

I still believe in miracles

..... **elements of botany**

marking 30 years of exhibitions drawn from the RBGE archives

The ART of EDUCATION: JOHN HOPE and JOHN HUTTON BALFOUR

I. JOHN HOPE, the LEITH WALK GARDEN and BOTANIC COTTAGE

One of the greatest treasures of the RBGE archives is the illustrations collection of John Hope (1725–1786), Regius Keeper from 1761 to 1786. The collection represents many aspects of the professional life of the man who did more than any other individual to establish the reputation of the Garden as an institution of international renown, which combined teaching, horticultural and research functions. He also had a highly developed aesthetic sense and commissioned the best artists and architects of his day. These provided Hope not only with plans and architectural designs for the new garden that he created at Leith Walk in the 1760s, but also illustrations of some of the plants cultivated there, and large diagrams with which he illustrated his innovative summer lecture course, delivered to university medical students. Hope was apparently the first person ever to use such large-format illustrations for botanical lectures, a tradition followed in the mid-nineteenth century by his successor John Hutton Balfour, some of whose teaching drawings are also displayed in this gallery.

Hope's teaching drawings were made by a number of different artists, chief among whom were Andrew Fyfe, John Lindsay and John Bell, who worked for him both as gardeners and what would now be called 'research assistants'. Probably at Hope's expense, Fyfe undertook formal training in art at the city's art school, the Trustees Academy, where he won a prize. More unusually for the time, Hope also asked his head gardener's daughter, Agnes Williamson, to make drawings. Some of the teaching drawings were made from nature, others copied or adapted from book illustrations.

The six drawings shown here represent the range of the collection, including records of two of Hope's physiological experiments; the plant in which he took greatest pride; and a diagram used in his lectures on classification. Jacob More's view of the Leith Walk Garden celebrates the recent completion of the translocation and reconstruction of Botanic Cottage in the present Inverleith garden. This elegant building, designed for Hope by John Adam, served both as a residence for the head gardener (the ground floor), with its upper floor as a lecture room in which the teaching diagrams were used year by year.

The drawings, together with many rare and interesting books from his grandfather's botanical library, came to RBGE in the 1890s from the estate of Hope's eponymous grandson. In 2003 they were conserved by staff of the National Archives of Scotland, made possible by a generous grant from the Pilgrim Trust.

Framed works

Turkey or medicinal rhubarb (*Rheum palmatum* L.)

The root of the Turkey, or medicinal, rhubarb was extensively used as a purgative in bowel-obsessed eighteenth-century medicine, and was imported from Central Asia at substantial expense. Hope was concerned to reduce this drain on the exchequer by growing the plant in Britain. An Edinburgh-trained medic based in Russia, Dr James Mounsey, sent seed from St Petersburg in 1763, from which Hope was able to grow the plant and distribute it to friends, medical colleagues and landowners all over Britain. He devoted a field adjacent to the Leith Walk garden to its cultivation, which proved successful – and even profitable. The thrifty Hope was proud of this, and in 1766 he published a paper on the subject in the *Philosophical Transactions of the Royal Society*. To illustrate this he commissioned one of Edinburgh's leading artists, William Delacour, Master of the Trustees Academy, for a portrait in watercolour of the prized species. The drawing was turned into a print by Andrew Bell, a notable engraver who also owned the *Encyclopaedia Britannica*, in which work the print was again reproduced, in the article on Botany written by Hope's pupil William Smellie.

By William Delacour, c. 1765.
Watercolour.
RBGE Hope collection B29.

Experiment on the effect of gravity on the growth of a shoot of an African marigold (*Tagetes erecta* L.)

Attending Hope's lectures in 1781 was Francis Buchanan (1762–1829), who went on to make important contributions to many fields of knowledge, including zoology and botany, in India, Burma and Nepal (see Gallery 5). Buchanan took down a particularly informative set of notes from Hope's course and in Lecture 26 on 'Motions peculiar to vegetables', the experiment shown in this drawing was described:

Roots not only grow down, but stems have a tendency to grow erect, for trees planted on a declivity grow perpendicular some time ago in the greenhouse, before [i.e., witnessed by] the gentlemen then attending lectures, a *Tagetes* was suspended with its head down, growing from the bottom of a pot. In a short time the top of the plant bent upwards.

This is a classic geotropic response: shoots respond negatively to gravity, whereas roots respond positively. This is a reminder of the innovative nature of Hope's lectures, in which he devoted far more time to physiology than did any of his contemporaries.

By John Bell or Andrew Fyfe, c. 1775.
Watercolour and iron gall ink.
RBGE Hope collection B1.46.

Three inarched trees

Hope realised that 'sap comes from the surface of the root and goes to the surface of the leaves, but it is also capable of descending and of going obliquely in all directions'. At Leith Walk, around 1774, in order to demonstrate the oblique movement of sap, he repeated an experiment of the Rev. Stephen Hales. In 1781 Buchanan quoted Hope's description of the experiment:

I inarched [grafted] a willow tree into two others ... after they had grown together I dug out the earth from the roots of the [central] tree. It is now 7 years since the experiment was made and the [suspended tree] is in as thriving condition as any [of the branches] on the trees.

