

The Flowers of St Clement's 2025

Page	Plant	Date
1	Sweet Columbine - Aquilegia	March 2025
2	Wood Avens – Herb Bennet	July 2025
3	St Valentine and the Crocus	June 2025
4	The Dandelion	May 2025
5	Elatior	March 2025
6	<i>Euphorbia milii</i> – the Crown of Thorns	May 2025
7	Forsythia	March 2025
8	<i>Geranium robertianum</i> – Herb Robert	April 2025
9	The Hollyhock	July 2022
10	The Ivy – Queen of the Churchyard	October 2023
11	<i>Convallaria majalis</i> – Lily of the Valley	April 2025
12	<i>Sedum spectabile</i>	December 2025
13	Sweet Violets	March 2025
14	<i>Vitis vinifera</i>	August 2025

Sweet Columbine - *Aquilegia*



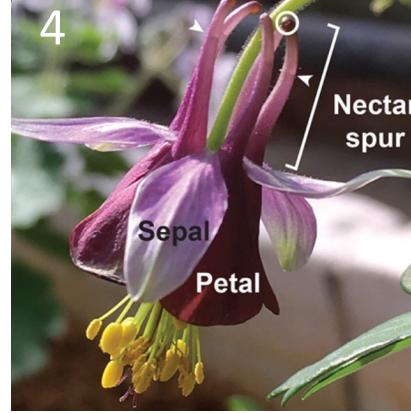
Last week's churchyard article described Rosemary, one of the flowers referred to by Ophelia in Shakespeare's tragedy Hamlet. Quite by chance, this week I noticed the arrival in the churchyard of another of Ophelia's flowers – the columbine (in botanical terms *Aquilegia vulgaris* L.). In the 'language of flowers', the columbine is said to represent flattery or insincerity, consistent with Ophelia's feelings at the time. Although too early as yet for flowering, our columbine already shows a rosette of developing leaves and some promising flower stalks (1).

A beautiful depiction of the Columbine can be found in Leonhard Fuchs' herbal "De historia stirpium commentarii insignes" (2). The columbine was associated with fertility ceremonies in both ancient Greece and Rome, and archeobotanical studies suggest that *A. vulgaris* was in cultivation by the 2nd century AD in Roman Britain. The common name 'columbine', is first seen in Middle English before 1350. It appears to derive from the French *colombine*, via the Latin *columba* for dove. Indeed, the flowers do show a remarkable resemblance to a group of doves gathered together around a water fountain (3). Another hypothesis is that the name columbine refers to the colours of a dove. In contrast, the botanical name of the columbine, *Aquilegia*, likely derives from the Latin for eagle, the talons of which may be represented by the spurs on its flowers.

During the Renaissance, this flower was associated with the Holy Spirit and the sorrows of the Virgin Mary. It was used medicinally to relieve the pains of childbirth, cure fever, and aid poor eyesight.

Aquilegia form a genus of some 130 species within the Buttercup family. Botanists have become fixated on the flower's 'nectaries', which occur at the base of the petals within specialised 'spurs' (4). Copious nectar is produced by the secretory cells lining the spur, accumulating at its base (arrowed in panel 4). A huge number of variants occur in spur shape and size, each adapted to the flowers' pollinators. Particularly long spurs are associated with hawkmoth pollination, while short spurs favour bees and, in America, hummingbirds. The perfect symmetry of the open flower (5) cannot but impress even the most unappreciative of pollinators!

A particularly beautiful member of the species is *Aquilegia fragrans* (6,7). Native to subalpine meadows in the Western Himalayas, it grows at altitudes of 2,400–3,600 m, conditions which are replicated in Europe in the Alps. Its discovery is credited to the distinguished botanist George Bentham (8), President of the Linnaean Society 1861-1874.



Wood Avens (1, *Geum urbanum*, L.) is a prominent churchyard resident at this time of the year. Its skeletal, wiry form is easily overlooked, and it spreads across the churchyard almost unnoticed – until one realises that it is everywhere! It is among a cadre of humble plants which underpin the churchyard ecosystem - and yet go almost unrecognized amongst the more eye-catching irises, ox-eye daisies and lilies.

In this respect, Avens resembles Herb Robert (*Geranium robertianum* L.), another modest yet ubiquitous feature of the churchyard. The delicate palmate leaves of Herb Robert are often seen together with the larger three-lobed, serrated leaves of Avens, as in (1). Before the advent of local Garden Centres, with their selection of racy perennials, plants such as Avens would have provided the gardener with a natural backdrop of delicate yellow flowers (2).



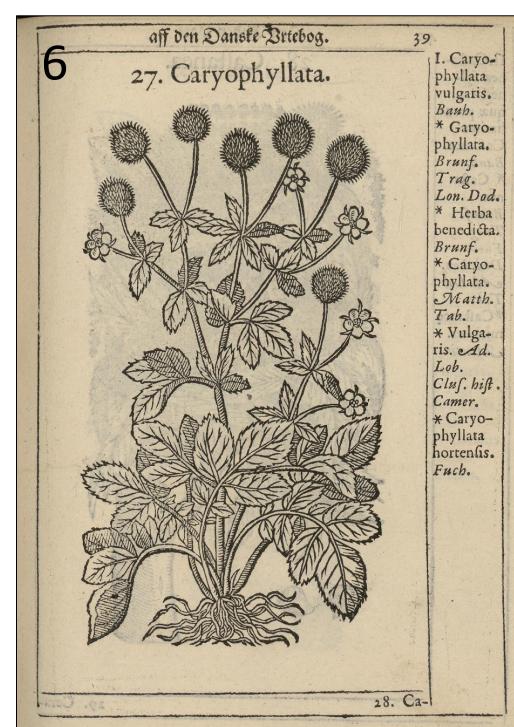
The leaves of Wood Avens occur typically in threes, and the petals of its yellow flowers in fives, which Christian symbolism associates with the Holy Trinity and the five Wounds of Christ. Its alternative name of St. Benedict's Herb or Herb Bennet, may reflect its medicinal properties - its roots contain eugenol, a substituted phenol with a pleasant, spicy, clove-like scent, used in the past as a sedative.

