

Issue N. 2 June 2023

INTERSECTIONS

An Interdisciplinary School Magazine

In this issue...

FLOWERS AND PLANTS

Flowers and
Literature

Botanical stories
of survival: plants
and radiation

Flowers and
History

**And even
more!**



Issue n. 2
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Flowers and Plants

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A Journey Through Metaphors: Flowers and Italian Literature

Hope, rebirth, beauty, happiness, melancholy, memories, purity, love, peace, strength, prosperity. In a word, flowers. Flowers have always had a symbolic value and have been widely used as metaphors expressing the variety of emotions felt by human beings, who continuously find inspiration from them for paintings, poems, songs, and legends.

Writers from all cultures have celebrated flowers as the main characters of some of their works, exalting their beauty or using them as metaphors for what they wanted to express.

In the context of Italian literature, Mariangela Gualtieri's contemporary poem 'Cosa sono i fiori' (2003) underlines the particularity of flowers: they punctually blossom again every year, suggesting rebirth, and the writer represents them as if returning from another world and singing their vision. They therefore appear as bearers of a message of love and joy for mankind. In the third stanza, Gualtieri wants to convey the idea that flowers are real beauty, which, however, fades and returns whenever it wants. In this final part the poem expresses the transience of beauty and the fact that flowers have the particularity of recalling that wonder.

As we will discuss in the following paragraphs, flowers have therefore offered writers the opportunity to express the complexity of human emotions and existence through their colours and beauty.

'Dama dei fiori': the rose



The rose is particularly frequent as a symbol and metaphor in Italian literature. It is linked to ideas of love, admiration, devotion, beauty, and perfection. This flower conveys dual and contrasting meanings, such as heavenly perfection and real passion, time and eternity, life and death, fertility and purity.

The theme of pure love emerges in Guido Guinizzelli's sonnet 'lo voglio del ver la mia donna

laudare' (second half of the 13th century) and also in Attilio Bertolucci's poem 'La rosa bianca' (1934). In the first poem the rose represents feelings of love and purity also thanks to its colour. With the lily, it is also compared to the woman to celebrate her kindness and the nobility of her soul. In Bertolucci's poem, the white rose represents the woman he loves, his lifelong companion, who appears as sweet and metaphorically blooming also in autumn and imagined by the poet at the age of thirty. Therefore, the idea of pure love emerges, while sexual love is represented by the greedy bees that pollinated the white flower.



The theme of love as a source of suffering can be seen in Antonio Fogazzaro's poem 'Ultima rosa' (1870s), where the rose, defined as "folle dama dei fiori", is at the same time "splendida" and "morente", and in Dino Campana's poem 'In un momento' (1914). In both poems the rose is a metaphor that expresses passionate love that ends and withers just as flowers do,

as the powerful image of falling petals underlines in Campana's poem, symbolising the end of his intense and troubled journey of love with the poetess Sibilla Aleramo.

The symbol of the rose has also been used by songwriters such as Fabrizio De André, who wrote 'Via del campo' (1967) without any didactic or moral aim as his purpose was to depict reality as it is. Indeed, he presents the figure of a prostitute that sells the same rose to every man, metaphorically suggesting that she sells her body and offers the same kind of love to everyone. Therefore, the rose appears as a symbol of truth and purity as qualities the humblest people have, far from the hypocrisy and false respectability that dominate bourgeois society.

The brightness of yellow: the broom and the sunflower

'La ginestra' is one of Giacomo Leopardi's most famous poems. It was written in Torre del Greco in 1836, one year before Leopardi's death. The poem opens with the image of the humble broom, growing at the foot of Mount Vesuvius, in a land that has become arid and dry. However, the broom is presented as "contenta dei deserti". It appears as a flower that is capable of resisting adversity and

filling the lava slopes of the volcano with its colour and fragrance, despite its apparent fragility. The broom's yellow colour symbolises wisdom and energy, while its flowers symbolise vitality and an invitation to use one's spiritual energy to its fullest, even in the darkest moments of existence. In the whole canto the broom, which is referred to as “odorata ginestra”, is a metaphor for man's resistance (“social catena”) to the harshness of life. In this poem, Leopardi explores the themes of pride, human misery, the destructive power of nature, and man's weakness compared to this power.

For Eugenio Montale sunflowers are metaphors of energy, with their yellow colour, which is the colour of the sun, of light and vitality, but also of a redeeming and bright female figure. The yellow colour is always associated with cheerfulness and joyful life force. Those who live in a condition of inner sterility and dryness, like the one described by Montale in ‘Portami il girasole ch'io lo trapianti’ (1925), long and ask for the sunflower so as to make their soil burnt by salt, that is their soul, fertile again through the power of its light.



The flower of blood and desire: the poppy



The poppy is a herbaceous plant with large, delicate flowers that are typically red and have small, black seeds. Thanks to its different characteristics, the poppy can be contextualised in different scenarios assuming as many meanings.

Poppies are red like blood and desire, and they appear in the following extract from Giovanni Verga's novella ‘La lupa’ (1880): “La lupa lo vide venire, pallido e stralunato, colla scure che luccicava al sole, e non si arretrò di un sol passo, non chinò gli occhi, seguì ad andargli incontro, con le mani piene di manipoli di papaveri rossi, e mangiandoselo con gli occhi neri. – Ah! Malanno all'anima vostra! – balbettò Nanni.” Here the poppy acquires a double metaphorical meaning as these flowers symbolise the passion and the power of seduction of gnà Pina, the peasant female protagonist, defined as “la lupa” because of her irrepressible erotic passion. They could also stand for blood and

death since in the ambiguous ending of the novella the female protagonist is maybe going to be killed by Nanni, her daughter's husband.