Rather than ask Fyfe to draw his own trio of willow trees, and rather oddly, he got the artist to adapt the rather schematic engraving in Hales's *Vegetable Staticks*. However, Fyfe has used his own imagination (and Delacour's training), and the attractive medium of red chalk, to turn the rather sparse boughs of the illustration by the Huguenot engraver Simon Gribelin, into a bosky, rococo grove.

By Andrew Fyfe, c. 1770.
Red chalk.
RBGE Hope collection D32.

Bird's-eye view of the Leith Walk Garden, 1771.

The Leith Walk garden was only about five years old when Hope commissioned the artist Jacob More (1740–1793) to make two monochrome perspective views, for which the artist was paid one guinea in December 1771. At this point More was about to leave Edinburgh for Italy, where he would pursue a distinguished career as a painter of Classical landscapes. The drawing shows the location of the garden on the east side of Leith Walk, with the Firth of Forth in the background. Entrance to the garden was by the gate to the left of a cottage that functioned as a dwelling for the principal gardener (downstairs) and Hope's lecture room (upstairs). The cottage was designed by Hope's school friend, the distinguished architect John Adam, as was the suite of conservatories. The latter consisted of a central, cool greenhouse, flanked by two hothouses or 'stoves' and overlooked a pond. The 'Good Samaritan' figure in the foreground, showing a physician treating a stricken traveller, is a reminder that botany was taught as part of the medical syllabus. The rectangular area to the right of the cottage, looking like a field, was the 'Schola Botanica', in which medicinal plants were planted according to Linnaeus's sexual system of classification.

By Jacob More, 1771.
Watercolour.
RBGE Hope collection D33.

Hope's summary of the Sexual System of Linnaeus

Hope was an admirer of many aspects of the work of the Swedish naturalist Carolus Linnaeus (if not of some of his language, or its underlying philosophy). When Linnaeus died Hope commissioned a monument to his memory from John Adam's more famous brother Robert, which was moved from the Leith Walk Garden and now stands behind the Temperate Glass House. Although he taught other classification schemes, not least a Natural System of his own devising, Hope was among the first to teach Linnaeus' Sexual System in Britain, but in this he followed the example of his elder contemporary William Cullen who had taught it earlier in Glasgow. The Sexual System is an artificial scheme based on a few, easily observable, floral characters. This summary by Hope is interesting as it does not list the Linnaean Classes in straightforward numerical order, but groups them emphasising characters other than those based on mere number (which Hope correctly believed to be unreliable). The Sexual System is often stated (pejoratively) to be purely numerical and completely artificial, but in fact several of the classes are based on more natural characters – such as the fusion of

stamens, or different filament lengths. The cloth loops, by which Hope hung this diagram for display, are intact – a method used in the following century by his successor J.H. Balfour.

Anonymous, c. 1775.

Iron gall ink.

RBGE Hope collection C69.

**TRANSLATION OF HOPE'S SUMMARY
OF THE SEXUAL SYSTEM OF LINNAEUS**

Flowers inconspicuous	[Class 24] Cryptogamia
Flowers conspicuous	[The 'rest': Phanerogamia]
[Groups defined] by sex	
Flowers of one sex	
in the same plant	[Class 21] Monoecia
in different plants	[Class 22] Dioecia
Flowers with both sexes (hermaphrodite)	
[Group defined] by situation of stamens & pistils	[Class 20] Gynandria
[Groups defined] by connection of stamens	
anthers united	[Class 19] Syngenesia
filaments united	[-]Adelphia
[Class 16] Mon[adelphia] ; [Class 17] Di[adelphia] ; [Class 18] Poly[adelphia]	
[Groups defined] by number of stamens	[-]Andria
[Class 1] Mon[andria] , [Class 2] Diandria ; [Class 3] Triandria ; Class 4 Tetrandria ; Class 5 Pentandria ; Class 6 Hexandria ; Class 7 Heptandria ; Class 8 Octandria ; Class 9 Enneandria ; Class 10] Dec[andria] ; [Class 11] Dodec[andria] ; [Class 12] Icos[andria] ; [Class 13] Poly[andria]	
[Groups defined] by proportion of stamens, 2 [short]	
[+ 2 long]	[Class 14] Didynamia
[+ 4 long]	[Class 15] Tetradynamia
[Class 23] Polygamia , with mixtures of male, female and hermaphrodite flowers, distributed in various combinations, is omitted]	

II. The TEACHING DRAWINGS of JOHN HUTTON BALFOUR

Following (indirectly) in the tradition established by Hope, John Hutton Balfour's University botanical lectures, given at RBGE between 1845 and 1879, were lavishly illustrated with the help of large-scale drawings, herbarium specimens, garden plants, and 3-D models. By 1904, when a catalogue of them was made, there were 3681 teaching illustrations in the joint University/RBGE collection, though many of these were commercial prints. Most of this collection was destroyed in the late 1950s, with the advent of 35 mm photographic transparencies to illustrate lectures. Fortunately Professor Peter Davis, a renowned aesthete and art collector, rescued some of the hand-drawn ones from destruction. These remarkable drawings were preserved by Dr Adrian Dyer, who returned them to RBGE in the more enlightened times of the mid-1990s.

