for beeches. One specimen to the south of the old avenue running down to the Stoke Cannon road has a girth of more than thirteen feet and is over 90 ft in height. There is a fruiting specimen of the Spanish chestnut, *Castanea sativa*, growing in front of the house, and beside it is a wellingtonia, *Sequoiadendron giganteum.* On the rising ground behind the house are several large yews, Taxus baccata, one with a spread over by 100 ft. Among the yews is a sawara cypress of Japan, *Chamaecyparis pisifera 'Squarrosa'*, with distinctly blue foliage. This stands some fifty feet high and has a girth of five feet. The nearby tulip tree, *Liriodendron tulipifera*, reaches a height of 70 feet. The cedar in this area is a cedar of Lebanon, *Cedrus libani*, and is 70 ft high. Other noteworthy conifers at Barton Place are a Monterey pine, *Pinus radiata*, and a monkey puzzle, *Araucaria araucana*.

Crossmead

In contrast to Barton Place, the house at Crossmead on the western outskirts of the City is of little architectural interest. It was built about 1893 and some additions were made in 1922. There are, however, in the ground of 11 acres which the University acquired in 1944, three very attractive Georgian villas which were built in 1829.

Certain deciduous trees on the boundary have reached full maturity and there are various conifers which have been introduced since the original plantings. The blues spruces around the lily pond and the swimming pool are very

handsome trees and there are also one or two good specimens of juniper. Unfortunately, some of the trees of the later planting are too crowded.

Perhaps the most striking feature of the grounds is the scarlet chestnuts which line each side of the main drive. These, unhappily, were planted much too close together and some of the trees are, consequently, in poor condition.

Lopes Hall

The original house, known as 'Highlands', and seven acres of land was bought in 1930 by the University College of the South West, from a Mr Tremlett. The main wing, designed with Dutch gables by Dr Vincent Harris was added in 1933. The house was renamed Lopes Hall after Sir Henry Lopes, a generous benefactor of the University College.

The grounds are at their best in the spring when the cherry trees on either side of the drive to the hall are in flower. The older cherries on the left-hand side of the drive were part of the gift of varieties *Prunus serrulata* made by the Japanese government in 1937.

The Lopes Hall gardens are surrounded by a fine belt of mature trees containing a mixture of conifers and broad-leaved species. On the north side, the Hall is well screened by a line of holm oaks, *Quercus ilex*. On the east side of the main drive there is a group of hybrid oaks, almost certainly *Quercus X hispanica 'Lucombeana'*.

A recent addition to the hall is the Ransom Pickard building, opened in 1967. The trees in the neighbourhood of this building have been preserved and have now been underplanted with a collection of rhododendrons and camellias.

Hope Hall

Hope hall was, as has been noted, one of the earliest halls acquired by the College in the neighbourhood of the Streatham Estate and an additional wing was added through the generous gift of Miss Hope, to the original house 'Homefield'. When Prince of Wales Road was constructed it went through the gardens of Hope Hall so now the former gate lodge of the house is on the opposite side of Prince of Wales Road.

Like most of the Halls of Residence of the University, Hope Hall is fortunate in being situated in gardens with trees and shrubs. There are few plants in them however which have not been already noted on other parts of the Estate.

Among the trees specially worthy of note are two wellingtonias and two redwoods, *Sequoia sempervirens*. One of the latter was cut down about twenty years ago and a number of shoots grown up from the cut stems. This feature, unusual among conifers, has already been discussed. Other large trees in the gardens are two Monterey pines and two Austrian pines. Again worthy of note are some bay trees and a winter flowering cherry, *Prunus*

subhirtella 'Autumnalis', a white beam, *Sorbus aria*, an *Azara dentata* and two specimens of *Pittosporum tobira*.

The annexes of Montefiore House and Lazenby House, purchased later, are so named in appreciation of the generosity of the Hon. Mrs Ida Sebag-Montefiore and of Miss Lazenby, both of whom took a great interest in the University College.

The Grounds and Gardens of the University of Exeter - All the figures

Fig 1. Queen's Building: trees of Pinus sylvestris and pond

Fig 2. Northcote House: daffodils and an Exeter Oak, Quercis X hispanica 'Lucumbeana'

Fig 3. Magnolia wilsonii, near Refectory

Fig 4. The lawns and terraces to the south and east of Streatham Hall, 1899 (Country Life)

Fig 5. The terraces below Reed Hall, 1969

Fig 6. Hiba, Thujopsis dolabrata

Fig 7. Bhutan cypress, Cupressus torulosa

Fig 8. White cypress, Chamaecyparis thyoides 'Andelyensis'

Fig 9. Hanoki cypress, Chameacyparis obtusa

Fig 10. Western red cedar, Thuja plicata

Fig 11. Cones of Bishop pine, Pinus murica

Fig 12. Cones of Monterey pine, Pinus radiata

Fig 13.Colletia cruciata

Fig 14. Chinese juniper, Juniperus chinensis

Fig 15. Tiger-tail spruce, Picea polita, near Reed Hall

Fig 16. Cones of tiger-tail spruce, Picea polita

Fig 17. Crinodendron hookerianum

Fig 18. Foliage, cone and staminate strobili of Chinese fir, Cunninghamia lanceolata

Fig 19. Quercus acuta

Fig 20. Tree of heaven, Ailanthus altissima

Fig 21. Foliage and cone of wellingtonia, Sequoiadendron giganteum

Fig 22. Foliage and cones of redwood, Sequoia sempervirens

Fig 23. Fruiting branch of Podocarpus salignus

Fig 24. Cones of Bhutan pine, Pinus wallichiana

Fig 25. Fruiting branch of plum-fruited yew, Podocarpus andinus

Fig 26. The pinetum from Queen's Building

Fig 27. Japanese larch, Larix kaempferi, with cones and young ovulate strobilus

Fig 28. Antarctic beech, Nothofagus antarctica, in snow

Fig 29. Umbrella pine, Sciadopitys verticillata

Fig 30. Chinese witch hazel, Hamamelis mollis

Fig 31. Californian nutmeg, Torreya californica, and Japanese maple, Acer palmatum. Reed Hall rock garden

Fig 32. Japanese hemlock, Tsuga diversifolia, showing upper and lower surface of leaves

Fig 33. Black walnut, Juglans nigra

Fig 34. Willow leaved pear, Pyrus salicifolia

Fig 35. Foliage and cones of Japanese cedar, Cryptomeria japonica

Fig 36. Oak by Reed pond

Fig 37. Brewer's spruce, Picea breweriana

Fig 38. Flowering cherries in front of the Washington Singer laboratories

Fig 39. Garrya elliptica

Fig 40. Griselinia littoralis

Fig 41. Mathematics and Geology Building and the pond above the plantation

Fig 42. Wintersweet, Chimonanthus praecox

Fig 43. Staminate (left) and ovulate (right) flowers of Drimys aromatica

Fig 44. Hymenanthera obovata

Fig 45. Azara petiolaris

Fig 46. Grevillea rosmarinifolia

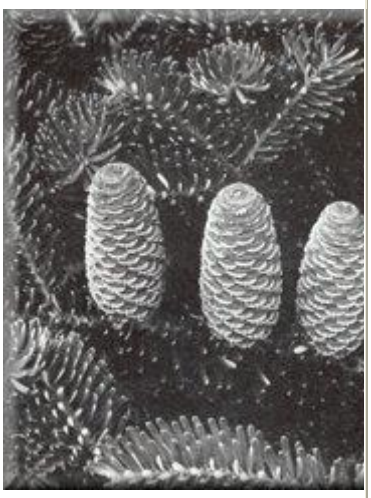


Fig 47. Korean fir, Abies koreana

Fig 48. Fothergilla monticola

Fig 49. Silver wattle, Acacia dealbata

Fig 50. Maidenhair tree, Gingko biloba

Fig 51. Phillyrea decora

Fig 52. Acacia rubida

Fig 53. Olearia gunniana

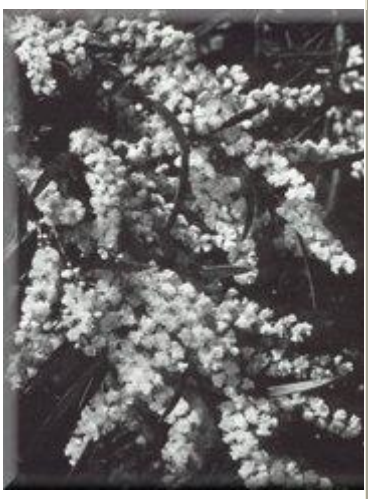


Fig 54. Corylopsis spicata

Fig 55. Kerria japonica (single form)