“Dormi sepolto in un campo di grano / Non è la rosa, non è il tulipano / Che ti fan veglia dall'ombra dei fossi / Ma sono mille papaveri rossi”. These lines are taken from ‘La guerra di Piero’ by Fabrizio De Andrè (1966), where the symbolism of these flowers is crucial: poppies are used to blossoming during spring, in the month of May when Piero dies. This theme is linked to their red colour, which is a symbol of the blood spilled because of the destructive power and meaninglessness of war. The contrast with roses and tulips, which stand for love, passion, and life in its entirety, emerges clearly.

In ‘Altri papaveri’ (1996) Andrea Zanzotto describes fierce and barbaric poppies, defined as bearers of massacre. The main feature of this flower is its red colour, which is essentially a medium to refer to the colour of the blood spilled in the wars of Yugoslavia. Indeed, from line 1 to line 14 there is the description of the condition of the country during the war, and the rivers of blood spilled are represented as a field covered with poppies.

The red crimson colour of poppies recalls war and death. In the United Kingdom the poppy has become the emblem of Remembrance Day, which is the celebration that commemorates the victims

of the two World Wars because these flowers bloomed decorating the battlefield in Flanders during the Great War.

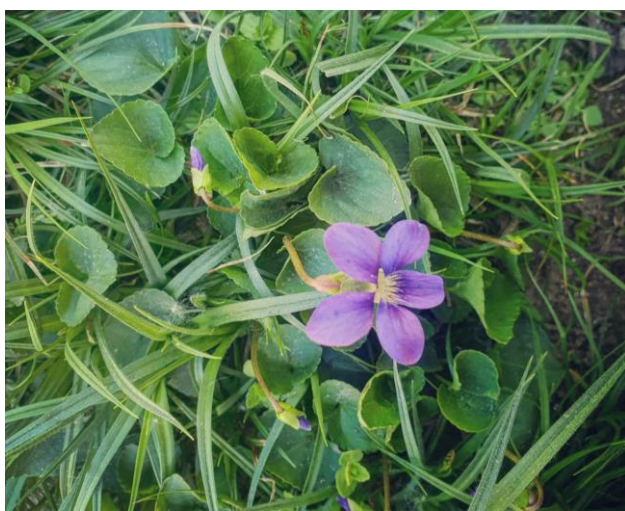


Giovanni Pascoli: the poet of nature and flowers

The periwinkle, the rose, the crocus, and then violets, lilies, jasmines, daisies, acanthus flowers: Giovanni Pascoli is certainly the poet that mostly loved and celebrated flowers in his two important collections of poems *Myricae* and *I canti di Castelvecchio*. Their evocative power refers to the humble and genuine world of the earth and the countryside, particularly loved by the poet. He sees in them a metaphorical shelter from the evil of the rest of the world and from the violence of history, stating a bucolic poetic line, exalted by the Virgilian quotation “arbusta iuvant humilesque myricae” (*Bucoliche*, IV, line 2).

In his poem ‘Viole d’inverno’ (1903) Pascoli describes violets as flowers that manage to flourish even in the midst of “nevi e brine”, suggesting the idea of strength and resilience. Exactly as violets manage to pop up in winter thanks

to the heat coming from a thermal source, the impulse of inspiration and creativity in the poet's heart gives warmth to his pure soul among the cold indifference of the world. The colour of violets opens this poem as these flowers seem to express the tranquility that can be perceived when admiring mountains at sunset.



Violets in the myth of Demeter and Persephone: the power of love and rebirth

Violets have been celebrated for their beauty, delicacy, tenderness, humility, and modesty. They appear in myths and legends, for example in the myths of Demeter and Persephone. When Hades, god of the underworld, kidnapped Persephone, that is Demeter's daughter, Demeter decided to make the land barren and dry as she was desperate for the loss of her daughter. Then Zeus, Persephone's father, convinced Hades to make Persephone stay with her mother for six months, during spring and autumn. This made Demeter happy, and for that reason she decided to fill the land with violets, that is flowers that could remind her of her beloved daughter's eyes. This is how violets (specifically 'pansies') originated, to celebrate Persephone's return to earth every spring.

In the poem 'Il gelsomino notturno' (1901), a modern epithalamium written on the occasion of the wedding of Pascoli's friend Gabriele Briganti, the jasmine, defined as night flower, becomes the metaphor of the joys and fertility of conjugal love. In the silent stillness of the night, while the petals of the jasmine are opening for pollination spreading a seductive perfume, in a bedroom a couple of newlyweds are uniting, generating new life.

In her short poem 'Bisogna dedicarsi' (2017) contemporary poetess Chandra Livia Candiani expresses the real and deep meaning of life: living everything with dedication, loyalty and care and loving every simple thing of life, even the most ordinary gesture. In its simplicity a jasmine flower, mentioned in the final line of this lyrical poem, can be rewarding, with the awareness that we can live happily even without wealth or luxury, taking care of our soul and our spirit just as we do with flowers.

Similarly, in his song 'Via del campo' Fabrizio De Andrè reminds us that flowers grow even from manure, thus associating flowers with hope, future and simplicity. It is not necessary to have diamonds or material possessions since what is really true and good can be created only by going through pain, suffering and the miseries of life, a concept that is

metaphorically represented by flowers in the song.

Therefore, flowers fill our anthologies, etymologically indicating a selection of what is best, becoming metaphorical images of emotions, passions, pains and the hopes of human beings and creating an inviolable and

indissoluble bond between man and nature.