The drawings illustrate the full range of the nineteenth-century botanical syllabus, from palaeobotany, to anatomy, physiology, morphology and taxonomy. Some were drawn from life, others copied and adapted from publications. The selection shown here demonstrates the variety of subjects to be found in the collection.

Information discovered since these drawings were last exhibited in 2008 has revealed that the artist of the majority of Balfour's diagrams was the Edinburgh artist Neil Stewart (1815–1875). By 1853 Stewart had already made 2000 drawings for Balfour (many of which were doubtless small-scale ones for use in his textbooks). Stewart also made large-scale botanical drawings for Glasgow University, ones of human anatomy for several of the Edinburgh medical professors, and zoological ones for Robert Jameson for the University Museum; he was also artist to the Botanical Society of Edinburgh.

Out of the collection of c. 400 that have survived (though in poor condition), 34 were conserved by staff of the National Galleries of Scotland in 2000, made possible by a grant from the Gordon Fraser Charitable Trust. Funds, however, are still required to conserve the remainder of this important collection.

Balfour also used 3-D *papier mâché* models to illustrate his lectures, purchasing his first ones in 1866 from the firm of Robert Brendel of Breslau (now Wroclaw, Poland), and further ones the following year from Louis Auzoux of Paris. As with the teaching diagrams, many of the models were destroyed in the 1950s, but some have survived of which a selection is shown here. The survivors appear to date from the late nineteenth century, by which time the Brendel firm was run by its founder's son Reinhold and based in Berlin; they were probably purchased by JHB's son, Isaac Bayley Balfour.

Exhibits

***Mantisia saltatoria* Sims: single flower and bract at life-size, and also greatly enlarged.**

An example of the highly specialised flower characteristic of the ginger family. *Mantisia saltatoria* was described by Hope's student John Sims, in 1810 in Curtis's *Botanical Magazine*, of which he was the second editor. Sims wrote that:

the blossoms have been fancifully compared to dancing opera girls, the yellow nectary making her petticoat, the outer laciniae her blue jacket with lappets, and the filaments with its appendices her arms and neck; the latter to be sure rather disproportionately long. To us it appears to bear some resemblance to the insect called MANTIS, whence our [generic] name.

This description was based on cultivated material sent to Britain from India by William Roxburgh in 1808. However, Roxburgh himself had described the species earlier as *Globba radicalis*, and his name has priority as the genus *Mantisia* is no longer regarded as distinct. The plant is a rare native of Bangladesh, north-east India and Burma.

Probably by Neil Stewart, c. 1860.
Watercolour and ink.
Teaching Collection Cat. no. 463.

***Nuphar luteum* (L.) Smith: half-flower of a yellow water-lily**

At the centre of this vertical section of a flower is the ovary, which develops into a bottle-shaped fruit; shown in section are two chambers (*locules*), containing rounded ovules which will develop into seeds; above this is the stout, columnar style and the lobed yellow stigma to which pollen is carried by insects. The numerous, wide, outer petals have been removed, but three transitional ones are shown (two on the right, one on the left), which show a gradation into stamens (of which only four are shown). This widespread species of Eurasia and eastern North America is relatively common in lowland Scotland, in slow-flowing rivers and lochs.

Probably by Neil Stewart, c. 1860.
Watercolour and ink.
Teaching Collection Cat. no. 820.

***Linum usitatissimum* L.: placentation of ovules in the ovary of flax**

The fruiting ovary of the flax is shown here in cross-section – it has five cells, but a wall (*septum*) develops in each cell, dividing it in two, the whole thus appearing ten-celled. In each cell a single ovule is attached to the ovary axis, which is thus said to have 'axile placentation'. The outer seed coat (*testa*) is shown in dark brown, the endosperm in pale green, the septa are uncoloured, and the ovary tissue is dark green. This species is not known in the wild, but is possibly derived from the European *Linum bienne*. It is widely cultivated for its stem fibres, which are used to make linen, and for its seeds which are pressed to make linseed oil. The tongue-twisting Latin epithet means 'most useful'.

Probably by Neil Stewart, c. 1860.
Watercolour and ink.
Teaching Collection Cat. no.463.

***Myosotis alpestris* F.W. Schmidt: inflorescence of a rare Scottish alpine plant**

Shown here is the arrangement of flowers commonly found in the borage family, known as a 'scorpioid cyme'. In this the apex of the flowering branch, bearing the youngest flowers, is curled like a scorpion's tail. This species of forget-me-not is a widespread arctic-alpine species, occurring in Europe, Asia and North America. In Britain it is very rare, but has been known on Ben Lawers since 1805. This Perthshire mountain was a favourite destination for Balfour's summer, student field-trips, doubtless the source of the plant illustrated here.

Probably by Neil Stewart, c. 1870.
Watercolour and ink.
Teaching Collection Cat. no. 2409.

Tooth types found on leaf margins of dicots

This drawing is typical of those designed to explain the technical terms necessary for the accurate description of plant morphology.