Fig 56. Acacia 'Exeter Hybrid'

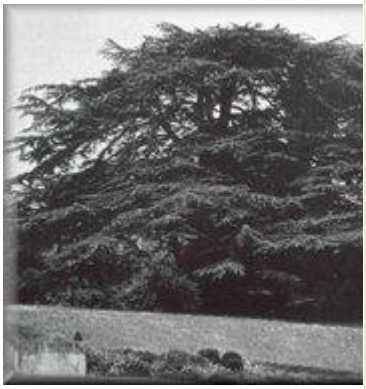


Fig 57. Cedar of Lebanon, Cedrus libani, near Hatherly Laboratories

Fig 58. Cones of cedar of Lebanon, Cedrus libani

Fig 59. Thomas Hall: Gunnera chilensis in foreground

Fig 60. The grounds of Thomas Hall

Fig 61. Chusan palm, Trachycarpus fortunei

Fig 62. Monterey cypress, Cupressus macrocarpa, Thomas Hall

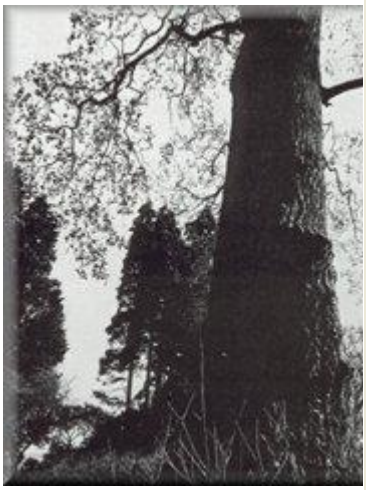


Fig 63. Evergreen tree of Quercus X Hispanica 'Lucumbeana' grafted onto Q. robur

Fig 64. The Duryard Halls

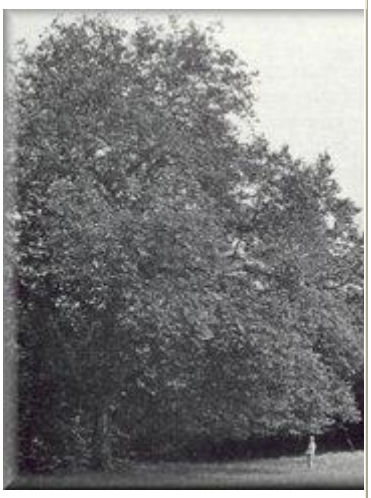


Fig 65. London plane, Platanus X acerifolia, Barton Place

The Grounds and Gardens of the University of Exeter - All the colour plates

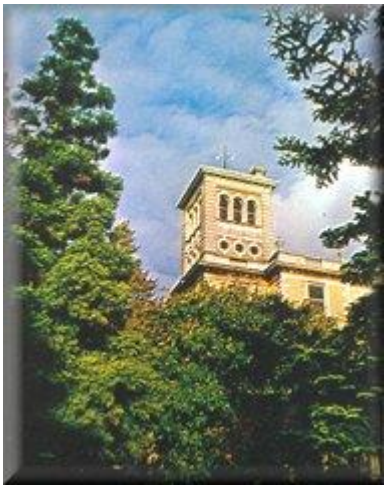


Plate 1a) Japanese cedar, Cryptomeria japonica in front of Reed Hall

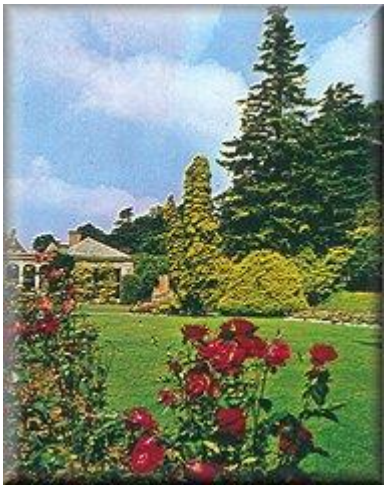


Plate 1b) Lawn and terraces east of Reed Hall, with St Lucia Fir, Abies bracteata

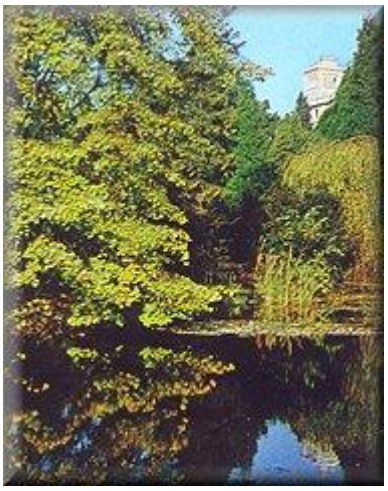


Plate 1c) Reed pond

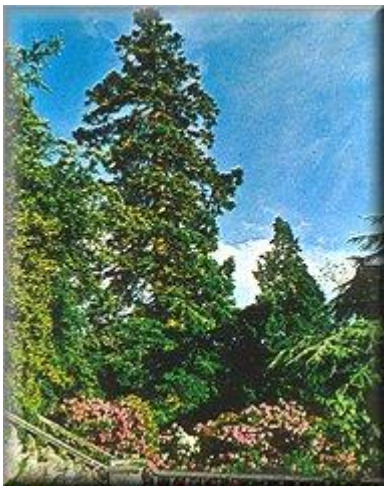


Plate 1d) Rhododendrons and wellingtonia, Sequoiadendron giganteum, south of Reed Hall

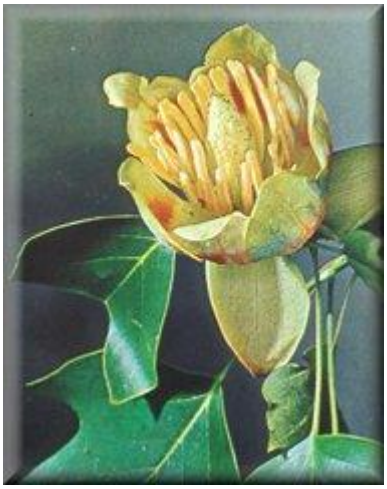
Plate 2a) Near the junction of the Queen's Drive and Streatham Drive: Japanese cedar, Cryptomeria japonica, and swamp cypress, Taxodium distichum	Plate 2b) The rock garden, Reed Hall
 Plate 3a) Carpenteria californica	 Plate 3b) Indian Bean, Calatpa bignonioides
 Plate 3c) Tulip tree, Lirodendron tulipifera	 Plate 3d) Passion flower, Passiflora caerulea