Taxonomically, Wood Avens belongs to the Rose family (Rosaceae) – the multitude of stamens and reflexed sepals certainly resemble those of a rose (3). It differs from most roses in the fruiting body (4). Each mature seedhead bears burr-like achenes, designed to attach themselves to passing creatures to aid seed dispersal.

Wood Avens is included in the RHS Plants for Pollinators list, with its summer flowers attracting hoverflies, small beetles and flies. Its leaves are a food plant for caterpillars of the grizzled skipper butterfly and the riband wave moth. Another skipper butterfly, the Essex Skipper, is known to frequent our churchyard, so it is entirely possible that we have several skipper breeding colonies in residence.

The Darwin Tree of Life Consortium, based at the Sanger Centre in Cambridge, have sequenced the complete genome of a carefully chosen *Geum urbanum* plant found at Kew. As discussed in previous Newsletters, such plant genome sequences can be valuable sources of the genes encoding the enzymes catalyzing natural product biosynthesis. Discovering them is one of the declared aims of the Sanger team (<https://doi.org/10.12688/wellcomeopenres.19664.2>).

Geums are popular and attractive plants for the herbaceous border (5). However, plant breeders are uncompromising: the cross shown in the photo, 'Totally Tangerine', recently introduced from the United States, is sterile and does not produce seeds. While very convenient for the gardener, it leaves open the question of its role in any fully functioning biological ecosystem. Caveat emptor!



Today, February the 14th, is an auspicious day for lovers, beekeepers and those suffering from epilepsy (1), for it is St Valentine's Day – and Valentine is their patron saint.

Although the Roman Catholic Church continues to recognize St. Valentine as a saint, he was demoted from their calendar in 1969 because of doubts about the details of his life and the legends surrounding it. The English Roman Catholic priest Alban Butler (1710-1773) crystallized what is known of the life of St Valentine in his book 'The Lives of the Saints', based on the *Acta Sanctorum* of Jean Bolland (1596-1665). Although many details are shrouded in mystery, Valentine is referred to as 'a holy priest in Rome, who, with St. Marius and his family, assisted the martyrs in the persecution under Claudius II. He was apprehended and sent by the emperor to the prefect of Rome; who, on finding all his promises to make him renounce his faith ineffectual, commanded him to be beaten with clubs, and afterwards to be beheaded, which was executed on the 14th of February, about the year 270'.

Many legends have arisen which embellish this rather stark history, one of which involves Julia, the blind daughter of Valentine's jailor. Valentine befriended Julia, miraculously restoring her sight by the laying on of hands. Valentine later wrote to her from prison. When Julia opened the letter, a yellow crocus pressed between the pages, fell into her hands. She touched the delicate flower, no doubt rejoicing in its bright yellow colour, a reminder of her friendship with Valentine who had given her the gift of sight.

The crocus in question is thought to have been *Crocus flavus*, a species first identified by the British botanist Richard Weston (1733-1806) and native to Greece, Turkey and the Balkans (2).

Valentine's letter was signed 'from your Valentine', an epithet used in a multitude of such letters over the ages! Valentine was executed on February 14, 270 AD. In his honour, Pope Gelasius declared the feast day of Valentine's death as St. Valentine's Day in 496 AD.

Although the feast of St Valentine is widely celebrated in this romantic context, a more natural association, promoted by the poet Geoffrey Chaucer (1343-1400), was as a precursor of the Rites of Spring. Chaucer's beautiful poem, the Parliament of Fowls, describes a chaos of bird species choosing their mates in springtime from within the poet's immersive dream. A specific reference is made to St Valentine's Day (3). Chaucer appears to have been the first to associate St Valentine's Day specifically with the rhythms of Nature.

Thus, although we may celebrate St Valentine's feast day with chocolates and red roses, the reality is more one of delicate crocuses and prolific birdsong!



Crocus flavus subsp. *Flavus*
Meneerke bloem



The Parliament of Fowls

The lif so short, the craft so long to lerne,
Th'assay^o so sharp, so hard the conqueringe,
The dredful joye alway that slit² so yerne,^o
Al this mene I by Love, that my feelinge
5 Astonieth³ with his wonderful werkinge
So sore, ywis, that whan I on him thinke,
Nat woot^o I wel wher^o that I flete^o or sinke.

attempt
quickly

know / whether / float

310 For this was on Saint Valentines day,
Whan every brid^o cometh ther to chese^o his make,^o
Of every kinde that men thinke may;
And that so huge a noise gan they make,
That erthe and air and tree and every lake
So ful was that unnethe^o was ther space
315 For me to stonde, so ful was al the place.

bird / choose / mate

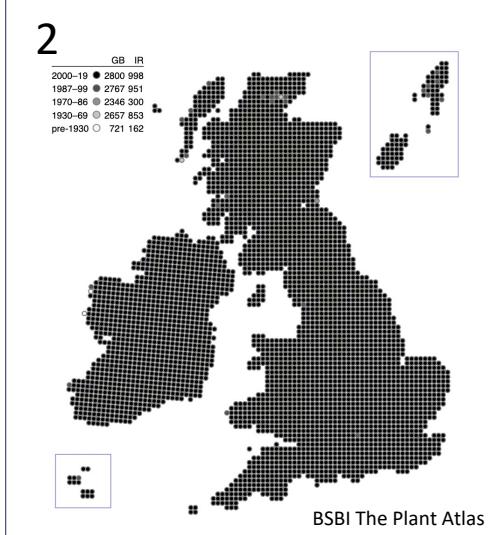
hardly

The Common Dandelion, *Taraxacum officinale* (1), is one of the most widespread wild plants in Great Britain (2). Although not beloved by gardeners, most of whom consider it a prodigious weed and a threat to their immaculate lawns, the dandelion's flowers nonetheless provide much-needed sustenance for many insects and animals during the bleakest times of the year (3).

Around 250 species comprise the Taraxacum genus in the British Isles: most are tap-rooted, perennial herbaceous plants, natives of temperate zones of the Northern Hemisphere. Dandelions can reproduce asexually without fertilisation, a process known as apomixis, which results in local populations of genetically identical individuals. A small patch of dandelions have established themselves at the edge of the churchyard, facing Portugal Place (4) – their flower buds are already emerging from the very centre of the dandelion's rosette of deeply serrated leaves. Following the production of its characteristic yellow flower heads, *Taraxacum officinale* will use its elegant wind-dispersed parachutes ('clocks', 5) as a seed dispersal mechanism to colonise distant landscapes.