Class 5CSU

Walking in Fields and Gardens

Intersecting Poetry and Prose

The purpose of this article is to discuss contrastively some literary texts in English where, in the context of fields and gardens, the symbolic and metaphorical meaning of flowers emerges to give deeper significance to the themes explored and the literary discourse created by the authors. The texts chosen – the poem ‘Le Jardin’ and the novel *The Picture of Dorian Gray* by Oscar Wilde, Wordsworth’s poem ‘Daffodils’ and Jamaica Kincaid’s novel *Lucy* – also allow for a discussion where poetry and prose intersect, with a consequent interaction of different languages, including the one of flowers.

Flowers, beauty and decay

As a leading exponent of Aestheticism who celebrated beauty as a supreme value and as a writer who contributed to create the poetics of Decadence, Oscar Wilde obviously devoted some intense pages of his works to flowers, which were clearly capable of evoking particular ideas in the context of his aesthetics. Gardens and flowers are indeed the subjects of some of his poems, for example ‘Le Jardin’ (1882), and the flowers of a garden

also appear in some of the most memorable pages of his only novel, *The Picture of Dorian Gray* (1891 in book form).

Both in ‘Le Jardin’ and in a famous passage from the second chapter of his novel, Oscar Wilde describes a garden with flowers, but in completely different terms to suggest opposite ideas. While in the passage from *The Picture* nature is described in all its beauty in a scene which takes place in June, in his poem we can clearly see the decay that autumn brings with itself.

Wilde’s poem ‘Le Jardin’ focuses on the image of a garden described in all its decay during the cold season. The atmosphere is desolate and silent. There are no colours prevailing apart from crimson, and the sun does not lighten up the scene. Everything is still except for the flowers and the leaves falling down slowly. The only animal that is mentioned is a wood-pigeon defined as “the last” as it probably has not migrated yet. It coos and calls, but nobody seems to be there to listen. Lilies and roses are present in the garden. The reference to a lily opens the poem while an image of roses closes it. The lily is withered and falls down,

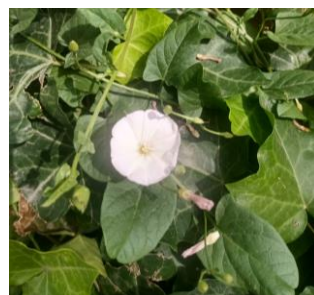
while the roses are already lying upon the grass. Whereas these flowers usually symbolise purity and beauty, here their state of decay seems to suggest the opposite idea, i.e. the loss of beauty and purity. No references to spring appear in the poem to suggest that these flowers will receive new life, blossoming again. As readers, we are not given the possibility to imagine them alive again. Nature, in its state of decay, progressive corruption and death, and human beings seem to share the same tragic destiny.

In the famous passage from chapter two of *The Picture of Dorian Gray*, Dorian, the handsome young protagonist of the novel, is resting in the garden of a painter's studio, after posing for his portrait. Lord Henry Wotton, who is a charming man and a friend of the painter's, joins him in the garden and they start having a dialogue. In his "panegyric on youth", Lord Henry clearly distinguishes human life from the eternal cycle of rebirth of nature, supporting his discourse with references to flowers. As Dorian here is apparently not aware of his own beauty, Lord Henry's discourse will completely change his perspective, behaviour and also his life.

In this scene Dorian is firstly depicted while he is standing near the lilac-blossoms, "drinking in their perfume as if it had been wine". We can clearly imagine this scene, where nature seems bright and full of life with birds singing and colours everywhere. This idea of its vitality is

also emphasised by the description of a bee which is flying around and suddenly slips into the trumpet of a Tyrian convulvulus, causing its movement. As said before, the attention is completely focused on the rebirth of nature. The hill-flowers, the laburnum and the clematis described will blossom again every year, as Wotton says. Their colours will come back like their perfume and their beauty will be continuously renewed:

The common hill-flowers wither, but they blossom again. The laburnum will be as yellow next June as it is now. In a month, there will be purple stars on the clematis, and year after year the green night of its leaves will hold its purple stars. But we never get back our youth. The pulse of joy that beats in us at twenty becomes sluggish. Our limbs fail, our senses rot.



Two of the flowers mentioned in the passage from Wilde's novel: the convulvulus (white) and the laburnum.

Other flowers Wotton refers to are lilies and roses as metaphors traditionally associated with beauty and youth and here mentioned with reference to Dorian ("Time is jealous of you, and wars against your lilies and your roses"). In these famous

pages, through the words of Henry Wotton, Wilde celebrates the beauty of nature and its eternal cycle of rebirth against the transience of human beauty and youth. The typical decadent taste for rotten states of corruption, disease and decay that appear in the poem is replaced in the novel by the admiration for what flowers symbolically represent with their beauty and human beings cannot have. But that decadent taste for decay will appear also in the rest of the novel with the image of the portrait bearing marks of corruption, merging with the Gothic traits of Wilde's story.

Daffodils, joy and anger

Lucy is a novel written by the Caribbean author Jamaica Kincaid (born 1949) and published in 1990. The protagonist, Lucy, moves to America from an unspecified Caribbean island (probably Antigua) to work as an au pair. At the beginning she is full of expectations but in this new reality she starts feeling homesick and isolated. Her employers, Lewis and Mariah, are caring, but they unconsciously control Lucy and impose their ideals on her. Leaving her homeland Lucy wanted to feel independent, but she is a 19-year-old immigrant who cannot help feeling also emotions such as anger and resentment with reference both to her past life her country and to this new

context.