Plate 4a) Embothrium coccineum

Plate 4b) Clematis orientalis

Plate 4c) Cistus ladaniferous

Plate 5. Autumn colour

Plate 5a) Acer griseum at Thomas Hall

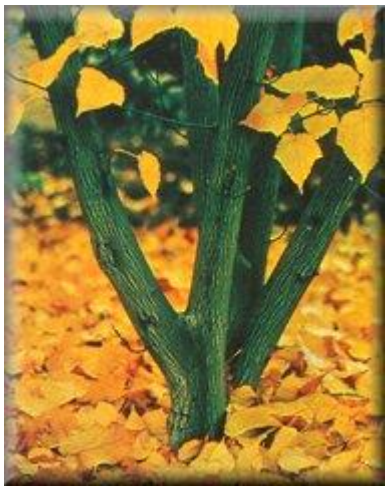


Plate 5b) Acer hersii

Plate 5c) Fothergilla monticola

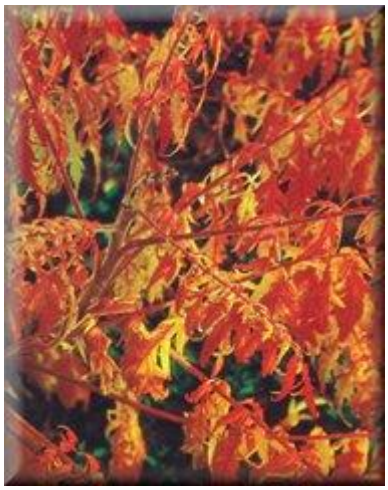


Plate 5d) Rhus typhina

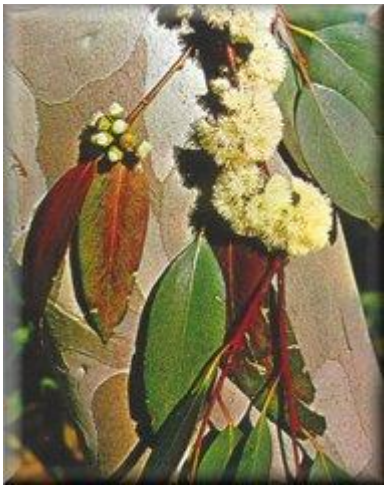


Plate 6a) Eucalyptus pauciflora X coccifera

Plate 6b) Azara dentata

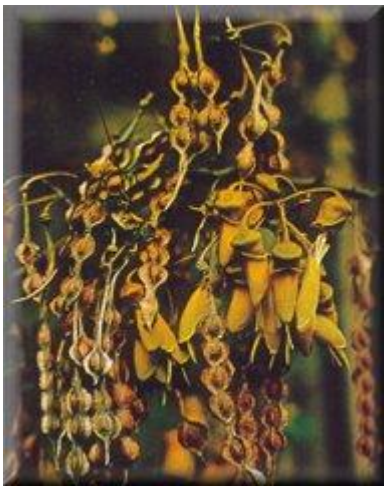


Plate 6c) Flowers and fruit of Sophora tetraptera

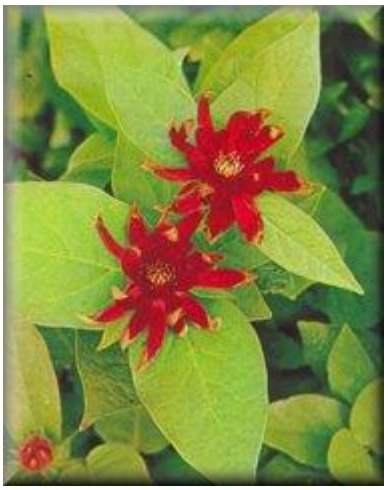


Plate 6d) Calycanthus floridus

Plate 7a) Autumn colour of Liquidambar styraciflua and Parrotia persica

Plate 7b) Weinmannia trichosperma

Plate 7c) Clerodendrum fargesii in fruit

Plate 8. Some plants in the glasshouses

Plate 8a) Epidendrum stanfordianum

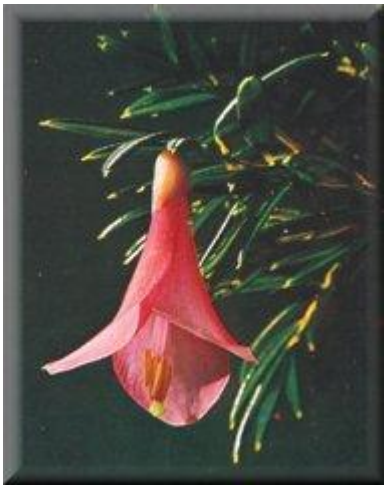


Plate 8b) Philesia magellanica

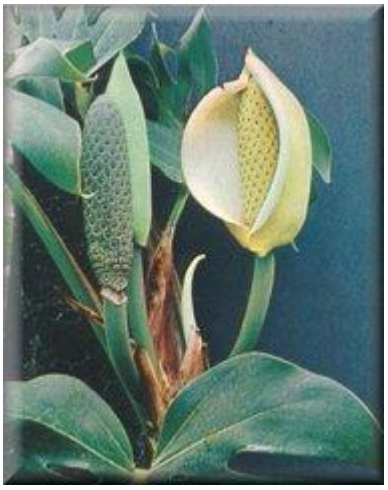
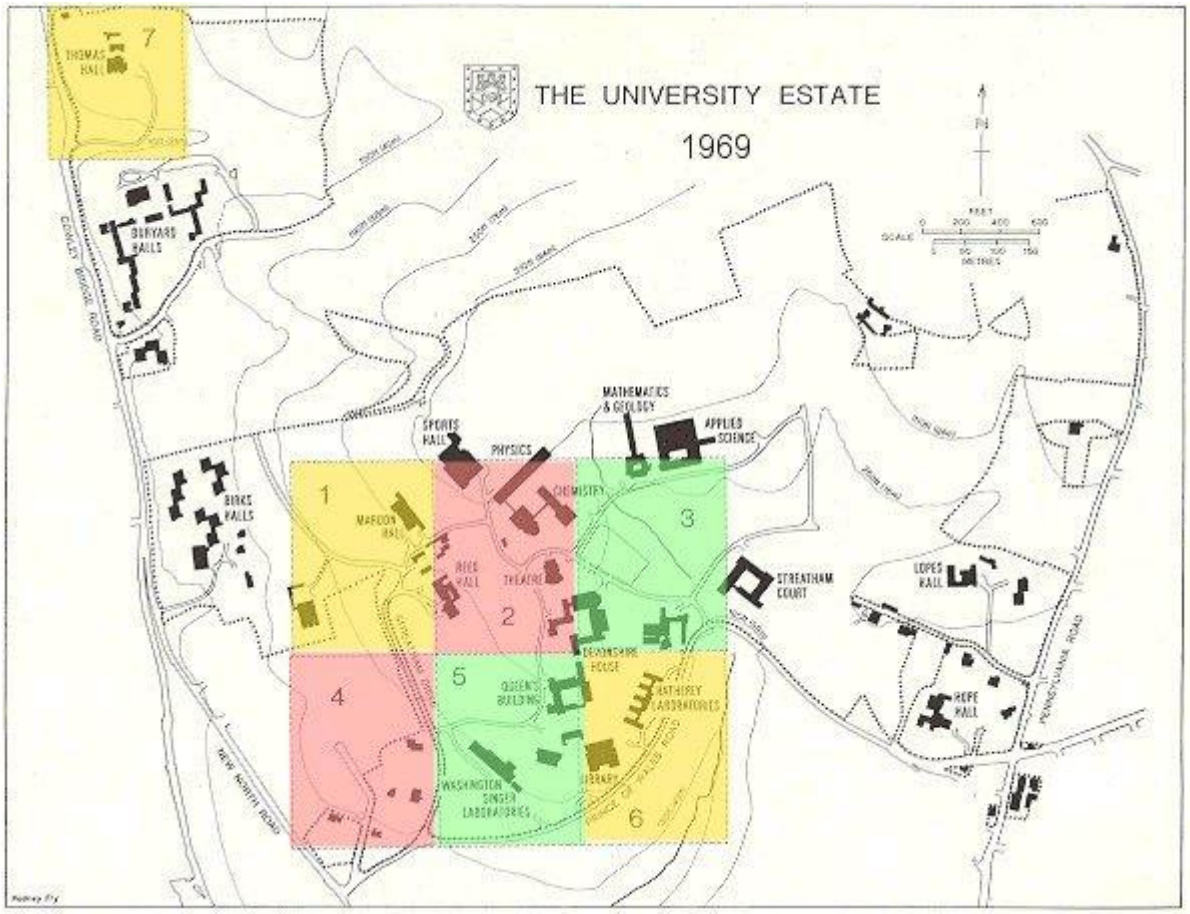


Plate 8c) Monstera deliciosa

Plate 8d) Columnea microphylla

Map and Sectional Plans of the Estate

The areas covered by the numbered sectional plans are shown on the general map of the University Estate below. The placing of the trees and shrubs on the plans is only approximately to scale.