Serrate: teeth sharp, pointing towards the leaf apex
Dentate: teeth sharp, outward-pointing
Crenate: teeth rounded

Probably by Neil Stewart, c. 1860.
Watercolour and ink.
Teaching Collection Cat. no. 1902.

***Nepenthes rafflesiana* Jack: section through a leaf pitcher**

This drawing was probably made from a living specimen grown at RBGE where Robert Lindsay, who later became the Garden's Curator (1883–96), specialised in the (notoriously tricky) cultivation of this genus of pitcher plant. This species was discovered by Sir Thomas Stamford Raffles (1781–1826) in 1819, when he founded the British colony of Singapore and was named after his patron by William Jack. Jack, whose father was Principal of Aberdeen University, was Raffles's personal physician and naturalist until his death in Sumatra in 1822, aged only 27. One of the most spectacular members of the genus, *N. rafflesiana* is a widespread and variable species, occurring in Sumatra, Borneo, New Guinea and the Malay Peninsula.

Probably by Neil Stewart, c. 1860.
Watercolour and ink.
Teaching Collection Cat. no. 2421.

THE BRENDEL MODELS

Marchantia polymorpha L.

This model (24 × life-size) shows the stalked, umbrella-shaped organ, the *archegoniophore*, of a species of liverwort – on which the female sexual organs are borne. These, the *archegonia*, containing the eggs, are borne on the underside of the lobed disc; the eggs are fertilised by sperm from equivalent male organs. Within the archegonia the fertilised cells develop into small bodies called *sporangia*, which are retained on the plant. From these spores are produced by reduction-division; the spores fall to the ground, germinate, and grow into the familiar flat, green body of the liverwort.

Probably by Reinhold Brendel, c. 1890.
Mixed media, including plaster of Paris.
Brendel no. 140 (Series Ib, 'Mosses' – price in 1900, 22 Marks)

Pinus sylvestris L.

Shown here, magnified 10 ×, are two stages in the germination of a Scots pine seed, and a seedling with numerous cotyledons. The fourth element of the group, a winged seed, is missing.

Probably by Reinhold Brendel, c. 1890.
Mixed media, including plaster of Paris.
Brendel no. 154b, c, d (Series IV, Broad-leaved Trees & Conifers – price in 1900, 18 Marks)

Digitalis purpurea L.

Flower of a foxglove magnified 5 ×. This is an articulated model; the flower can be taken apart to reveal a longitudinal-section through the ovary.

Probably by Reinhold Brendel, c. 1890.
Mixed media, including plaster of Paris.
Brendel no. 64 (Series V, Poisonous Plants – price in 1900, 14 Marks)

Dionaea muscipula Ellis

A Venus fly-trap leaf magnified 10 ×. Within the leaf of this carnivorous North-American plant can be seen a trapped bluebottle fly.

Probably by Reinhold Brendel, c. 1890.
Mixed media, including plaster of Paris.
Brendel no. 132 (Series VIII, Marsh- and Water-plants – price in 1900, 11 Marks)

INDIAN BOTANICAL DRAWINGS and the CLEGHORN COLLECTION

I. THE ROYAL BOTANIC GARDEN EDINBURGH COLLECTION

The RBGE archives houses a major collection of botanical drawings made by Indian artists in the late eighteenth and first half of the nineteenth centuries. Although these arrived by various, in some cases unknown, means, their origins lie with surgeons trained at Edinburgh University who found employment with the East India Company (EIC). On reaching India those with cultural and scientific interests were able to find skilled artists willing and able to make drawings to document their chosen field of study – which included natural history.

John Hope (Regius Keeper 1761–1786) placed particular value on the use of the visual sense in the transmission of information (see Gallery 2). Several of his students became responsible for major illustrated botanical publications in Britain, but the drawings in this room demonstrate Hope's direct and posthumous influence in India. The first exhibit is the earliest Indian drawing in the RBGE collection, sent to Hope by James Kerr from Bengal around 1775. In the field of Indian natural history and its illustration Hope's most important students were William Roxburgh (1751–1815) and Francis Buchanan (later Hamilton) (1762–1829). Between 1776 and 1813 Roxburgh commissioned drawings of more than 2500 Indian plant species – a project begun on the south-east Coromandel Coast and continued after his appointment to run the Calcutta Botanic Garden in 1793. These drawings are known as the Roxburgh *Icones*. Between 1795 and 1815 Buchanan, as records of his statistical surveys of Burma, Mysore, Nepal and Bengal, commissioned a smaller number of botanical drawings. In the Madras Presidency of southern India Robert Wight (1796–1872), a pupil of Hope's successor Daniel Rutherford, took up where Roxburgh had left off, also commissioning several thousand botanical drawings. Contemporary with Wight, but in western India, was Alexander Gibson (1800–1868), who commissioned 170 drawings in the botanic gardens of the Bombay Presidency (especially Dapuri) of which he had charge.