Lucy's past in her country emerges as a background against which the author also explores issues of cultural relativism and cultural imposition as a consequence of colonialism. In particular, there is a passage of the novel in which these issues emerge through references to Wordsworth's poem 'I Wandered Lonely as a Cloud'. Spring is about to arrive and Mariah explains to Lucy how the view of daffodils makes her feel alive. It is not the same for Lucy, who does not know exactly what spring is, as there is no spring in her country. Moreover, she associates these flowers only with the memory of a poem she was forced to memorise and recite at school when she was ten years old. The poem is 'I Wandered Lonely as a Cloud' by Wordsworth, where a field of daffodils is described as a source of joy. While the poet



depicts the simple experience of a walk in the countryside which becomes a joyful memory of contact with nature in a field of "golden daffodils", for Lucy daffodils represent an unpleasant memory that emerges while she is living in

an unknown country. Unlike the poet and Mary, Lucy has never seen daffodils because that type of flower is not typical of her country.

Therefore, daffodils are perceived differently in the two texts and provoke opposite reactions and emotions due to the opposite personal experiences involved. The yellow flowers are considered a “jocund company” by the poet and he feels joyful and enriched by that contact with nature. The language of emotions underlines this concept with words such as “gay” and “glee”. On the contrary, Lucy feels detached from them and cannot appreciate their beauty. Besides, in the last stanza of Wordsworth’s poem the poet is in a state of tranquillity and starts recollecting the past experience of that walk. The memory is so beautiful and full of happiness that his heart “dances with the daffodils”. In these moments of recollection, the object of his joy is not present anymore. But even though he is physically distant from the flowers, he does not feel alone. He feels those sensations in his heart. This cannot be said for Lucy,

who cannot feel that type of pleasure. The memories associated with daffodils cannot create beautiful sensations in her. On the contrary, she can clearly remember the awful dreams she had after reciting the poem, with “bunches and bunches” of daffodils that were chasing her and finally formed a pile that buried her. When during a walk with Mariah she eventually sees these flowers in a garden she feels the desire to cut them down and kill them.

By means of this powerful intertextual reference, in these passages from *Lucy* the same flower thus appears as a symbol of joy and as its opposite, supporting the author’s exploration of complex issues of cultural relativism and cultural imposition.



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Botanical Shakespeare: The Case of *Hamlet*

Writing about Shakespeare undoubtedly means discussing his inventiveness and deep understanding of our existence, as they emerge in particular from the words and personalities of the extraordinary characters he created and made alive on the stage. However, Shakespeare's works also display some other surprising aspects of interest. As explored in books like *Botanical Shakespeare* by Gerit Quealy and Sumié Hasegawa-Collins, they also reveal Shakespeare's knowledge of botany, his passion for flowers and his ability to combine different elements to make his artistic representation of human existence even more interesting.

A quick overview of some of the botanical references in Shakespeare's works can give an idea of his wide knowledge of botany and of the compendium of flowers, plants and herbs his works also are. We find more frequent references to roses, lilies, violets, rushes, nettles, primroses, willows, grasses, oaks, corn, but also mentions of daffodils, ivy, marigolds, lady-smocks, saffron, garlic, ginger, and various types of orchard fruits, just to give a few

examples from a long list.



In Shakespeare's works roses are mentioned more than any other flower.

An important play that contains various references to plants, herbs and flowers is *Hamlet*. In this famous and complex tragedy we can see how Shakespeare used botanical references to make some scenes even more captivating, revealing at the same time some typical traits of his art.

Hamlet was probably written between 1599 and 1601. The play explores themes that are mainly expressed through the philosophical attitude of its melancholic protagonist, like doubt, uncertainty, death, corruption and deception. The plot revolves around the ghost of the King of Denmark who tells his son Hamlet to avenge his murder by killing the new king, Hamlet's uncle Claudius, who is

responsible for his death. Hamlet looks for evidence, shows signs of madness, reflects on life and death, wants revenge but at the same time procrastinates it. His uncle, fearing for his own life, plots to kill Hamlet. At the end of the play, during a duel, Hamlet, his opponent Laertes, the King and the Queen all die.

Throughout the play there are various references to flowers, in the words and speeches of different characters. For example, the ghost of Hamlet's father mentions the hebenon (or hebona), that is the plant that was used to poison him. But the most important and famous speech containing references to plants and flowers in the play is the one given by Ophelia in Act IV Scene 5.

Ophelia is a complex and interesting character. She is the daughter of Polonius (the chief counsellor of the dead king) and the sister of Laertes. Her actions are subject to the will of three men in the play – her father, her brother and Hamlet – that will lead her to madness and eventually to death. Laertes and Polonius try to advise her to watch out for Hamlet's affections, as the prince of Denmark does not seem to have the same feelings for her. Nevertheless, they still trust her and her judgement. As soon as Hamlet starts acting insane, Polonius talks her out of her relationship with Hamlet and makes her cut off every connection

with him. This leads to Hamlet's misogynistic behaviour. Hamlet's actions and the fact that he erroneously kills her father bring Ophelia to a spiral of madness that eats her up and leads to her death. Throughout the play she is deprived of her innocence and self-control.

We can find Ophelia's speech in the scene in which Laertes furiously storms in Claudius' castle to confront the one who is responsible for his father's death and his sister's madness. However, Laertes ends up being comforted by Claudius, while Ophelia, who has become mad because of the loss of her father and Hamlet's rejection, starts singing and passing out flowers to the other characters. In this scene, Shakespeare uses flowers to symbolise her grief, but also other concepts. Here are Ophelia's words:

“There's rosemary, that's for remembrance. Pray you, love, remember. And there is pansies; that's for thoughts. [...] There's fennel for you, and columbines. There's rue for you, and here's some for me: we may call it herb of grace o' Sundays. O, you must wear your rue with a difference. There's a daisy. I would give you some violets, but they withered all when my father died. They say he made a good end”.