Walther Otto Müller (1833–1887)



Dandelions evolved about 30 million years ago in Eurasia (seeds of *Taraxacum tanaiticum* dating from the Pliocene have been found in southern Belarus) and have been used for food for much of recorded history. They were well known to ancient Egyptians, Greeks and Romans, and have been used in traditional Chinese medicine for over a thousand years. The English name, dandelion, is a corruption of the French *dent de lion* meaning 'lion's tooth', referring to the deeply serrated shape of their leaves, while the Latin suffix 'officinale' indicates their use as medicinal herbs in medieval times.

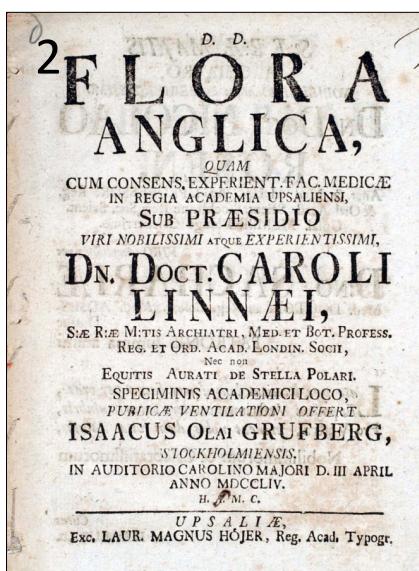
In French, they are also referred to, more disparagingly, as 'piss-en-lit' (traditionally in English 'Pissabed') reflecting the pharmacological activity of dandelion extracts as diuretics, which increase urine production and detoxify the blood, thereby improving kidney and liver function. This refreshing property is reflected in the use of dandelion flowers in tea (6), while its roots, leaves and flowers can be used in soft drinks such as Fentiman's 'dandelion and burdock' (7). Ground roasted dandelion root can be used as a non-caffeinated coffee substitute (8). Apparently, dandelion roots that are harvested in the spring have sweeter and less bitter notes, while autumn-harvested roots are richer but bitter, if anyone wants to experiment!



Another less obvious use for dandelions is in the industrial production of latex. Latex, the white sticky exudate from damaged dandelion stems, is produced in specialised tubes within the plant called 'laticifers'. Although natural rubber is primarily produced by tapping rubber trees (*Hevea brasiliensis*, the Brazilian rubber tree, now primarily grown in huge plantations in Southeast Asia, Africa, and South America), dandelions provide an alternative source. The story of the discovery and development of dandelion latex is a fascinating one, recounted in excruciating detail on the Fraunhofer Institute website (<https://www.fraunhofer.de/en/media-center/videos/videos-2015/natural-rubber-from-dandelions.html>). Briefly, all dandelions secrete latex when damaged - but in the common dandelion, latex content is low and variable. However, in *Taraxacum kok-saghyz*, the Russian dandelion, yields are higher, and this dandelion can be cultivated at scale to produce industrially significant quantities of latex. Fraunhofer have produced and road-tested dandelion rubber tyres, and Linglong Group Ltd has invested \$450 million to produce dandelion tyres in factories in China... In Nature, latex plays a key role in the defence of dandelion plants against herbivores, and its sequestration within laticifers protects the plant from the cytotoxic effects of its own poisons!

The Oxlip (*Primula elatior* Hill) is certainly a newcomer to the garden – it has only just arrived from Crocus and has yet to be planted! But judging by the excellent growth of its relatives, the Primrose (*Primula vulgaris* Huds.) and the Cowslip (*Primula veris* L.), we have great hopes that it will flourish here. In more general terms, Cambridgeshire with its moist woods on chalky boulder clay, is one of the best places to find Oxlips, with Hayley Wood near Great Gransden one of the best sites for them in the UK (1).

The Primula was first formally delineated as a genus by the botanist Carl Linnaeus in 1753, as recorded in his book 'Species Plantarum', the first to use specific binomial classifiers. One year later, in 1754, in the *Flora Anglica*, a dissertation on English plants produced by one of Linnaeus's students, Isaac Grubberg (2), we see four species of Primula: *P. veris officinalis*, *P. elatior*, *P. acaulis* and *P. farinosa*.



In all, Linnaeus described seven species of *Primula*. Today, we recognize over 400, occupying a range of habitats from alpine slopes to boggy meadows, about 75% of which are found in the eastern Himalayas and western China. The most beloved member of the genus is probably the wild primrose, which occurs at several places in the St Clement's churchyard. We also have examples of the cowslip in our Spring Garden. Now we also have the Oxlip!

It is relatively easy to distinguish the oxlip from the cowslip (3,4). The oxlip is a tall plant, up to 30cm high, from which it derives the epithet 'elatior' (Linnaeus used the term to differentiate many taller plants from their sessile relatives). It has subtle, pale-yellow flowers in a one-sided cluster. The lobes of its green corolla tube each have a prominent dark green midrib so that it appears striped. Each flower is shallow, dish-shaped, not flat like a primrose, or cup-shaped as in the bright yellow cowslip (4).

Although these differences seem pretty clear at a practical level, controversy has arisen over naming the various members of the *Primula* genus as described in *Flora Anglica* and starred in (2). An early adopter of the Linnaean binomial system for classification was the botanist, John Hill (5). A colourful character, Hill was a composer, actor and author, but is largely remembered for his illustrated botanical compendium 'The Vegetable System', one of the first works to use the Linnaean taxonomy system. A magnum opus of some 26 folio volumes containing 1600 copperplate engravings, it was produced for Lord Bute, and resulted in the award of the Order of Vasa in 1774 from Gustav III of Sweden. Thereafter styling himself 'Sir John Hill', Hill attempted to become a member of the Royal Society, but without success. Samuel Johnson said of him that he was "an ingenious man, but had no veracity." Perhaps his greatest achievement was in naming the oxlip which is now remembered as "*P. elatior* (L.) Hill, Veg. Syst. 8: 25 (1765)"....