Drawings made for British patrons in India have been referred to, generically, as 'Company School', though it might seem perverse to have named a style after the corporate body who employed the commissioners of such works – rather than the artists who made them! In fact the artists came from a wide variety of backgrounds. The finer painters used in northern India (as, for example, by Kerr and Buchanan) probably had origins in schools of courtly painters (including Mughal); those in the south were drawn from more vernacular traditions, including chintz-painters (used by Roxburgh), sandalwood carvers (used by Cleghorn) and a group called 'moochies', traditionally leather-workers and toy-makers as well as painters (used by Wight and Cleghorn). Gibson's painter was Indo-Portuguese. Copying has always been a fundamental practice in Indian art, one that the Company surgeons also exploited; so also shown here are some 'copy drawings' – with examples based both on 'original' botanical drawings and on printed book illustrations

Framed works

The moving plant of Bengal, *Burum chundalli*, *Codariocalyx motorius* (Houttuyn) H. Ohashi

The earliest drawing in the RBGE collection by an Indian artist was sent to John Hope by a former student, James Kerr, from Bengal in about 1775. Kerr also sent Hope seeds of the plant depicted, which germinated to produce one of the vegetable wonders of the Leith Walk garden. The plant is a leguminous shrub, to 60 cm in height, which is widespread in the lowlands of South and South-East Asia; its leaves exhibit two kinds of spontaneous movement – at night the large terminal leaflet declines in a ‘sleep movement’, but during the day the small lateral leaflets jerk spontaneously like semaphore signals. Kerr also sent a written description of the plant, in which it was said to be an object of superstition in Bengal. The locals may, however, have been having a joke at Kerr’s expense when they told him that on a Saturday they would:

“cut off two [basal leaf-] lobes the instant they approach together, & beat them up with the Tongue of an Owl”: with this composition the Lover touches his favourite Mistress, to make her comply with his wishes

– in other words, an oriental, herbal *rohypnol*.

By an anonymous Indian artist, for James Kerr, c 1775.
Bodycolour, gum arabic and ink.
RBGE Hope collection B17.

***Caesalpinia enneaphylla* Roxb.**

When Roxburgh made a description of a new plant species, he had two copies of a drawing of it made – one he kept for himself in India (latterly in Calcutta), the other he sent back to the EIC in London. Sometimes a batch of the copies went adrift en route, and a third version had to be made by Roxburgh’s team of artists. Such appears to have been the case with this drawing, but the original copy must also eventually have reached London. After the EIC’s set of drawings was deposited at Kew, one of the pair of copies must have been sent to RBGE, in the late nineteenth century, as a duplicate. The drawing was probably made from a specimen growing in the Calcutta Botanic Garden, where the plant had been introduced from Chittagong, between 1796 and 1798, by Roxburgh’s friend Francis Buchanan. The plant is a large, spiny climber, which can grow over large forest trees; it occurs in north-east India, Bangladesh, Burma, Thailand, Vietnam and possibly also Indonesia.

Contemporary copy for William Roxburgh, by one of his own artists, Calcutta, c. 1800.
Watercolour, ink and gum arabic over pencil.
Robinson 537, Roxburgh *Icones* no. 1425.

***Kaempferia rotunda* L.**

When Roxburgh left India in 1813 he was forced by the EIC to leave behind his own set of *Icones*, which they believed to be their property, at the Calcutta Botanic Garden. The Company was jealously possessive of the drawings and for copies to be made, official permission had to be sought and granted. James Hare, who acted as Superintendent of the Garden for sixteen months in 1816/7, believed that he had got such permission from the Governor-General (the Marquess of Hastings). He brought in artists from Calcutta to make

copies, who continued to work after he had himself returned to Britain. However, Hare's successor Nathaniel Wallich, successfully challenged this and the completed drawings had to be surrendered to the EIC in London. Hare eventually got permission to retrieve them, but though he ended his days in Charlotte Square, Edinburgh, it is not known how or when this partial set of his copies reached RBGE. Executed in fine ink, with only minimal details coloured, they are in many ways of higher quality than the 'originals' by Roxburgh's own artists. The plant shown is probably native to India, but its wild distribution is uncertain as it is widely cultivated for its fragrant flowers and medicinal use. It also occurs in Indo-China and Malaysia; the flowers appear before the leaves.

By an anonymous Calcutta artist, copied from one of Roxburgh's *Icones* for James Hare, c. 1816.

Watercolour and ink.

Robinson 18, Roxburgh *Icones* no. 1012.

Rohdea nepalensis (Rafinesque) N. Tanaka

In 1802/3 Francis Buchanan spent eleven months based in Kathmandu, as surgeon to a diplomatic mission to Nepal led by Captain William Knox. He used the time to investigate the natural history of the then virtually unknown kingdom, using techniques he had pioneered in Burma and Mysore: he employed a Brahmin, taken with him from Calcutta, and also an unknown botanical artist. He also used local Nepalis both as collectors and informants, which was particularly necessary as his own travels were severely restricted. Despite the difficulties Buchanan made descriptions of more than 1000 plant species, of which more than 100 were illustrated. The majority of the descriptions and drawings were never published (had they been, most would have been new to science): Buchanan gave them to James Edward Smith, a fellow student under Hope in Edinburgh, and they remain in the Linnean Society of London. The plant shown here is a shade-loving member of the family Asparagaceae with leathery, *Aspidistra*-like leaves. Buchanan intended calling it 'Tilcusta sylvatica', basing his new generic name on the Newari name for the plant, following a tradition of making scientific binomials from local names, as suggested for Indian plants by Sir William Jones.