Ophelia hands out fennel, columbines, rue, and rosemary. As she specifies, she would have handed out violets too if she had had any, but due to her father's loss, violets died with him. No stage directions are given to understand clearly who Ophelia is addressing when she says "for you" and whether she hands out real or imaginary flowers. The characters who are present in the scene with her are the King, the Queen, and Laertes. Ophelia uses flowers to express her state of mind, but their symbolism reveals more than that. She clarifies the meaning associated with some of these flowers and herbs. The rosemary, which is probably given to Laertes, is "for remembrance" and thus appears as an invitation to remember their dead father or even an anticipation of her own death. Pansies are "for thoughts". The rue, which is a bitter plant, is said to be called "herb of grace" on Sunday. Ophelia keeps it for herself and also hands it out, probably to Gertrude, who must wear it "with a difference". Nothing is explicitly said about the symbolism of fennel and columbines, probably given to Claudius.

In the context of a corrupt royal court, of Laertes' desire for revenge and in the light of her losses, Ophelia's bouquet symbolically hints at ideas of remembrance and thoughts (the rosemary and the pansies), deceit

and flattery (the fennel), sorrow, regret and repentance (the rue), faithlessness and infidelity (the columbine). The daisy, which is probably not handed out, instead symbolises innocence, simplicity and purity. Violets are symbolically associated with modesty, death and faithfulness. Ophelia says that these flowers withered when her father died.

Obviously, the rich symbolism of these plants has paved the way to various interpretations, including for example rue as a possible reference to self-induced abortion because of this aspect of its use in those times.



«There's a daisy»

«And there is pansies; that's for thoughts».



«I would give you some violets, but they withered all when my father died».



Shakespeare therefore gives Ophelia's madness a language of its own based on the language of flowers, in a passage that reveals and hides at the same time by combining the meaning of symbolic

associations with the silence resulting from gaps in explanation.

Shakespeare is considered the greatest playwright ever and a genius and these titles apply to him also for his ability to raise questions with his art rather than give answers, allowing for different interpretations. As *Hamlet* shows with the example discussed, even his artistic use of his knowledge of botany contributes to give his works their unique poetic power and intriguing complexity.

Ophelia, flowers and art

The character of Ophelia and her association with flowers inspired the British artist sir John Everett Millais and one of his most important paintings, Ophelia (1851-52). He decided to represent the scene where Ophelia was allegedly drowning and painted her surrounded by some flowers that all have a symbolic meaning. His aim was to represent her death as something that could also be seen as beautiful. Ophelia's death in connection with flowers is mentioned in Act IV Scene 7, when Gertrude says that "with fantastic garlands did she come / Of crow-flowers, nettles, daisies, and long purples".

SHAKESPEARE'S GARDENS

They are gardens created in honour of the playwright and where the plants mentioned in his works are cultivated. In some of these themed parks all 175 plants cited in his works are on display. Shakespeare gardens can be found, for example, in Stratford-upon-Avon, in Central Park, New York, in Brooklyn, and in Ontario, Canada.

Alice Pedrazzoli and Samia Rahmoun
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Artistic Floral ‘Obsessions’: Monet’s water lilies and Van Gogh’s sunflowers

Among the most famous paintings with flowers as subjects there are surely the works with water lilies by Monet and the paintings with sunflowers by Van Gogh. During their life, both painters developed a deep passion for those flowers, and we can clearly perceive this by looking at their paintings. Water lilies and sunflowers are indeed the subjects of a series of works made by the two artists in their lifetime, showing how passionate they were about these flowers and how they used them to express their world as artists and as men.

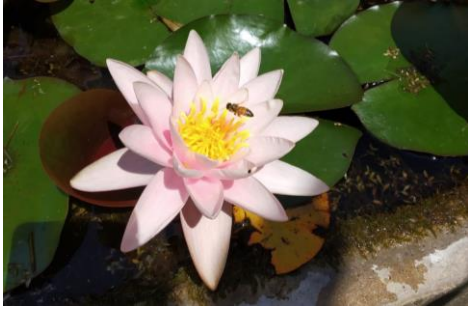
Monet’s water lilies

Claude Monet created more than 250 water lilies paintings and they became a symbol of Impressionism. Monet soon developed a deep artistic interest in the surface of the water and the reflection on it of the sky, the clouds and the nature surrounding it. Water lilies symbolise a reality that is always in movement, never still.



“My finest masterpiece is my garden” Monet said. He actually had two gardens that he personally took care of in Giverny. The first garden was a traditional and predominantly geometric one, while the second one was an oriental water garden, which was full of exotic plants and architectural elements such as “The Japanese footbridge”. This bridge and the garden are present in the painting ‘Water Lily Pond, Harmony in Green’ (1899). It can be divided horizontally in two parts by means of the bridge itself. The dominant colour is the green of the trees and their reflection on water. The water lilies are made with white, pink and red brushstrokes. The atmosphere

Is calm and serene.



Nature was fundamental for Monet and during all his life he painted *en plein air*. His main objective was to capture the impression of the moment. In his opinion, every instant was unique. To achieve this, he recurrently painted works in series, with the same subject but in different moments. He wanted to see how the same scene transformed each time and how the colours changed depending on the season, the hour or the moment of the day, typically at dawn or at sunset. This procedure was used for the subject of the Rouen Cathedral and obviously for the water lilies series.