Euphorbia milii – the Crown of Thorns

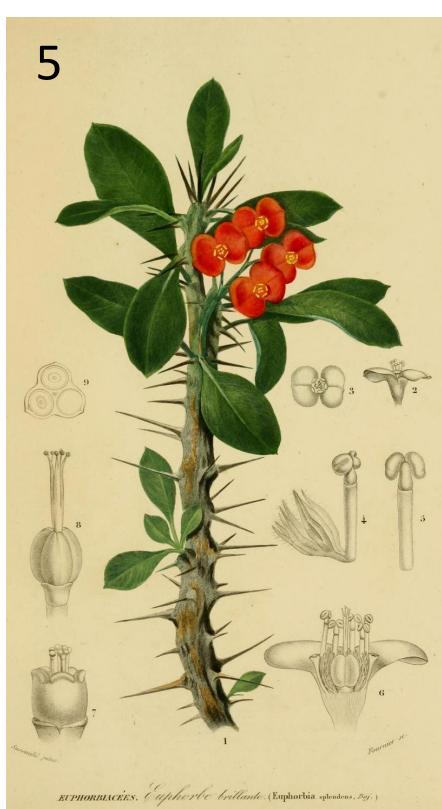
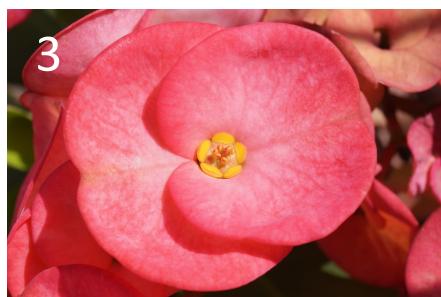


My visit to Sicily proved instructive: I hadn't imagined that a plant armed with thorns like a rose, growing in the cactus garden in the Taormina amphitheatre, was in fact a species of Euphorbia. The plant in question was identified as *Euphorbia milii* Des Moul. (1,2).

The flowers of all Euphorbia are built on a unique floral platform, the *cyathium*, which forms a complex inflorescence bearing the stamens and pistils of the flower. In the case of *Euphorbia milii*, the flowers are surrounded by large fleshy bracts which are reddish-pink in colour, and cup the much smaller flower with its nectaries in the centre (3,4).

Euphorbia milii is also known as the Crown-of-thorns, the Christ plant, or Christ's thorn. Although native to Madagascar, it is thought that the species was introduced to the Middle East in ancient times, legend associating it with the crown-of-thorns worn by Christ upon his crucifixion. The brutal array of thorns on the stem seem to emphasise the pain of the crucifixion, while the red flowers call to mind drops of Christ's blood. The suffix *milii* commemorates Baron Milius, once Governor of Réunion, who introduced the species to France in 1821. It was named by the French botanist Charles des Moulins.

We do not have Christ's thorn in the churchyard, but we do have another Euphorbia species, *Euphorbia characias*, the Mediterranean Spurge (6,7). Its tall unbranched stems bear long narrow leaves terminating in large dense spherical clusters of fluorescent green flowers. These flowers possess distinctive nectar glands, either dark red or black for the subspecies *characias*, or yellow-green and horned for the subspecies *wulfenii*, each within yellow cup-like cyathia. They make an eye-catching display in the churchyard in April and May.



1



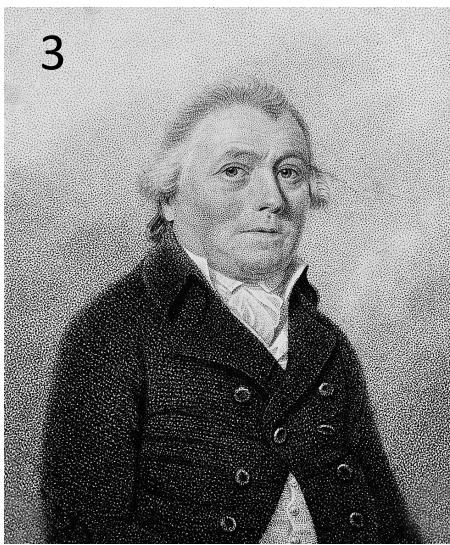
24 March 2025

2



24 March 2025

3



4



Wikipedia

The Bridge Street area of the churchyard is currently sporting an impressive stand of Forsythia (1,2). Ours is rather a chaotic plant, badly in need of pruning, but its bright yellow plumage adds a welcoming springtime feel to the garden when viewed from the street.

The genus *Forsythia* is named in honour of William Forsyth (1737-1804) (3), a Scottish botanist who was head gardener at the Chelsea Physic Garden in London from 1771, later becoming superintendent of the Royal gardens at Kensington and St. James's Palace. However, the history of *Forsythia* has little to do with William Forsyth, as we shall see.

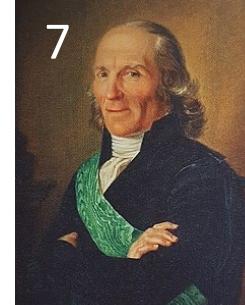
Many new plants were brought back to Europe by botanists who were accommodated on voyages of discovery to the Far East in the 17th and 18th centuries, financed by commercial concerns such as the Dutch East India Company. Amongst these plants was *Forsythia*.

The precise genetic relationships between today's *Forsythias* are often obscured by extensive hybridisation undertaken both in botanical gardens and within commercial companies to produce new varieties. The most common variety of *Forsythia* is probably *Forsythia x intermedia* Zabel, an artificial hybrid between two *Forsythia* species, *F. suspensa* and *F. viridissima*, a seedling of which was found by Hermann Zabel in the Munden Forestry Botanical Garden and Arboretum in 1878. Following its formal description in a short article by Zabel in the journal *Gartenflora* in 1885 confirming provenance, a sample of the plant was sent to Harvard's Arnold Arboretum for further propagation and distribution – clearly a successful project judging by the number of *Forsythia* plants one sees!

Forsythia suspensa, (known as Weeping *Forsythia*), the presumed parent of *Forsythia x intermedia*, is the type species of the genus. This rather attractive plant (4) had been described earlier by the Norwegian botanist Martin Vahl (1749-1804). Its étiquette photographed in the Jardin des Plantes in Paris, hence in French (6), also mentions someone called 'Thunb'. This abbreviation is botanical shorthand to indicate the botanist Carl Peter Thunberg (1743 – 1828). Vahl and Thunberg are pictured below in panels (5) and (7), respectively.