The plants, with their reference numbers, are listed in alphabetical order of their Latin names, and cultivar names where applicable. A few miscellaneous items are included at the end of the list.

1	*Abies ambilis*	Red silver fir
2	*x bommuelleriana*	
3	*bracteata*	Santa Lucia fir
4	*cephalonica*	Grecian fir
5	*concolor*	Colorado White fir
6	*delavayi var. forrestii*	
7	*firma*	Japanese fir
8	*grandis*	Giant fir
9	*homolepis*	Nikko fir
10	*magnifica*	Californian red fir
11	*nordmanniana*	Caucasian fir
12	*numidica*	Algerian fir

13	*pinsapo*	Spanish fir
14	*procera*	Noble fir
15	*procera 'Glauca'*	Noble fir
16	*Acacia dealbata*	Silver wattle
17	*Acer capillipes*	
18	*griseum*	Paper bark maple
19	*hersii*	
20	*japonicum 'Aconitifolium'*	Coral bark maple
21	*palmatum*	Japanese maple
22	*palmatum (cultivars)*	
23	*pictum*	Painted maple
24	*platanoides*	Norway maple
25	*platanoides 'Crimson king'*	Purple leaved Norway maple
26	*pseudoplatarms*	Sycamore
26a	*rufinerve*	
27	*saccharinum*	Silver maple
28	*Aesculus californica*	Californian buckeye chestnut
29	*X carnea*	Red horse chestnut
30	*hippocastanum*	Horse chestnut
31	*indica*	Indian horse chestnut
32	*Ailanthus altissima*	Tree of Heaven
33	*Alnus glutinosa*	Common alder
34	*Amelanchier canadensis*	
35	*Araucaria araucana*	Monkey puzzle
36	*Arbutus unedo*	Strawberry tree
37	*Athrotaxis selaginoides*	King Williarn pine
38	*Azara microphylla*	
39	*petiolaris*	
40	*Berberis darwinii*	
41	*x stenophylla*	
42	*Berberis spp.*	Barberries
43	*Betula ermanii*	
44	*japonica var. mandschurica*	Japanese white birch
45	*papyrifera*	Paper or canoe birch
46	*pendula*	Silver birch
47	*pendula 'Dalecarlica'*	Swedish birch
48	*Buddleia alternifolia*	
49	*Calocedrus decurrens*	Incense cedar
50	*Camellia japonica*	
51	*japonica 'White Swan'*	
52	*Carpenteria californica*	Californian anemone bush

53	*Carpinus betulus*	Hornbearn
54	*betulus Pyramidalis'*	Fastigiate hornbeam
55	*Cassia corymbosa*	Buttercup bush
56	*Castanea sativa*	Spanish chestnut
57	*Catalpa bignonioides*	Indian bean tree
58	*Cedrus atlantica*	Atlas cedar
59	*atlantica 'Glauca'*	Blue Atlas cedar
60	*deodara*	Deodar
61	*libani*	Cedar of Lebanon
62	*Cephalotaxus fortuni*	Chinese plum yew
63	*harringtonia*	Cow's tail pine
64	*harringtonia 'Fastigiata'*	
65	*harringtonia var. drupacea*	Cow's tail pine
66	*Ceratostigma willmottianum*	
67	*Cercidiphyllum japonicum*	Katsura tree
68	*Cercis siliquastrum*	Judas tree
69	*Chamaecyparis lawsoniana*	Lawson's cypress
70	*lawsoniana 'Allumii'*	Scarab cypress
71	*lawsoniana 'Columnaris'*	
72	*lawsoniana 'Erecta'*	
73	*lawsoniana 'Erecta Aurea'*	
74	*lawsoniana 'Filiformis'*	
75	*lawsoniana 'Fletcheri'*	
76	*lawsoniana Traseri'*	
77	*lawsoniana Tycopodioides'*	
78	*lawsoniana 'Stewartii'*	Golden Lawson's cypress
79	*lawsoniana 'Triomf van Boskoop'*	
8o	*lawsoniana 'Wisselii'*	
81	*nootkatensis*	Nootka cypress
82	*nootkatensis 'Argenteo-Variegata'*	
83	*obtusa*	Hinoki cypress
84	*pisifera 'Filifera Aurea'*	
85	*pisifera Tlumosa'*	Sawara cypress
86	*pisifera Tlumosa Aurea'*	
87	*pisifera 'Squarrosa'*	
88	*thyoides*	White cypress
88a	*thyoides 'Andelyensis'*	
89	*Choisya ternata*	Mexican orange blossom 3
90	*Cissus striata*	
91	*Cistus spp.*	Rock roses
92	*Clematis armandii*	

93	*x hatherliensis*	
94	*montana*	
95	*Clerodendrum fargesii*	
96	*Clianthus puniceus*	Lobster claw or Parrot's bill
97	*Colletia cruciata*	
98	*Cordyline australis*	Cabbage palm
98a	*Cornus capitata*	
99	*florida*	Flowering dogwood
100	*mas*	Cornelian cherry
101	*nuttallii*	
102	*Cotoneaster microphylla*	
103	*Crataegus X carrierei*	
104	*Crinodendron hookerianum*	Lantern tree
105	*Cryptomeria japonica*	Japanese cedar
106	*japonica 'Elegans'*	
107	*Cunninghamia lanceolata*	Chinese fir
108	*X Cupressocyparis leylandii*	Leyland cypress
109	*Cupressus glabra*	Smooth barked Arizona cypress
110	*lusitanica*	Cedar of Goa or Mexican cypress
111	*macrocarpa*	Monterey cypress
112	*macrocarpa 'Goldcrest'*	
113	*macrocarpa 'Lutea'*	
114	*sempervirens*	Mediterranean cypress
115	*torulosa*	Bhutan cypress
116	*Cytisus battandieri*	Pineapple broom
117	*Davidia involucrata*	Handkerchief tree
118	*Decaisnea fargesii*	
119	*Dritnys winteri*	Winter's bark
120	*Eleagnus X ebbingei*	
120a	*umbellatus*	
121	*Embothrium coccineum*	Chilean fire bush
122	*Erica spp. etc.*	Heathers
123	*Eriobotrya japonica*	Japanese loquat
124	*Erythrinia crista-galli*	Coral tree
125	*Eucalyptus globulus*	Blue gum
126	*gunnii*	Cider gum
127	*Eucryphia glutinosa*	
128	*x nymansensis*	
129	*Euonymus europaeus*	Spindle tree

130	*japonicus*	Euonymus, evergreen spindle tree
131	*Fagus sylvatica*	Beech
132	*sylvatica Fastigiata'*	Fastigiate beech
133	*sylvatica 'Heterophylla'*	Fern leaved beech
134	*sylvatica 'Pendula'*	Weeping beech
135	*sylvatica Turpurea'*	Purple beech
136	*Fatsia.japonica*	Castor oil plant
137	*Feijoa sellowiana*	
138	*Ficus carica*	Common fig
139	*Fitzroya cupressoides*	Alerce
140	*Fraxinus angustifolia*	
141	*excelsior*	Common ash
142	*ornus*	Manna ash
143	*Fuchsia magellanica*	
144	*Garrya elliptica*	
145	*Gaultheria shallon*	Shallon
146	*Ginkgo biloba*	Maidenhair tree
147	*Gleditschia triacanthus 'Inermis'*	Honey locust
148	*Griselinia littoralis*	
149	*Gunnera chilensis*	
150	*Gymnocladus dioica*	Kentucky coffee tree
151	*Halesia monticola*	Snowdrop tree
152	*Hamamelis mollis*	Chinese witch hazel
153	*Hedera colchica*	
154	*Hippophae rhamnoides*	Sea buckthorn
155	*Hoheria lyallii*	
156	*Hydrangea petiolaris*	
157	*Ilex x altaclarensis 'Camellifolia'*	Spineless broad leaved holly
158	*x altaclarensis 'Lawsoniana'*	
159	*aquifolium*	Holly
160	*aquifolium 'Argenteomarginata'-*	
161	*aquifolium 'Argenteomarginata Pendula'-*	
162	*aquifolium 'Aurea'*	Golden holly 1
163	*aquifolium 'Aurea Pendula'*	Golden weeping holly
164	*aquifolium 'Ferox Aurea'*	Golden blotched hedgehog holly
165	*aquifiolium 'Fructu-luteo'-*	Yellow berried holly
166	*aquifolium 'Silver Queen'*	
167	*Juglans nigra*	Black walnut
168	*regia*	Common walnut