Monet's passion for water lilies is testified by the huge number of works with this subject he painted and by their dimension. Some of them were monumental, around two square metres. Monet often reworked his paintings looking for the perfect representation of nature. But the beauty of water lilies in his works hides another aspect. When he was 82, Monet discovered that

he had a cataract, and he was operated three times to try and correct his eyesight. But this did not stop the inevitable deterioration of his sight and the use of new unusual colours for the water lilies testifies to this. His last paintings were therefore the result of his affection for those flowers but also of the struggle and pain he felt. In his work 'Water Lilies: The Japanese Bridge', painted in 1923 and part of a later series, we can see how Monet's style changed. The dominant colours are now brown, orange, red and maroon. Everything seems more obscure and intense because of swirls and imprecise contours.

The artist died at 86 in his house in Giverny with his timeless subject, his garden, which he had defined as his "finest masterpiece".



Picture of a pond with water lilies in the garden of a historical palace.

Van Gogh's sunflowers

The still lifes with sunflowers in a vase are some of Van Gogh's most

famous works. He painted them in Arles in 1888 and 1889. Even though some painters considered this specific variety of flowers unrefined, Van Gogh always enjoyed painting them and gave them the leading role in a lot of canvases.



He painted five works with sunflowers in a vase. Now they can be found at museums all around the world. He also painted other two versions, but one was lost during the Second World War while the other is in a private collection.

The choice of flower still lifes is linked to his will to experiment with colour. Moreover, these types of paintings sold well. Van Gogh was also inspired by the Impressionists' paintings he saw in Paris and decided to introduce more colour and contrasts also in his works. Unlike the Impressionists, he was also interested in giving symbolic meanings to the elements and subjects he painted.

Two examples of his different artistic treatment of these flowers and of his experimental attitude are his work 'Sunflowers', painted in 1888 and now in Munich and

another painting with the same title, made in 1889 and now in Amsterdam. In the first painting, the flowers are in a vase, presented in different stages of their life. Van Gogh chose a light blue background and there are also dark shades of yellow. In the still life made the following year and now in Amsterdam he painted the flowers in a yellow vase against a yellow background. In this case he wanted to show the variations of a single colour, yellow, and how it could still be very communicative. He noticed that by doing this, the painting expressed more joy.

Paul Gauguin was really impressed by Van Gogh's first paintings with sunflowers and thought they were "completely Vincent". This immediately reassured Van Gogh, who even wanted to create a community of artists in the South of France, in a yellow house he had rented. Gauguin wanted to participate and before his arrival Van Gogh painted sunflowers to decorate his bedroom.

Some critics have interpreted the twisted shapes of the petals of Van Gogh's paintings as a sign of anguish. Other critics suggest that they represented happiness for him. The artist wrote that sunflowers symbolised gratitude and they surely always had great significance for him. When he died, his friends went to his funeral bringing sunflowers with them.

Botanical Stories of Resilience and Survival: Plants and Radiation

The nuclear accidents of Chernobyl and Fukushima did not only change history and human lives. They also gave scientists the opportunity to explore the effects of long-term exposure of flora and fauna to radiation and see how plants can react and adapt, managing to survive.

Studying radioactivity before and after Chernobyl

The Chernobyl accident in 1986 was the consequence of a defective reactor design that was operated by inadequately trained staff. The steam explosion and fires that resulted from the accident released radioactive materials into the environment in many parts of Europe. On March 11, 2011, the Great East Japan Earthquake and tsunami caused a humanitarian disaster in northeastern Japan and a serious accident at the Fukushima nuclear power plant. Three of the six reactors at the plant were critically damaged and released hydrogen and radioactive materials.

Before the Chernobyl and Fukushima accidents, most studies of the effects of radiation had been

conducted in laboratories or under highly controlled conditions, using low doses of radioactivity. Therefore, the sites of these nuclear accidents have created an environment in which scientists have been able to make large-scale observations with an alternative approach that has offered better opportunities and has allowed them to study the effects of the different levels of radioactivity present in the geographical areas surrounding the places where the accident occurred. Most of these studies have focused on **plants that have tested to be highly resilient species capable of surviving and repopulating heavily contaminated environments**, such as the famous Chernobyl 'Exclusion zone'. These studies, conducted in the open field on organisms inserted in complex ecosystems which are subject to many variables, required a new experimental approach and the birth of a new field of study: **radioecology**.

Radioecology, a multidisciplinary science

Radioecology is a multidisciplinary science that studies radioactive substances that are present in the

environment, the collateral effects they have on the ecosystem, how they migrate in the environment and are absorbed by living organisms. Radioecology mainly entails:

- laboratory investigations to assess the effects of radiation on organisms
- studying contaminated areas by measuring their environmental radioactivity and its changes over time
- monitoring the levels of radioactivity found in the species present in the different ecosystems and describing their consequences.

Radioecology studies involve numerous researchers from different fields, such as biology, ecology, physics, chemistry, geology, hydrology, and mathematics. The synergistic work of these scientists is useful not only for scientific progress but also for developing greater awareness among the population and institutions about the effects of radiation and the need to establish policies and procedures that can reduce the risks of future accidents like those of Chernobyl and Fukushima.