During his time first as a Professor and then Rector at Uppsala University, Carl Linnaeus taught many devoted students, seventeen of the most promising and committed of whom he called "apostles". In a fascinating forerunner of modern scientific networking, Linnaeus carefully masterminded the worldwide distribution of his "postdoctoral fellows", covering most of the rapidly emerging botanical New World. These apostles were students whose careers he supported by placing them on expeditions to various parts of the world, in the hope they would return with eye-catching new specimens, which they usually did.

Thunberg was perhaps the most famous and successful apostle, embarking on a nine-year expedition in 1770, visiting South Africa and Japan, writing a comprehensive *Flora Japonica* - and sending back valuable specimens to his mentor in Uppsala, including *Forsythia* which he discovered in a Japanese garden. Others were Christopher Tärnström (the first apostle, who travelled to China in 1746), Pehr Kalm (who travelled to North America) and Daniel Solander (who circumnavigated the world with James Cook, and whose specimens helped establish the Natural History Museum in London). Together, these 'plant hunters' harvested the Arctic, Siberia, the USA, the Middle East, Africa, Asia and Oceania, often enduring life-threatening hardships to do so.



Geranium robertianum – Herb Robert



Herb Robert is omnipresent in the churchyard – it lodges in the church walls, it spreads across the Spring garden, it colonises every nook and cranny. The specimen shown to the left is attempting to scale the sacristy wall (1,2).

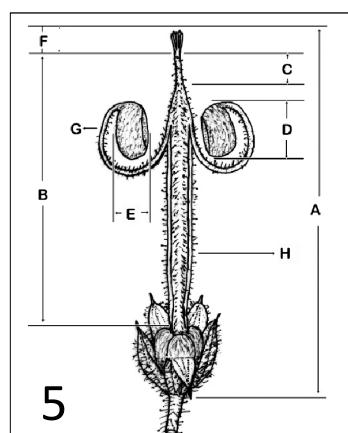
Herb Robert is a quintessential Crane's-bill, with basal sepals through which an elongated pistil protrudes, forming a prominent central rod resembling a crane's beak within which the seeds will develop (3).

Indeed, the name *Geranium* comes from the ancient Greek word for 'crane', γέρανος (*géranos*), a description also used by the Romans. Linnaeus in *Species Plantarum* (1753) credited Bauhin's *Pinax theatri botanici* (1623) for using the polynomial *Geranium robertianum primum*. In turn, Bauhin credited Dodoens, who listed *Geranium robertianum* in his *Stirpium historiae* of 1554. Apparently Dodoens used the name *Robertiana herba* after Ruellius who published *De natura stirpium* ("On the nature of species") in 1543. The Robert referred to remains shrouded in mystery, although he might be Robert de Milemes, a healer and saint from the 11th century.

Herb Robert flowers have an elaborate opening routine, described by Stephen Harris: "When the flower opens, the stigmas are close together. The five anthers closest to the centre of the flower split open releasing their pollen; the other five stamens bend towards the petals. The stigmas then separate to expose their receptive surfaces; the inner stamens wither and the outer ones move towards the stigmas and open." Despite the flowers being visited by numerous types of insects, seed production appears to be by self pollination.

But even more unusual is the seed dispersal mechanism used by Herb Robert and other members of the genus. The fruit is called a *schizocarp*, a type of dry fruit that splits into separate single-seeded pieces (*mericarps*) at maturity. During drying, so much torque builds up that upon splitting, the connective tissue awns, acting as springs, hurl the seed-containing mericarps more than five metres away, by a catapult mechanism resembling that of a trebuchet. All this happens in a split second, ejecting the seed and leaving the empty case at the end of the beak: indeed, a miracle of plant development (3-7).

There are over 350 species in the geranium family; botanists have spent their lives characterising them. The Cambridge University Botanic Garden is a centre of excellence for geranium phylogeny, based on the pioneering work of Peter Yeo who bred a series of attractive cultivars based on *Geranium x cantabrigiense*. Peter was a Botanist, Taxonomist, Lecturer and Librarian at the Botanic Garden, as well as Fellow of both Wolfson College and the Linnaean Society.



Keys to Figures 4-7

Figure 4, expansion of the style after petals have been shed (photo: Chris Jeffree, School of Biological Sciences, University of Edinburgh); Figure 5, nomenclature of schizocarp components, from Deniz & Yıldız, *Phytologia Balcanica* (2018). A: overall fruit size; B: rostrum length; C: rostrum neck; D: mericarp; E: mericarp width; F: stigmatic remains; G: awn; H: columella;

Figure 6, schizocarp of *G. robertianum* during dehiscence;

Figure 7, schizocarp of *G. sanguineum* immediately after ballistic ejection of seeds (Wikipedia, note retention of mericarp shell in the schizocarp remaining after seed ejection in this species).

The Hollyhock

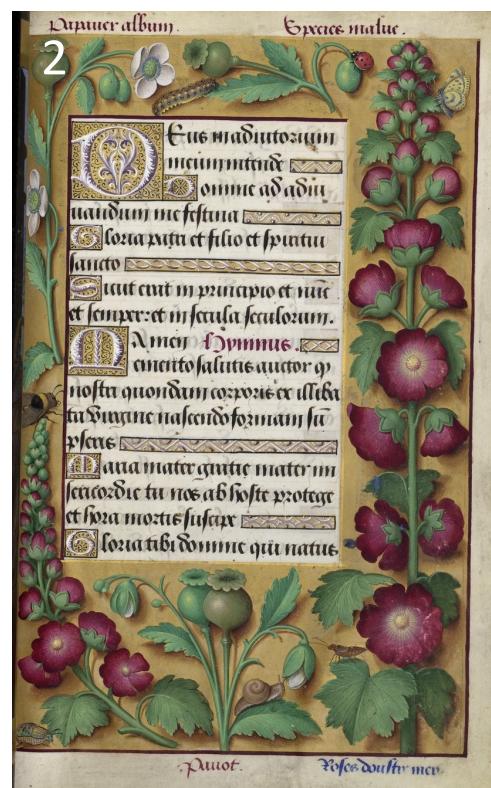
The Hollyhock is the pride of the English Cottage Garden. Hollyhocks can be over 9 feet tall and create an impressive focus for the herbaceous border, where they form a wall of spires (1).