169	*Juniperus chinensis*	Chinese juniper
170	*communis 'Oblonga Pendula'*	
171	*communis 'Stricta'*	Irish juniper
171a	*excelsa*	Grecian juniper
172	*horizontalis*	Creeping juniper
173	*sabina 'Tamariscifolia'*	Savin
174	*virginiana*	Pencil cedar
175	*virginiana 'Cupressifolia'*	
176	*Laburnum anagyroides*	Common laburnum
177	*Larix decidua*	European larch
178	*kaempferi*	Japanese larch
179	*Laurus nobilis*	Sweet bay
180	*Leptospermum spp.*	New Zealand tea tree
181	*Ligustrum lucidum*	
182	*Liquidambar styraciflua*	Sweet gum
183	*Liriodendron tulipifera*	Tulip tree
184	*Lomatia ferruginea*	
185	*Magnolia campbellii*	
186	*delavayi*	
187	*grandiflora*	Laurel magnolia
188	*kobus*	
189	*macrophylla*	
190	*obovata*	
191	*salicifolia*	
192	*sargentiana*	
193	*X soulangeana 'Lennei'*	
194	*wilsonii*	
195	*Mahonia lomarifolia*	
196	*Malus floribunda*	Japanese crab
197	*X lemoinei*	
198	*Mandevilla suaveolens*	Chilean jasmine
199	*Metasequoia glyptostroboides*	Dawn redwood
200	*Myrtus communis*	Common myrtle
201	*communis 'Tarentina'*	Tarentum myrtle
202	*Nothofagus antarctica*	Antarctic beech
203	*dombeyi*	
204	*obliqua*	Rob1e beech
205	*Olearia macrodonta*	
206	*nummularifolia*	Daisy bush
207	*solandri*	
208	*Osmanthus delavayi*	

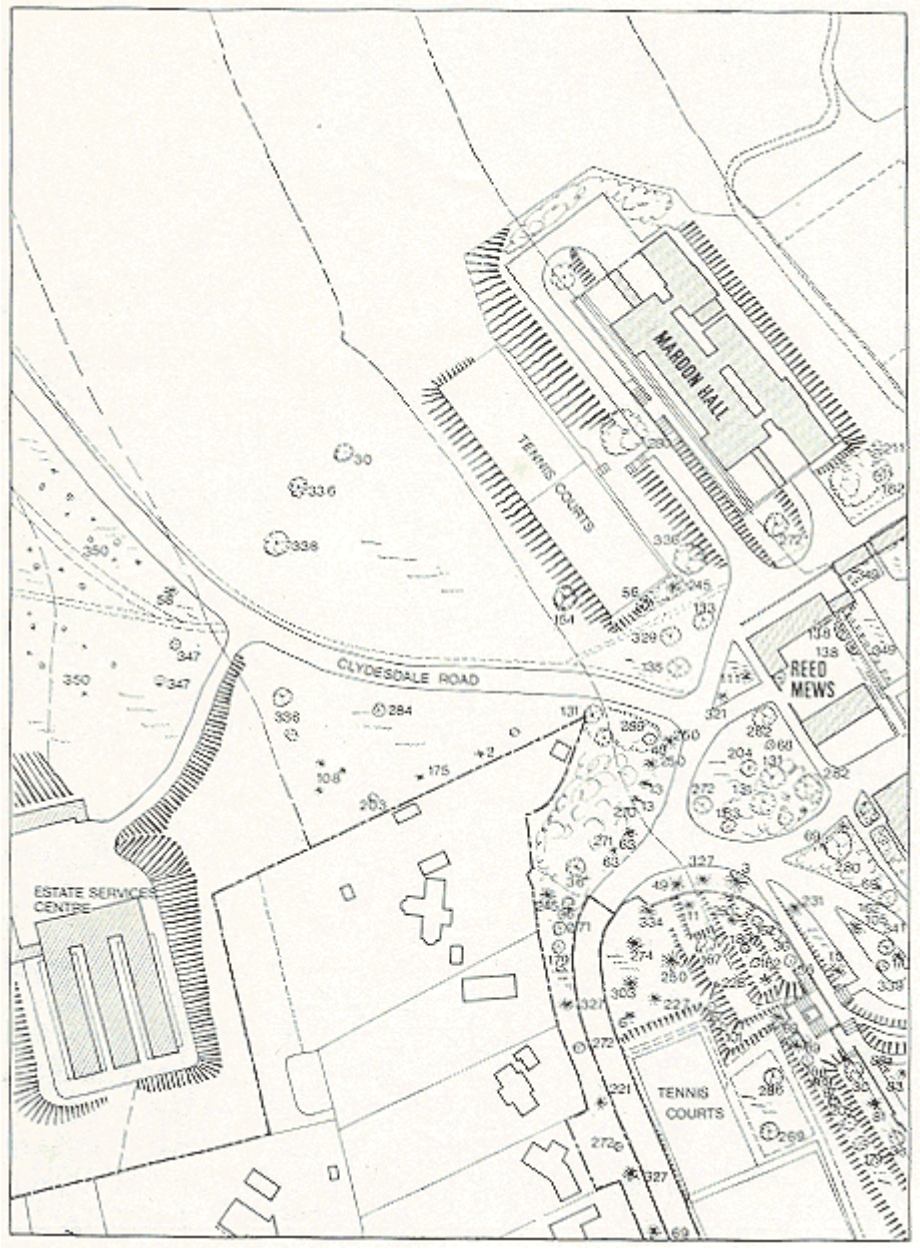
209	*x Osmarea burkwoodii*	
210	*Osmunda regalis*	Royal fern
211	*Parrotia persica*	Iron Tree
212	*Parthenocissus henryana*	
213	*Passiflora caerulea*	Passion flower
214	*Paulownia tomentosa*	
215	*Phellodendron japonicum*	
216	*Phillyrea angustifolia*	
217	*Phormium tenax*	New Zealand flax
218	*tenax 'Veitchii'*	New Zealand flax
219	*Photinia serrulata*	Chinese hawthorn
220	*Picea abies*	Norway spruce
221	*breweriana*	Brewer's weeping spruce
222	*engelmannii*	Engelmann's spruce
223	*glauca*	White spruce
224	*jezoensis*	Yezo spruce
225	*mariana*	Black spruce
226	*omorika*	Serbian spruce
227	*orientalis*	Oriental spruce
228	*polita*	Tiger tail spruce
229	*pungens*	Colorado spruce
230	*sitchensis*	Sitka spruce
231	*smithiana*	West Himalayan spruce
232	*Pinus ayacahuite*	Mexican white pine
233	*banksiana*	Jack pine
234	*cembra*	Arolla pine
235	*contorta*	Lodgepole pine
236	*densiflora*	Japanese red pine
237	*greggii*	Gregg's pine
238	*halepensis*	Aleppo pine
239	*X hoyordiana*	
240	*jeyreyi*	Jeffrey's pine
241	*mugo*	Dwarf mountain pine
242	*muricata*	Bishop pine
243	*nigra var. caramanica*	Crimean pine
244	*nigra var. maritima*	Corsican pine
245	*nigra var. nigra*	Austrian pine
246	*parviflora*	Japanese white pine
246a	*peuce*	Macedonian pine
247	*pinaster*	Maritime pine
248	*pinea*	Stone pine