Survival and mutation

The study of the effects of nuclear radiation on plants is important because it has demonstrated how

the continued exposure to radioactivity can cause many different mutations. The term ‘mutation’ is used to refer to a DNA alteration that can cause a modification of its structure, which in some cases can lead to death. The different studies conducted about plants in Chernobyl have demonstrated many mutations, as **Table 1** shows:

MUTATIONS EFFECTS	DESCRIPTION	N. of species
abnormal pollen	pollen grains show anomalies in their structure and function	8
abnormal spores	spores show an altered structure	6
aberrant cells	cells have altered structure and functionality, they cannot perform their usual tasks.	5
abnormal divisions	abnormal cell replication	5
allele number	there are new alleles that increase the gene pool	3
Chromo-somal aberration	the number and structure of chromosomes are altered	2
abnormal segregation	segregation is caused by errors during cell division	2

For each mutation, also the speed with which it manifested itself has been studied, demonstrating that if a species reproduces quickly, the probability of mutation increases.

The mutation rates found in plants cells are higher than the ones studied in animals because plants are sedentary. Therefore, they are subject to constant exposure, while animals can move from place to place, maybe with less contamination. Scientists think that mutation rates are higher in plants because they found more DNA molecules in them, which means that plants are more subject to mutations.

Growth of plants and radiation

Several scientists have made investigations to evaluate the effects of radioactivity on plant growth. In particular, Mousseau et al. have carried out a survey on trees of *Pinus sylvestris* in the area of Chernobyl, where they analysed the logs wood and evaluated the growth rate and morphological alterations. The results obtained showed a decrease in the growth rate in the most radioactive areas in the three years following the accident. Mousseau's team also noticed a particular vulnerability to radiation exposure in younger trees, which exhibited significant changes in their newer parts.

However, the fact that these alterations might be partly due to biotic factors cannot be excluded.

Mousseau et al. documented that in the most contaminated areas of Chernobyl the decay of fallen leaves is reduced, determining a reduction of mineral salts available for plants growth.

Regarding the accident of Fukushima, instead, few investigations have been made, with the exception of studies about Japanese red pines (*Pinus densiflora*), Japanese firs (*Abies firma*) and rice samples. Watanabe and Yoschencko noticed that pines and firs reported anomalies in growth similar to those already seen in pines in Chernobyl. This reinforced the hypothesis that exposure to radiation during the plants' growth is the cause of their alterations.

Many laboratory studies have been carried out, even though sometimes with contradictory results. It is worth mentioning the one conducted by Arena's team, which studied plants grown from tomato seeds (*Solanum lycopersicum*) radiated with high doses without noticing any negative effects. Actually, the plants that grew from those seeds showed more photochemical efficiency and produced bigger fruits, but in less quantity. On the contrary, Biermans's team tested the effects of exposure to nuclear alpha radiation on herbaceous species, documenting a clear negative impact on their photosynthetic efficiency and assimilation of carbon.

Reproduction of plants and radiation

The studies carried out in Chernobyl showed that nuclear radiation can have a direct or indirect impact also on the reproduction system of plants, decreasing its efficiency.

Table 2 reports the alterations induced by mutations that have an impact on the efficiency of plants reproduction.

STRUCTURAL AND FUNCTIONAL ALTERATIONS	IMPACTS ON REPRODUCTIVE PROCESSES
Delayed plants growth	<ul style="list-style-type: none">• Delay in flowers production• Lower exposure to pollinators
Alteration of pollen	<ul style="list-style-type: none">• Lower vitality
Alteration of buds	<ul style="list-style-type: none">• Decrease/increase in the flowers number• Decrease in the flowers size
Alteration of seeds	<ul style="list-style-type: none">• Lower number of seeds produced• Reduction of weight• Slow germination

Those effects were documented during an experiment done in a greenhouse using 660 seeds coming from 33 wild carrots (*Daucus carota*) that had been exposed to three different levels of radiation in the Chernobyl area. Their seeds

displayed significant decrease in germination times and rates. Scientists observed that the highest level of decrease in germination rate was in the seeds exposed to high levels of ionizing radiation.

Despite the unquestionable negative effects that radiation has had on plants in the exclusion zone in Chernobyl, the vegetal cover is increasing also thanks to the abandonment of the cultivated land and the low number of herbivores. The exclusion zone of Chernobyl is now dominated by plants, shrubs, and pine and birch trees. However, the progressive appearance of these trees has not entailed the reappearance of flowering plants, whose presence has considerably decreased.

A future perspective

The studies conducted on the plants growing in the sites of nuclear disasters could be used for programming future space missions. Cosmic waves in space are made of the electromagnetic spectrum and of many charged particles that interact with biological molecules which are similar to the ones produced by Chernobyl and Fukushima radioisotopes, although they have different features. Therefore, contaminated areas, such as Chernobyl and Fukushima, may continue to be used by radiobiologists as ‘open air’ laboratories to carry

out other studies about the effects of long-term exposure of plants to radiation, so in conditions that are similar to those of plants that might be growing in future space stations.

Class 3ASC

Sources:

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Bamboo, a Plant for Music

BAMBOO

Its versatility and characteristics

Bamboo is one of the most unusual plants on earth. It has two distinguishing features: its extraordinary growth and its ability to grow in a variety of terrains and climates. These features have contributed to its rapid expansion and sustainability.



Bamboo adapts even to harsh conditions because it can retain water incredibly well. It is also characterised by hardness, strength and durability. Its features make it ideal for its use in manufacturing all

across the globe and for areas like building, repairing, writing, and eating. But its properties also make it a special material for making musical instruments.

Bamboo and music. Why is it used?

Bamboo has been used to make musical instruments for thousands of years, as its properties and its shape make it particularly suitable for creating instruments, which are typically (but not exclusively) straight and cylindrical.