By an anonymous Indian artist, for Francis Buchanan, Nepal, 1802.

Watercolour, ink and gum arabic over pencil.

Linnean Society of London, 401D/1/19.

Cymbidium cochleare Lindley

Buchanan asked his artist to draw many orchids, because it is hard to make out the structural details of their complex flowers from herbarium specimens. The plant shown here, and its accompanying Latin description, were under the name 'Limodorum cyperifolium', which Buchanan described as growing among moss on trees. This name was not published at the time either by himself, by J.E. Smith to whom Buchanan entrusted the drawing and description, or by David Don. Don was a son of the Superintendent of RBGE, whose early days were spent in the Botanic Cottage; he went on to become Professor of Botany at King's College, London and described some of Buchanan's plants (though neither the 'Tilcusta', nor this 'Limodorum') in his pioneering *Prodromus Florae Nepalensis* of 1825. The plant shown here is now known under a name coined by the great orchid-expert John Lindley in 1859, based on a specimen collected in Sikkim by Joseph Hooker. The epithet 'cochleare' refers to the spoon-shaped structure formed by two convergent ridges on the lip of the flower. The distribution of this orchid is from Nepal eastwards through northern India (Sikkim, Darjeeling), Bhutan and China to Taiwan.

By an anonymous Indian artist, for Francis Buchanan, Nepal, 1802.
Watercolour, ink and gum arabic over pencil.
Linnean Society of London, 401D/1/34.

***Sauropus bacciformis* (L.) Airy Shaw**

Robert Wight, following the example of William Roxburgh, first used an artist to draw plants while he held the post of Madras Naturalist between 1826 and 1828. This artist was probably Rungiah, who worked for Wight until around 1845, and this drawing represents one of the artist's early works. The plant depicted is an annual or biennial herb, widespread from India and Sri Lanka eastwards to Malaya, China, the Philippines and Indonesia. In South India it occurs on the plains up to an altitude of 500 metres, growing on fallow land, bunds of paddy fields and in sandy, saline places near the sea. This was one of the species sent back to his old teacher by J.G König from Tranquebar, and described in Linnaeus's *Mantissa Plantarum* of 1767. The flowers are unisexual and both male and female are clearly seen here – attached to the plant and in the floral details at bottom right. The ovary develops into a somewhat berry-like capsule, to which the epithet refers. This drawing was not published by Wight, and is one of those that he sent from Negapatam to Professor William Hooker in Glasgow, accompanied by a written description and notes on its habitat ('common ... in almost all soils & in flower at all seasons').

By Rungiah, for Robert Wight, Madras, c. 1828.
Bodycolour and gum arabic over pencil.
RBGE Wight no. 440.

***Lagerstroemia speciosa* (L.) Persoon**

This is one of the few drawings by Rungiah that is dated. The main drawing of the plant habit was not reproduced by Wight in any of his extensive illustrated publications, though some of the floral details on the reverse of the sheet were. This tree can reach a height of 18 metres in the wild and is native in hilly parts of western and north-eastern India, Sri Lanka, Burma, China and the Malay Peninsula. It is also commonly cultivated as an ornamental in Indian gardens (and elsewhere in the tropics). Edward Balfour, with whom Wight corresponded over the plant products to be sent to the Great Exhibition of 1851 from Madras, described how:

in full blossom, in the morning, the tree looks as if mantled with roses, but the flowers change through the day to a beautiful purple, making it appear at evening ... like a bower of English lilacs.

This painting would therefore appear to have been made towards evening. In Wight's time the soft, red timber was used for building purposes, and, because of its durability under water, for making boats and water casks.

By Rungiah, for Robert Wight, Madras, 1834.
Bodycolour, ink and gum arabic over pencil.
RBGE Wight no. 413.

***Capparis spinosa* L.**

Alexander Gibson, who, like Wight, had studied botany at RBGE under Daniel Rutherford, went to the Bombay Presidency of western India as an EIC surgeon. He was appointed to supervise the botanic gardens of the Presidency and later became its first Conservator of

Forests. Between 1847 and 1849 he commissioned an un-named Indo-Portuguese artist to draw plants in his gardens, especially those of Dapuri, situated around the Governor of Bombay's summer residence close to Poona (now Pune) – the plants depicted were both natives and exotics. Shown here is one of the native plants, a rather spiny shrub known to Gibson as *Capparis murrayana*. This species, however, is no longer considered to be distinct from a widespread and variable one that occurs in dry areas from the Mediterranean and North Africa, through the Middle East to the Himalayas and western India, with varieties also found in the Pacific Islands and Australia. In western India the plant grows in dry stream beds. In Europe the pickled flower buds are used as a flavouring – for example as a pizza-topping. In India, according to Sir George Watt, the root bark has various medicinal uses.

By an anonymous Indo-Portuguese artist, for Alexander Gibson, Dapuri, c. 1848.
Watercolour, bodycolour and ink over pencil.
RBGE Dapuri no. 5.