249	*ponderosa*	Western yellow pine
250	*radiata*	Monterey pine
251	*rigida*	Northern pitch pine
252	*strobus*	Weymouth pine
253	*sylvestris*	Scots pine
254	*tabuliformis*	Chinese pine
255	*thunbergii*	Black pine
256	*wallichiana*	Bhutan pine
257	*Pittosporum tenuifolium 'Silver Queen'*	
258	*Platanus orientalis*	Oriental plane
259	*Podocarpus acutifolius*	
260	*alpinus*	
261	*andinus*	Plum fruited yew
262	*macrophyllus*	
263	*salignus*	
264	*Polygonum baldschuanicum*	Russian vine
265	*Poncirus trifoliata*	Trifoliate orange
266	*Populus nigra var. italica*	Lombardy poplar
267	*trichocarpa*	Western balsam poplar
268	*Prunus avium*	Gean
268a	*avium 'Plena'*	Double gean
269	*cerasifera 'Atropurpurea'*	Purple plum
270	*laurocerasus*	Cherry laurel
271	*lusitanica*	Portugal laurel
272	*serrulata etc.*	Japanese cherry
273	*subhirtella 'Autumnalis'*	Winter flowering cherry
274	*Pseudotsuga menziesii*	Douglas fir
275	*Ptelea trifoliata*	
276	*Punica granaturn*	Pomegranate
277	*Pyrus salicifolia*	Willow leaved pear
278	*Quercus acuta*	Japanese evergreen oak
279	*Quercus borealis*	Red oak
280	*cerris*	Turkey oak
281	*coccinea*	Scarlet oak
282	*X hispanica 'Lucombeana'*	Exeter oak
283	*ilex*	Holm oak
284	*palustris*	Pin oak
285	*robur*	Common oak
286	*robur 'Asplenifolia'*	Fern leaved oak
286a	*Raphiolepis delavayi*	
287	*Rhododendron augustinii*	

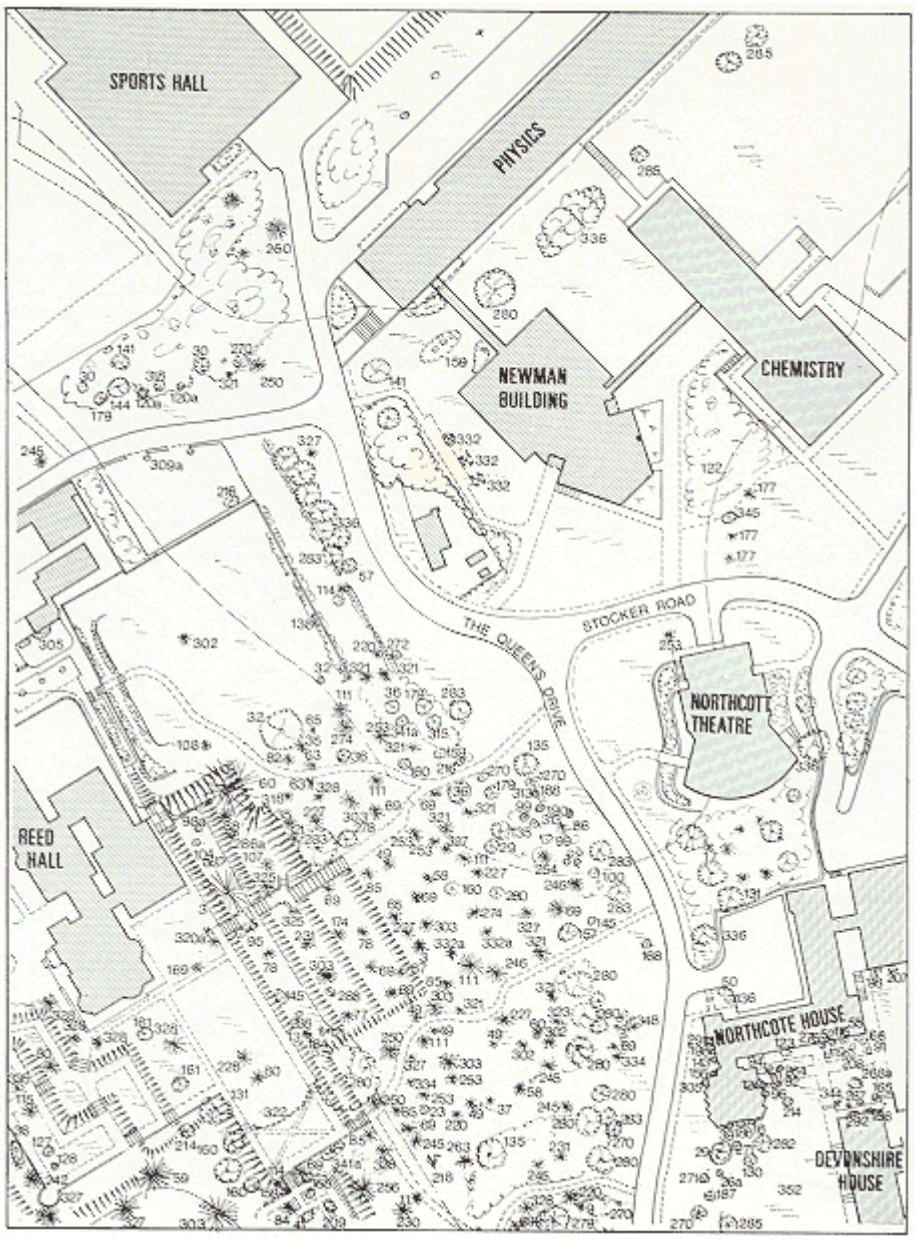
288	*obtusum var. amoenum*	Kurume azaleas
289	*spp. and Lilium spp.*	Rhododendrons and lilies
290	*Rhus typhina*	Stag's horn sumach
291	*Rosa banksiae*	Banksian rose
292	*'Mermaid'*	
293	*Salix alba var. caerulea*	Cricket bat willow
294	*alba var. vitellina*	Golden willow
295	*babylonica*	Weeping willow
296	*cinerea var. atrocinerea*	Grey sallow
297	*daphnoides*	Violet willow
298	*gracilistyla*	
299	*matsudana 'Tortuosa'*	Contorted willow
300	*x viridis*	
301	*Sciadopitys verticillata*	Umbrella pine
302	*Sequoia sempervirens*	Redwood
303	*Sequoiadendron giganteum*	Wellingtonia
304	*Skimmia x foremanii*	
305	*Sophora tetraptera*	Kowhai
306	*Sorbus aria*	Whitebeam
307	*aucuparia*	Mountain ash, Rowan
308	*discolor*	
309	*hupehensis*	Chinese mountain ash
309a	*intermedia*	
310	*polmashanensis*	
311	*sargentiana*	
312	*vilmorinii*	
313	*Stewartia pseudocamellia*	
314	*Styrax hemsleyana*	
315	*japonica*	
316	*Taxodium distichum*	Swamp cypress
317	*distichum 'Pendens'*	
318	*Taxus baccata*	Yew
319	*baccata 'Adpressa'*	
320	*baccata 'Dovastoniana'*	Westfelton yew
320a	*baccata 'Elegantissima'*	
321	*baccata 'Fastigiata'*	Irish yew
322	*baccata 'Fastigiata Aurea'*	Golden Irish yew
323	*baccata 'Fructu-luteo*	Yellow berried yew
324	*Thuja occidentalis*	Arbor vitae or white cedar
325	*occidentalis 'Vervaeneana'*	
326	*orientalis*	Chinese arbor vitae