Bamboo forests are said to contain the instruments for a whole orchestra, like xylophones, marimbas, drum sticks, maracas, guitars, ukuleles, violins, saxophones, and clarinets. This plant is indeed used for musical instruments because it can have a

long-lasting future and can produce excellent sounds thanks to its properties.

Examples of bamboo musical instruments

Two examples of instruments made with bamboo are the jinghu and the bamboo flute. The **jinghu** is a Chinese two-stringed instrument. It needs an experienced performer to be handled well. The **bamboo flute** is a very popular musical instrument in India, South America and Africa. Its sound is relaxing and leads the mind to spiritual meditation.

Other examples of instruments made with this plant are the **bamboo Pan flute**, the **bamboo rainstick**, the **bamboo ukulele**, and the **bamboo xylophone**.

Bamboo in a future perspective

As it has been remarked by many articles and books, the use of bamboo has endless opportunities for expansion in the future as this plant could be used much more than is currently happening. In particular, bamboo is increasingly being considered an example of nature-based solutions to

environmental issues for its sustainability, although there is no complete agreement on this for all the areas of its use. Today, its uses include new chemical and electrical bamboo-based biomaterials, like cosmetics, pharmaceuticals, food additives, fabrics and biocomposites.

Bamboo thus appears as a plant linked to tradition but which is also going to

characterise our future. We will therefore go on enjoying the music produced by bamboo instruments while appreciating the properties of this extraordinary plant also in a variety of other contexts.



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Flowers and Historical Facts

Dear readers,

Have you ever imagined that flowers could be used on many different occasions with reference to different historical contexts and facts? They were used in monarchs' clothes, in war, as dynastic symbols and also to refer to feelings and emotions. But let's explain better.

Flowers and monarchs' clothes

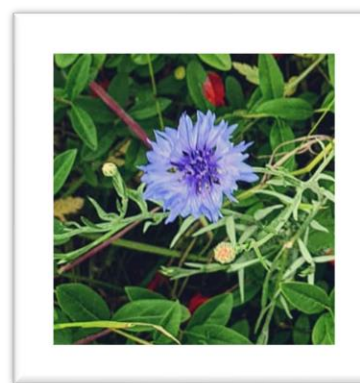
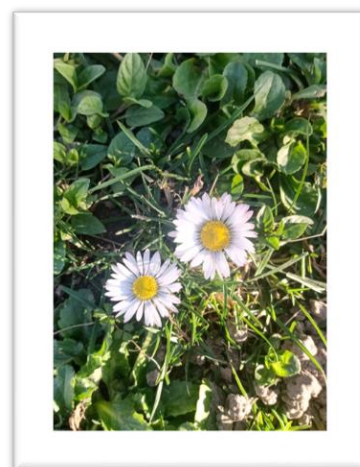
Flowers in history were also used to decorate and make monarchs' clothes.

In the 15th century Margaret of Anjou chose the **daisy** as her personal symbol. This symbol was sewn on her and her valets' clothes.

During the Elizabethan Age the starch from the bulbs of **bluebells** (also known by the name 'wild hyacinths') was used to stiffen the collars worn by the monarch and by rich people.

In the 18th century, **cornflowers** were the flowers loved by the Prussian royal family. They were worn in the buttonhole of jackets on the day of the king's birthday to demonstrate loyalty to the royal family.

Plants, trees and flowers referring to the emblems of the UK and of the countries of the Commonwealth, for example the Tudor rose, the thistle, the shamrock and the lotus flower, decorated the gown of Queen Elizabeth II on the occasion of her coronation, in 1953.



Flowers as symbols of dynasties



Flowers were also used by several important families to symbolise their dynasty and their magnificence.

As it is well known, the emblem of French monarchs was the *fleur de lys*, based on a variety of **iris**.

The **peony** is probably the most represented flower in Chinese iconography, especially on ceramics, plates and porcelain, and it was cultivated in imperial gardens. During the 13th century the **Chrysanthemum** was used as a symbol by the Japanese imperial family. This tradition started with Go-Toba, who chose this flower as his emblem.

In England, the **forget-me-not flower** was Henry IV's emblem. In the 15th century, a war called 'War of the Roses' broke out. It takes this name from the emblems of the two rival families involved. As it is well known, this war was fought between the House of York, whose symbol was a white rose, and the Lancaster one, which was symbolised by a red rose.



Flowers linked to feelings in history

Some types of flowers were associated with feelings and used to demonstrate emotions. The meanings people associated with them changed based on the historical context.

Between the 16th and 17th centuries, during Elizabeth I's reign (1558-1603), the **lavender flower** was given to demonstrate feelings and to declare one's love.

The **forget-me-not flower** was traditionally placed on graves in Germany in memory of the deceased people to demonstrate affection for them.

Finally, it is worth mentioning a particular interest in the language of flowers during the Victorian Age.

Flowers in war

Flowers were also used in wars with different purposes.

The **iris** was used in coats of arms of samurai. During the American civil war in the 1860s, the **Achillea** was used by soldiers to make medications to heal wounds. Its name refers to the epic hero Achilles.

In Japanese culture, **cherry blossoms** have been traditionally and typically associated with war and the idea of a soldier's glorious death. Their petals even decorated the airplanes of the Japanese suicide pilots during the Second World War, as a symbol both of the brevity of life and of the soldiers' belief in their rebirth as flowers. A model of kamikaze aircraft was called 'ohka', which means cherry blossom.

On the 25th of April 1974, in Portugal's 'Revolution of Carnations', some soldiers rebelled against the dictatorship and showed their peaceful intentions by putting **red carnations** in their guns.



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