The Common Hollyhock (*Alcea rosea* L.) originated in China, with seeds being carried to Europe along the Silk Road as early as the 13th Century. The story goes that Eleanor of Castile, the first wife of Edward I, brought hollyhock seeds back from Palestine having accompanied Edward there in the Crusades.

There is an early illustration of the hollyhock in *Les Grandes Heures d'Anne de Bretagne*, illuminated between 1503 and 1508 by Jean Bourdichon for Anne Queen of France (2). In French hollyhocks were described as 'roses d'oustremer' (roses from overseas), from which their common name of 'rose trémière' in French originates.

Hollyhocks are first mentioned in the English botanical literature in *The Great Herbal* of William Turner (1509-1568), where the plant is referred to as the 'Holyoke', derived from the Middle English 'holy' and Anglo Saxon 'hoc' meaning mallow (OED). Indeed, the Hollyhock does belong to the Mallow family, or Malvaceae, which embraces globally at least 4,225 species of herbaceous plants, shrubs, and trees, and is divided into around 240 genera.

The hollyhock genus itself, *Alcea*, comprises 82 species, growing wild from the Mediterranean to Central Asia. These include the Common Mallow (*Malva sylvestris*), which is an abundant smaller wildflower in our churchyard, as well as the much larger Tree Mallow (*Malva arborea*), or Lavatera, an example of which can be seen in Janet Unwin's garden a little further along Portugal Street.



The life-cycle of the hollyhock is shown in panel 3. Unfortunately, although hollyhock seeds (4) are produced abundantly and germinate freely, the young seedlings are susceptible to attack by slugs and snails, squadrons of which are alive and well in the churchyard, encouraged by the wet weather of the last few years. In a gallant effort to encourage the addition of the hollyhock to the churchyard garden, John Gatiss (5) collected thousands of seeds from neighbours' gardens and scattered them in the churchyard - but few have survived, although one doughty specimen is growing close to the railings on Portugal Place (6)!

The Ivy – Queen of the Churchyard

The Common Ivy (*Hedera helix* L.) is a rampant, evergreen clinging vine, acting as a keystone species in the churchyard ecosystem. Its flowers provide a rich source of nectar for insects in the autumn and its berries are a source of food for birds in the winter. Ivy also provides a key nesting site for birds in the spring. The flowers are visited by over 70 species of nectar-feeding insects, and the berries eaten by at least 16 species of birds.

In the season of Christmastide, ivy has come to symbolise the Virgin Mary, in apposition to holly which represents Christ through its crown of thorns. In the Dionysian and Bacchanalian rites of the ancient Greeks and Romans, wreaths of ivy leaves were worn around the head, some say in the hope of staving off inebriation, while the Roman god Bacchus, the god of wine and festivity, was often depicted wearing a wreath of ivy and grapevines. In sharp contrast, ivy was also a symbol of intellectual achievement and sporting prowess – wreaths of ivy were used to crown winners of poetry contests and given to winning athletes. Ivy was also a symbol of fidelity and priests would present a wreath of ivy to newly married couples. It is still the custom for bridal bouquets to contain a sprig of ivy.

English ivy, collected from Petersham Common in Richmond, Surrey, has recently been used to produce the first high-quality ivy genome, estimated as approximately 1,550 Mb in size. It is hoped that this information may shed light on ivy's biochemistry, especially the biosynthetic pathways underlying the production of valuable triterpenoid saponins. The species is also of interest for its developmental genetics - ivy undergoes a dramatic transition in leaf shape, with juvenile shoots producing small, distinctly ivy-like leaves, climbing by adventitious roots and lacking flowers. In contrast, mature shoots have large, lobed, spirally-arranged leaves (1) and lack roots but produce flowers (2), arranged in greenish-yellow umbels.

Common ivy is now found around the globe as a non-native alien species, often being known as "English" ivy and classified as an invasive alien. Despite popular belief and superficial appearances, ivy is not a parasite: it produces its own food resources via photosynthesis, only attaching itself loosely to the stems of trees by adventitious roots. Only when ivy dominates the canopy does its mass become a problem. At St Clement's, with the Council's help, we keep a watchful eye on the spread of ivy (3). Banks of ivy can also be seen at St Clement's plot in the Mill Road Burial Ground (4), where it serves as an important habitat and contributes to this site's designation as one of special environmental importance.



Convallaria majalis – Lily of the Valley



Last Easter, Robin generously provided a selection of Lily-of-the-Valley plants from his garden to display in the church, following which they were transferred to the churchyard. I am pleased to say that they are thriving in the Spring Garden facing Portugal Place (1). Our problem now may be to prevent them invading the rest of the churchyard!

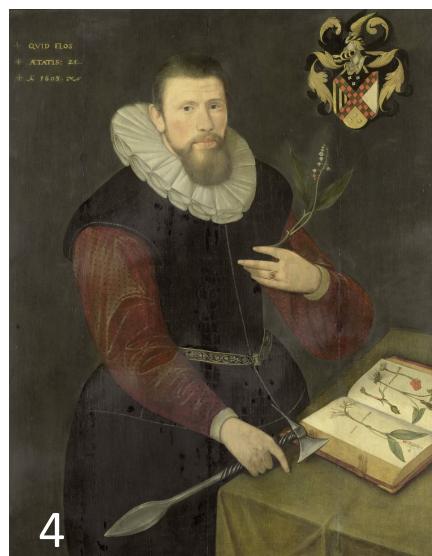
Lily-of-the-Valley (*Convallaria majalis* L.) is a native of northern Europe and Asia. Its small, fragrant, white flowers (2) characterise shady woodlands in late spring when the plants suddenly sprout from an apparently empty landscape. In the wild, their aerial leaves can be connected to an extensive spreading underground network of roots (via rhizomes and stolons). Evidence from ancient woodlands suggest that these underground networks are long-lived and may date back many centuries.

Along with the rest of the world, plant taxonomy is changing! Beset by new classifications based on DNA sequencing and bioinformatics, the traditional binomial Linnean system of plant names, based on observing flower parts and collating the results in floras (4), is gradually being supplanted by the more modern APG III system of plant classification. In the APG III classification system, the *Convallaria* genus is placed in the family Asparagaceae, subfamily Nolinoideae. It was originally placed in its own family Convallariaceae, and, like many lilioid plants, before that in the Lily family, Liliaceae.