327	*plicata*	Western red cedar
328	*Thujopsis dolabrata*	Hiba arbor vitae
329	*Tilia X europaea*	Common lime
330	*petiolaris*	Pendent silver lime
331	*Torreya californica*	Californian nutmeg
332	*Trachycarpus fortunei*	Chusan palm
332a	*Tsuga canadensis*	Eastern hemlock
333	*diversifolia*	Northern Japanese
334	*heterophylla*	Western hemlock
335	*mertensiana*	Mountain hemlock
335a	*Ulmus glabra*	Wych elm
336	*procera*	Common elm
337	*stricta*	Cornish elm
338	*stricta var. sarniensis*	Jersey elm
339	*Viburnum henryi*	
340	*odoratissimum*	
341	*rhytidophyllum*	
341a	*tinus*	Laurustinus
342	*Vitis coignetiae*	
343	*Wisteria sinensis*	Chinese kidney bean
344	*Yucca recurvifolia*	Century plant
345	*Zelkova carpinifolia*	Russian elm
346	*cretica*	
347	*serrata*	
348		Alpines
349		Collection of half hardy shrubs and plants
350		Recently established arboretum
351		Sculpture by Barbara Hepworth 'Figure for Landscape'
352		Spring bulbs
353		University map

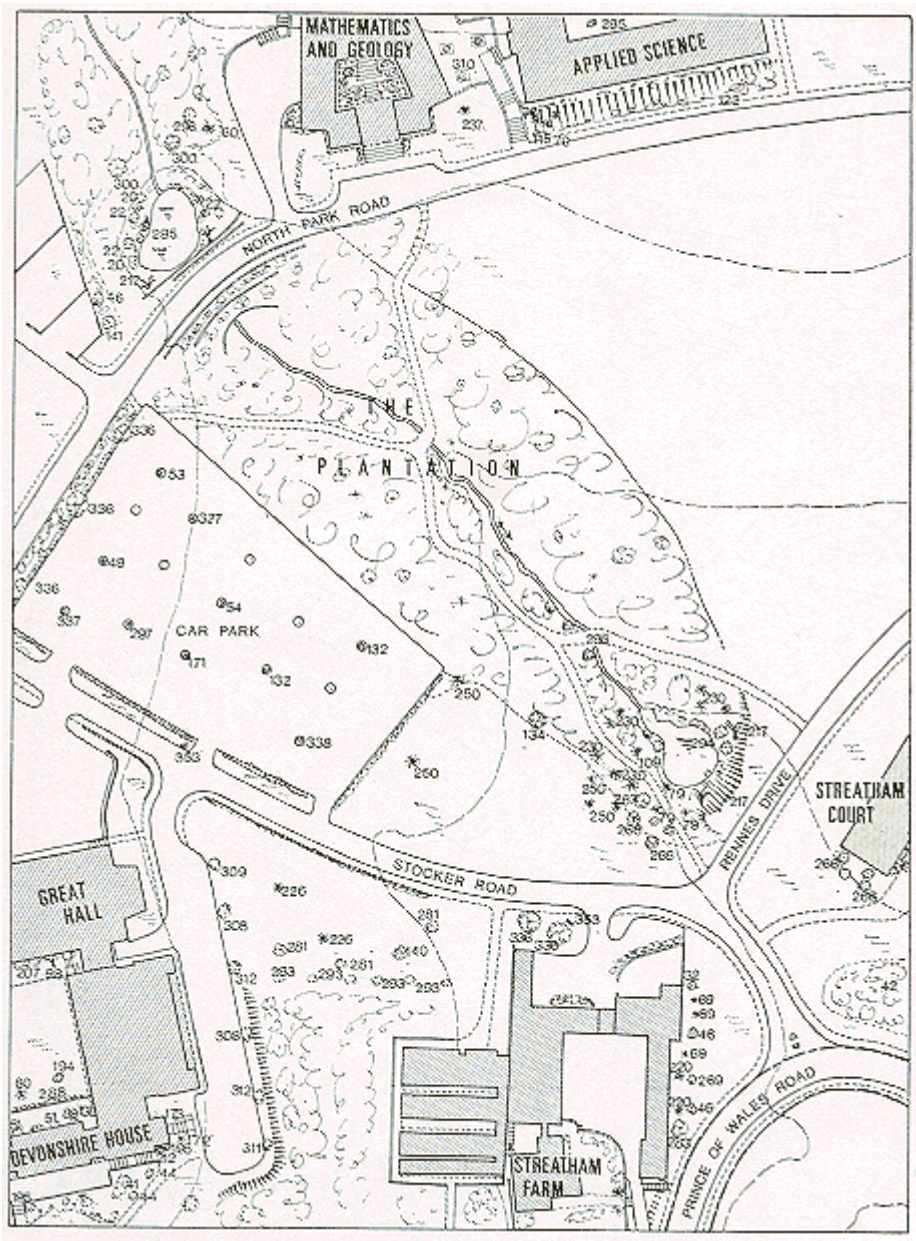
Plan 1 of the Estate



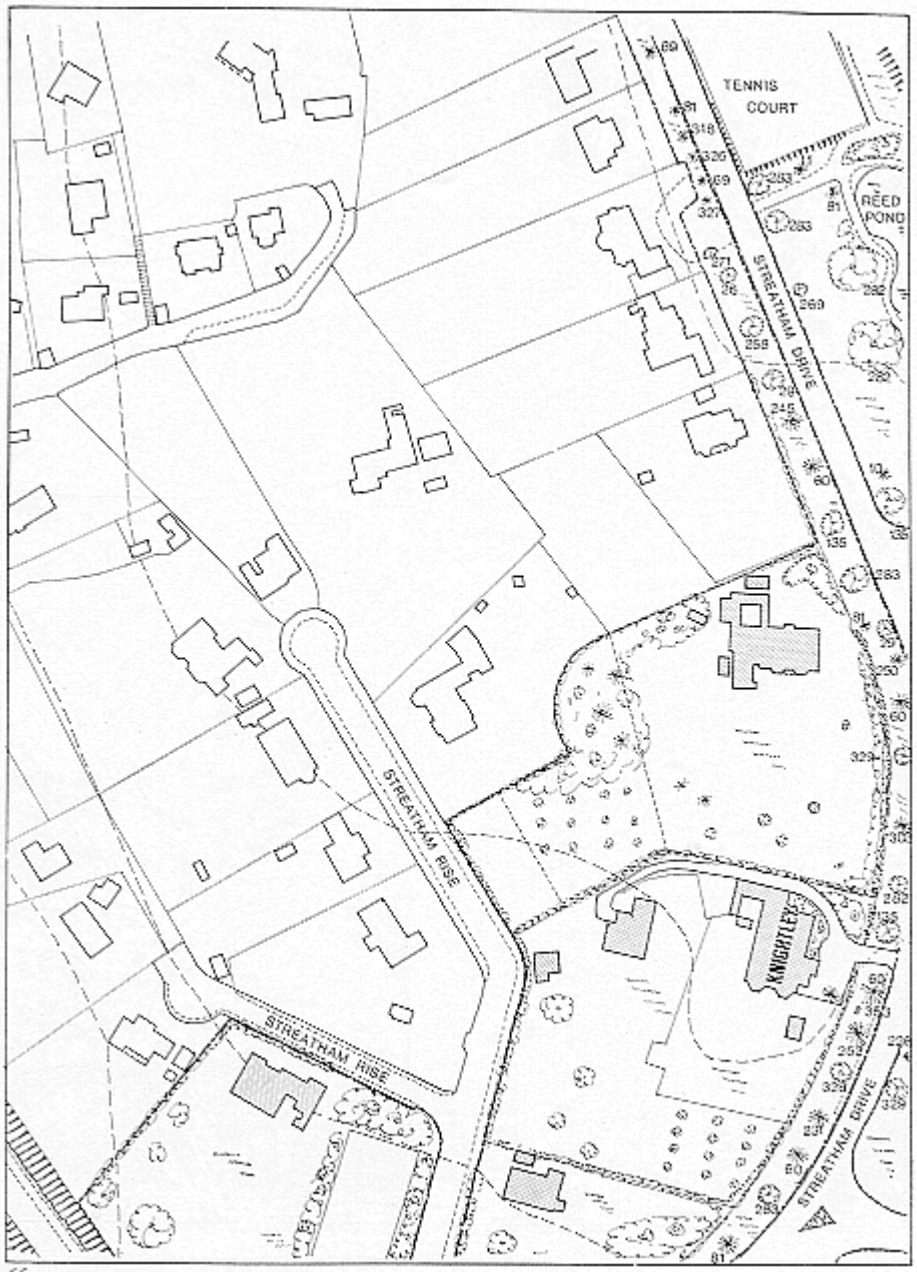
Plan 2 of the Estate



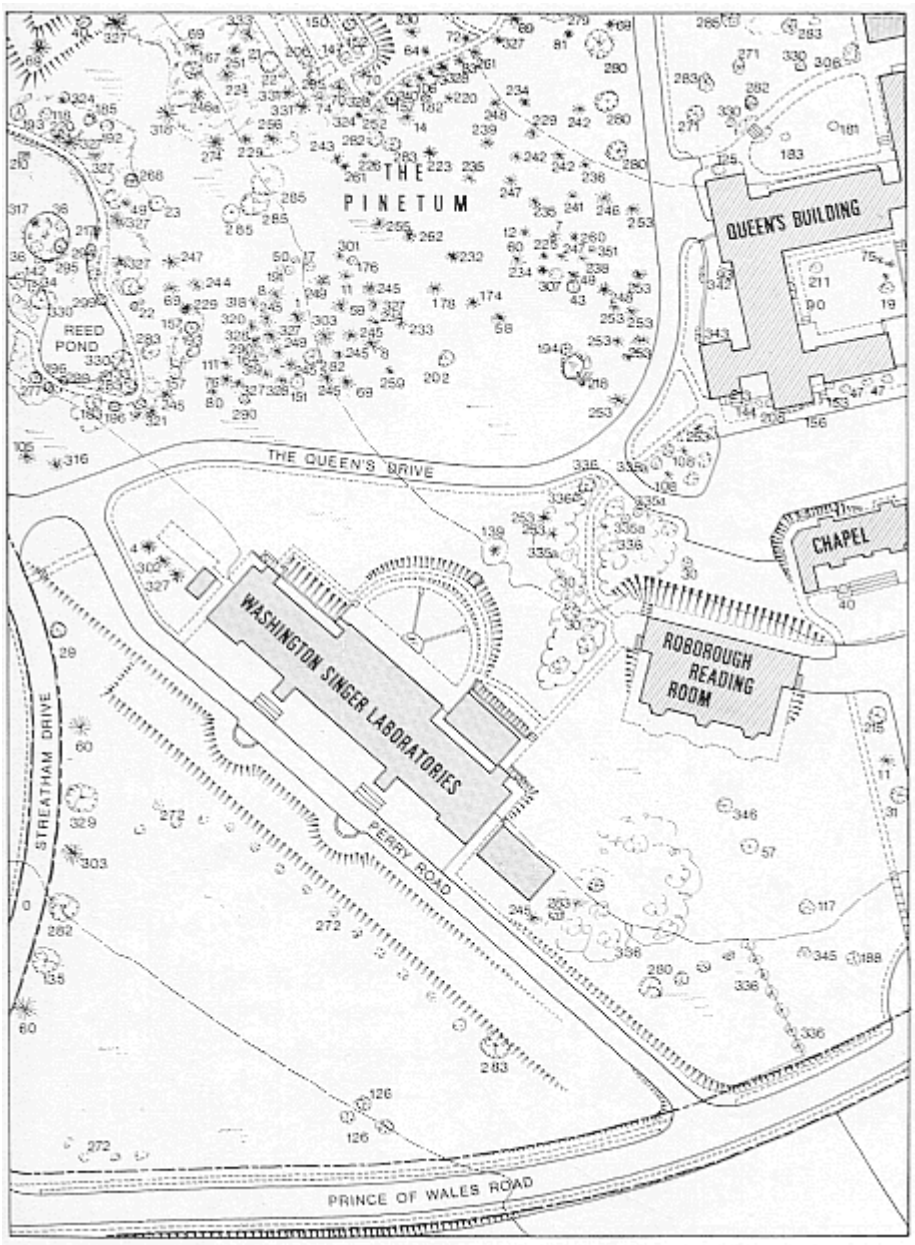
Plan 3 of the Estate



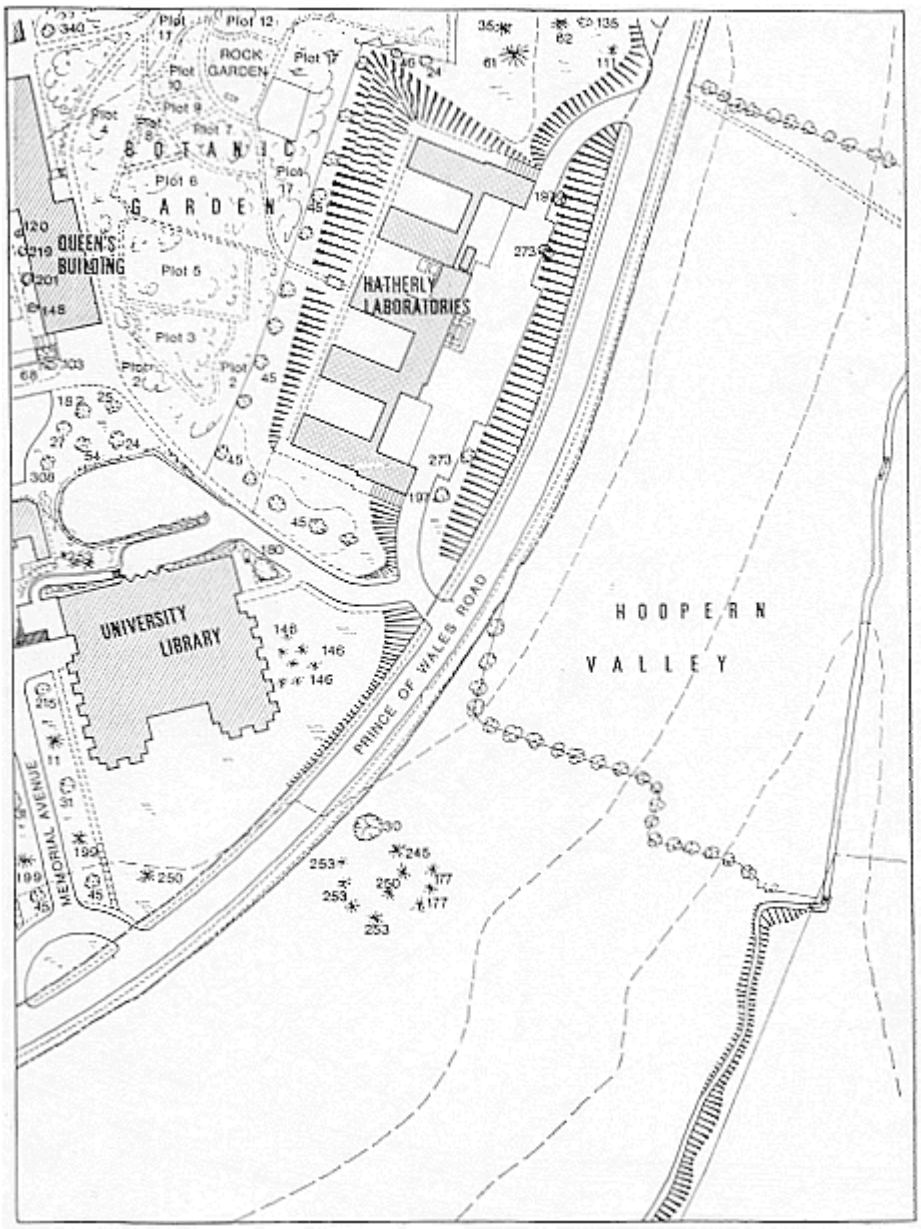
Plan 4 of the Estate



Plan 5 of the Estate



Plan 6 of the Estate



Plan 7 of the Estate