Delonix regia (Hooker) Rafinesque

As a representative of one of the exotic species depicted by the Dapuri artist none is more spectacular than the flamboyant or gul mohur, a small tree, to 15 metres tall. It was the reproduction of this drawing on the cover of the catalogue of the first exhibition of these drawings in 1998 that attracted the attention of Mehroo Dinshaw and it was the generous sponsorship of Mrs Dinshaw and her family that allowed the conservation and publication of the drawings of the Dapuri and Wight collections. Originally native of Madagascar, the flamboyant has been widely planted as a street tree in the tropics, for its ornamental flowers and delicate, fern-like foliage. Gibson in his 1842 Garden Report recorded that it had been introduced to Dapuri by 'the late Dr Heddle'. John Fraser Heddle (1806–1842) was Secretary of the Agri-Horticultural Society of Western India, with responsibility for 'the botanical division of the labours of the Society'. By 1861 Dalzell and Gibson, in their *Flora of Bombay*, recorded that *Delonix* had been introduced from Mauritius and was 'now becoming rapidly naturalized'.

By an anonymous Indo-Portuguese artist, for Alexander Gibson, Dapuri, c. 1848.
Watercolour, bodycolour and gum arabic over pencil.
RBGE Dapuri no. 112.

II. THE CLEGHORN COLLECTION

The most extensive single collection of Indian drawings at RBGE (numbering about 3000 items) was commissioned by Hugh Francis Clarke Cleghorn (1820–1895), who studied botany here at the Inverleith garden under Robert Graham in 1838 and 1839. After obtaining his MD in 1841 Cleghorn went to Madras as an EIC surgeon and between 1843 and 1847 found himself stationed in the Kingdom of Mysore in south-west India, an area traversed by Francis Buchanan 40 years earlier. Here he followed the example of his father's friend Robert Wight and found a 'Marathi' artist who painted a different plant for him every day between 1845 and 1847. After sick leave in Britain (during which he worked on the Great Exhibition and wrote an influential report on tropical deforestation) Cleghorn returned to Madras in 1851, where he was appointed Professor of Botany at the Medical College, Secretary of the Madras Agri-Horticultural Society and, in 1856, Conservator of Forests. In all these roles he continued to commission artists, who made illustrations of native and cultivated plants and copied book illustrations for him. On Wight's departure from India in 1853 Cleghorn inherited from him the artist Govindoo, but prior to this he had employed several young artists trained by his fellow surgeon, Dr Alexander Hunter, who, in 1850, had started a School of Art in Madras. This period, from 1852 to 1858, was the most fruitful period for the development of Cleghorn's illustrations collection, when around 2500 drawings were made. After a second home leave, in 1860/1, most of his time was spent setting up Forest conservancy in the Himalayas and northern India, but few drawings date from this period. By this time he had no access to artists other than a few European amateurs, but his reasons for commissioning drawings had gone – he had no teaching commitments, and had abandoned the idea of a publication on the Indian flora, for which the drawings may originally have been intended.

Following Cleghorn's death in 1895, his botanical books and drawings were split between the Edinburgh Museum of Science & Art and Edinburgh University, and his herbarium given to RBGE. In 1940 the books and the drawings, which formed the Cleghorn Memorial Library, were transferred to RBGE by what was by then called the Royal Museum of Scotland, whereupon Cleghorn became, if posthumously, one of the Garden's most significant patrons. This role had been almost entirely forgotten until a recent project to write Cleghorn's biography, and to publish a representative selection of the botanical drawings in an illustrated volume.

Framed works

***Gloriosa superba* L.**

This is one of the 464 drawings made by a ‘Marathi’ artist employed by Cleghorn between August 1845 and July 1847 while he was stationed as a surgeon and magistrate at Shimoga in the Kingdom of Mysore – in what is now the state of Karnataka. The plant depicted is a relative of the autumn crocus (*Colchicum*), which scrambles up other vegetation such as hedges by means of tendrils on the ends of the leaves. The tuberous roots are poisonous (containing the alkaloid colchicine – which is used to disrupt cell-division in studies of plant chromosomes) and are said to be used in South India to effect suicide. The plant is commonly cultivated in greenhouses and as a pot-plant in temperate regions for its baroquely curlicued flowers.

By an anonymous ‘Marathi’ artist, for Hugh Cleghorn, Shimoga, 1846.
Ink and watercolour over pencil.
RBGE CN 201.

***Boerhavia coccinea* Miller**

In 1753 Linnaeus described four species in a genus that he named after the great Dutch medic and botanist Hermann Boerhaave. Linnaeus had studied with Boerhaave in Leiden, as had Charles Alston, Regius Keeper of RBGE (1716–60). The genus is difficult taxonomically and is now considered to include about 20 species – mostly widespread, pantropical, annual weeds. The plant depicted here has generally been known as *Boerhavia diffusa*, a species based by Linnaeus on specimens from Ceylon, Jamaica, and a plate in Rheede’s *Hortus Malabaricus* – these are now assigned to three different species, of which this drawing shows what is known as *B. coccinea*. This segregate species is almost certainly among the forms described (under *B. diffusa*) by Cleghorn’s friend Heber Drury, in his *Useful Plants of India* (1859), as, despite being a troublesome weed, having useful medicinal properties. The powdered root was used as a laxative and, as an infusion, against parasitic worms; it was also found to be a ‘good expectorant, and [has] been prescribed in asthma with marked success, given in the form of powder, decoction, and infusion’.