It is not surprising that such a beautiful flower has acquired considerable symbolic significance. In the 'language of flowers' as promulgated in Victorian times, Lily-of-the-Valley symbolized a return to happiness. The flowers have also been associated with humility, purity, chastity and trustworthiness, as well as motherhood and happiness. The flowers are popular in wedding bouquets (5) and were included in the wedding bouquets of both the late Queen Elizabeth II, and of Kate Middleton, the current Princess of Wales.

Despite their popularity in bouquets, Lily-of-the-Valley are actually highly poisonous. They contain a toxic cocktail of cardiac glycosides, similar to the digoxins of foxgloves (*Digitalis purpurea*). These compounds, even in small amounts, can cause reactions such as abdominal pain, vomiting and skin rashes. Nevertheless, illustrating the maxim of the alchemist Paracelsus that the dose makes the poison, the drug convallatoxin, extracted from *Convallaria majalis*, has been used successfully in stroke therapy.

In Christian iconography, lilies of the valley are associated with remorse, with the flowers growing from Eve's tears as she was expelled from the Garden of Eden, and Mary's tears as they fell to the ground at Christ's crucifixion. The French celebrate *La Fête du Muguet* on May 1st, international Labour Day, supposedly the only day in the year when VAT is not payable. Not a cause of remorse!



Sedum spectabile

We have started a new 'plant sponsorship' scheme in the churchyard. Any member of the congregation can name their favourite plant, and we will add it to the other 150 species in the garden. The first 'plant sponsor' is Ann Walton who has chosen *Sedum spectabile* (1,4), a specimen of which has been harvested from her garden in Cambridge and will be planted on the sunny bank facing Bridge Street.

Sedums are succulent plants (1-5) with fleshy leaves and flat, nectar-rich flowerheads beloved by bees and other pollinators. They are popular with gardeners as they flower late in the summer and provide late garden colour while providing insects with late seasonal sustenance. They also withstand long periods of drought by carrying out a specialised form of water-saving photosynthesis, known as Crassulacean Acid Metabolism (CAM). CAM plants such as succulents and cacti, open their stomata at night to absorb CO₂, storing it biochemically as malic acid, while closing their stomata and completing photosynthesis during the day, thereby markedly reducing water loss and increasing drought tolerance.

Sedums comprise a large genus within the Crassulaceae family: the GBIF (Global Biodiversity Information Facility) database recognizes 555 species. Two main forms have been described: a taller form known as 'border sedum' and a ground cover variety known as 'stonecrop'. The type species is *Sedum acre* L. (2,3)



Sedums cope well with poorer, well-drained soils, although they can get a bit floppy and collapse from the middle out when growth is rapid, a feature reduced by carrying out the 'Chelsea Chop' which involves reducing stem length by half (traditionally around the time of the Chelsea Flower Show in May). Plants become more compact and stems branch out and develop numerous heads instead of one top-heavy one.

A recent RHS Trial of Herbaceous Sedums (6), published by Christopher Whitehouse, Keeper of the Wisley Herbarium, found that several popular garden varieties looked fabulous but were not attractive to insects. One of the best for insects was Sedum 'Matrona', a cross between *S. spectabile* and *S. telephium* (5).

Sedums are also a popular replacement for grasses on 'green roofs', where, in addition to insulation and water retention, they provide habitats for insects and ground-nesting birds such as skylarks. The largest sedum-covered roof in the UK is the 8-acre roof at the Rolls-Royce factory in Goodwood, West Sussex (7). Helpfully, when planted on tramways as in Basel (8), sedums markedly reduce train noise and vibration....



Sweet Violets



Continuing our voyage through Shakespeare's spring flowers, as seen in St Clement's churchyard, we come to the Violet, *Viola odorata*, prized for its sweet perfume by the Elizabethans and Victorians alike. Apparently, it was Queen Victoria's favourite flower.

Shakespeare's famous lines from *A Midsummer Night's Dream*, spoken by Oberon, King of the Fairies, set our scene:

'I know a bank where the wild thyme blows,
Where oxlips and the nodding violet grows,
Quite overcanopied with luscious woodbine,
With sweet musk-roses and with eglantine.'

Francis Bacon, in his *Essay of Gardening*, wrote, "I do hold it in the royal ordering of Gardens, there ought to be Gardens for all the months in the year, in which, severally, things of beauty may be then in season", continuing, 'For March, there come Violets, especially the single blue, which are the earliest.... In April follow the double white Violet.... That which above all others yields the sweetest smell is the violet and next to that the musk rose.'

The eminent herbalist and barber-surgeon John Gerard (1545-1612; panel 3), wrote of violets in his book, 'The Herball, or Generall historie of plantes', that "there be made of them garlands for the head, nosegaies and poesies, which are delightfull to look on and pleasant to smel ... gardens themselves receive by these the greatest ornament of all, chiefest beauty, and most excellent grace."

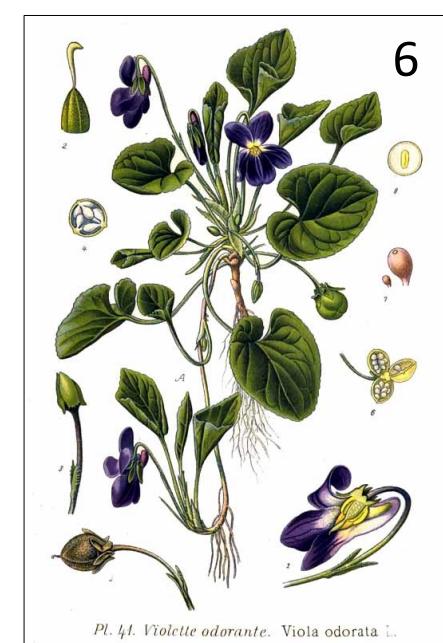
The St Clement's churchyard has its own bank of wildflowers where violets and primroses flower at this time of the year, many contributed from her own garden by Mary Macintosh (1,2).

The Violet belongs to the *Viola* genus, in which there are some 680 species, and many sub-species, including the Pansy (of which more, later in the year).

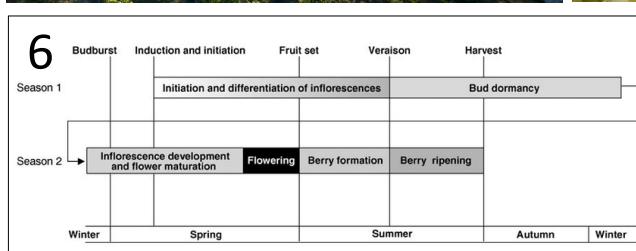
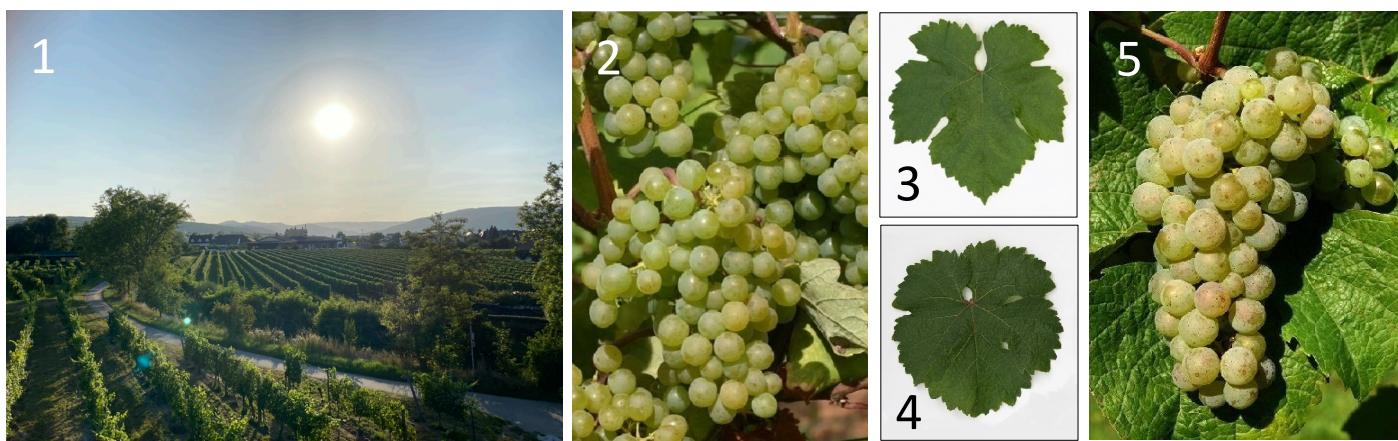
Viola odorata spreads rapidly using stolons (above-ground runners). The flowers are normally either white or dark violet (4,5) and are usually scented. Typically, *Viola* flowers have five petals and hooked styles (6). The lower petal, which is broader than the others, usually has a pouch extending behind it (arrowed in figures 4 and 6) and two of the five stamens of the flower have nectar spurs that project into this pouch, where nectar oozing from the spurs collects and attracts insects. Other features such as lines of pigmentation, epidermal iridescence and contrasts between the centre and margin of the flower as seen under UV are all used to attract pollinators.

Viola species often produce two flower types. Chasmogamous flowers which open and attract pollinators, and cleistogamous flowers which remain closed, producing selfed seed, thereby ensuring each plant produces at least some seed each year. When mature, *Viola* fruits split into three parts which, as they dry, contract; seeds become minute, explosively liberated projectiles. In some *Viola* species, additional dispersal occurs by ants carrying seeds to their nests; they are attracted to and eat the fatty bodies (elaiosomes) on the seeds, leaving the seeds themselves intact and ready to germinate.

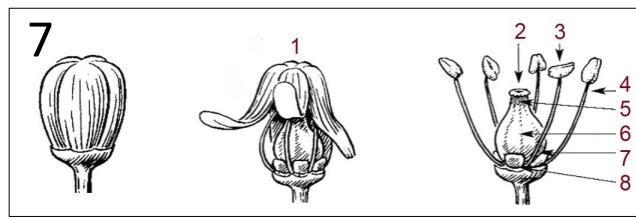
What a complicated little plant!



The grapevine, *Vitis vinifera* L., belongs to the flowering plant family Vitaceae, which contains 20 genera and embraces approximately 910 known species. Unfortunately, we do not currently have an example of *Vitis vinifera* in the churchyard – the closest we come to a grapevine is its vitaceous relative, *Parthenocissus quinquefolia*, to be found at the base of Canon Wood's grave. Nevertheless, the grapevine is a worthy subject for discussion, with a rich history intertwined with human civilization. This article has been inspired by a recent visit to the Wachau valley in Austria, where grapevines dominate the landscape (1). Here, grapes are mainly of the Gruner Veltliner (2,3) and Riesling (4,5) varieties.



Grapevines are one of the most economically and culturally important fruit crops worldwide. Their domestication, over 8000 years ago, can be traced to Georgia in the Caucasus, although viticulture (grape-growing) and viniculture (winemaking) has probably evolved many times and in many places since.



It is fascinating to see the development of an ordinary bunch of grapes. The inflorescence is initiated within the developing bud a year in advance of fruiting (6). Grape flowers have sepals at the base of the developing flower, which form a calyx consisting of five short, tooth-like parts (7,8). Grape flowers do have petals, but these are unlike the showy, separate petals of many other flowers. Instead, they are fused at the top and base, forming a protective cap known as the calyptra (7). This cap covers the internal reproductive organs of the flower. At anthesis (flower opening), the cap detaches and falls off as a whole unit, revealing the stamens and pistil inside (9).



This developmental complexity is recapitulated within all cultivars and detailed using transcriptomics and genome sequencing. Until recently, identifying and determining the relationships between grape varieties was a science unto itself, known as ampelography. In a process akin to that used by Linnaeus in the 18th century, grape species identification was undertaken by careful measurement of plant characteristics such as leaf shape, berry size and colour, and time of bud break and ripening (10). These characteristics can be discriminatory, as leaf shape shows (3,4), but have largely been superceded by DNA-based approaches.

Ancient wild varieties of grapevine often show adaptation to hostile local environments. In contrast, modern cultivars have been bred to show much less diversity, which makes them susceptible to environmental changes – such as global warming. Today's advances in paleogenomics and plant breeding allow us to discover and resurrect ancient traits from plants growing in such hostile environments (11), enabling us to breed drought and pathogen resistance into sensitive modern varieties.