Possibly by Mooregasan Moodeliar, for Hugh Cleghorn, Madras, 1856.
Watercolour, ink and gum arabic over pencil.
RBGE CNS 122.

***Eucalyptus cinerea* Bentham**

In the 1850s there was great interest in planting Australian trees in the Nilgiri Hills, around Ootacamund, the hill-station of the Madras Presidency. The main purpose was as firewood, a topic on which Cleghorn wrote a report in 1859. The favoured genera, for their fast growth, were *Acacia* and *Eucalyptus* – choices later to be regretted. The first *Eucalyptus* was planted by the engineer Captain Frederick Cotton in 1843, and the species most often grown was the Tasmanian blue gum, *E. globulus*. It is recorded that in 1856 Captain Morgan imported seed of ‘blue gum’ from Australia, but the following year it was still considered so rare that a plant purchased from the Government Gardens cost 12 annas. It is not known if Morgan’s introduction involved more than one species, but the plant shown here could be part of this introduction, as large-scale planting did not take place until 1863. This drawing was made

from a plant in the garden of Kempstow, a house that belonged to Mrs Brooke Cunliffe, wife of a Madras Civil Servant. The juvenile and mature foliage of many eucalypts differ greatly in shape, and the clasping ('perfoliate') form shown here is typical of the immature foliage of several species. However, the fact that the flowers are borne in groups of three at the juvenile stage shows this to be *Eucalyptus cinerea*, a native of New South Wales and Victoria.

By Govindoo, for Hugh Cleghorn, Madras, 1859.
Watercolour and ink over pencil.
RBGE CMG 30.

Spathodea campanulata P. Beauvois

A large, usually evergreen, tree to 21 metres tall, widespread in tropical Africa, but now popular as a street tree throughout the tropics for its brilliantly coloured flowers. It was first described from West Africa by the French botanist Palisot de Beauvois in 1805 and introduced to British hothouses where Joseph Paxton flowered it for the Duke of Devonshire at Chatsworth in 1852. Its date of introduction to India is unknown, but when this spectacular drawing was made in 1855 there was difficulty in identifying it, which suggests that it was then a novelty. For its identification Cleghorn sought help from his friend the Madras Civil Servant Walter Elliot of Wolfelee, to whom he lent his own copy of the volume of De Candolle's *Prodromus* containing the account of Bignoniaceae to assist him; Elliot's reply of 5 March 1856, with its correct identification, was pinned to the drawing and survives. The flower buds, with their spathe-like calyces (from which the generic name is derived), are filled with fluid, and can be used as water pistols by mischievous children – accounting for the common names of 'fountain tree' and 'squirt tree'.

By Govindoo, for Hugh Cleghorn, Madras, 1855.
Watercolour, ink and gum arabic over pencil.
RBGE CAH 79.

Spinifex littoreus (N.L. Burman) Merrill

In addition to using artists, Cleghorn experimented with the direct making of prints from herbarium specimens, using a method devised by the Madras Government printer, Henry Smith. In 1856 Cleghorn was commissioned by the Madras Military Board to write a report on plants that could be used to stop sand from blowing on the Madras Beach 'between the Saluting Battery and Saint Thomé'. This nature print is of one of the species he discussed. It is a grass with long, creeping rhizomes, similar in habit to the lyme and marram grasses of British sandy seashores, but very different in its spiky, spherical inflorescences known in Tamil as 'Ravana's whiskers'. According to Cleghorn the plant is *polygamo-dioecious*, that is having some plants with male and bisexual flowers, and others with female and bisexual flowers:

reproduction is effected in a very remarkable manner; the male spikes congested into an umbel are carried by the wind to the female flowers, which are fascicled on a distinct plant, and being light and spherical, the Dutch call them ... wind-boll.

Nature print, probably by Hugh Cleghorn, Madras, c 1857.
RBGE s.n.

Lagenandra ovata (L.) Thwaites

Around half of the drawings in Cleghorn's illustrations collection are copies from printed illustrations in books, which vary from facsimiles to free adaptations. One of the great classics of tropical botanical literature is Hendrik van Rheede's *Hortus Malabaricus*, written and compiled on the western coast of India in the late seventeenth century with the help of a team of Indian doctors and plant collectors, and Dutch artists. Cleghorn did not own copies of volumes 6 to 12 of the work, so had one of his artists copy many of the plates (this one is from plate 23 of the eleventh volume, published in Amsterdam in 1692). The plant depicted is a large herb of wet places in Sri Lanka and south-west India, where it usually grows beside running water. The tubercles on the outside of the spathe are characteristic of the species. Linnaeus based his species *Arum ovatum* entirely on this illustration.

Possibly by Govindoo, after Rheede, for Hugh Cleghorn, Madras, c. 1855.

Ink and ink wash over pencil.

RBGE HM 11/23.

H.J. Noltie,
Herbarium, RBGE
July 2016