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BEACON

CONNECTION

This year's edition of the Beacon journal contains a range of thoughtful and often eye-opening articles exploring the theme of connection, written by our Upper School Academic Scholars. The topics explored – from the sociopolitical to the literary and scientific – are a testament to the wide-ranging knowledge and enthusiasm of our Scholars, who have taken truly individual approaches to this year's theme. These articles brilliantly reflect the spirit of creative and critical endeavour that South Hampstead fosters. I hope you enjoy reading them!

KATIE, UPPER SIXTH

Deputy Head Girl - Academic & Scholarship

Contents

The Schizophrenia Blind Spot

ADA, YEAR 11

No individuals with congenital – i.e., present at birth – blindness have ever been diagnosed with schizophrenia. This severe mental health condition, characterised by symptoms such as persistent hallucinations, delusions, disorganised thinking and anhedonia, affects approximately 0.45% of adults worldwide; however, despite over 24 million cases, the disorder is often misunderstood and thus commonly stigmatised. Although the causes of schizophrenia are yet to be completely determined, scientists believe the correlation between the absence of schizophrenia and congenital blindness to be especially unusual, as early blindness often results from infections, genetic mutations or brain trauma – factors which all individually indicate a higher risk of developing psychotic disorders. This anomaly may provide insights into understanding schizophrenia, which may, in turn, help inform mental health services' management of this complex condition and, perhaps, enable more effective intervention methods to be found.

The strongest evidence demonstrating this correlation emerges from a study conducted in Western Australia in 2018, with a large sample size of 467,945 children who were born between 1980-2001. It found that of the 1,870 children who later developed schizophrenia, none were born blind. One possible explanation proposed by researchers is that those with congenital blindness may possess a protective mechanism that prevents schizophrenia from developing, although early blindness does not seem to affect the likelihood of developing neurodevelopmental disorders in general (e.g., studies have suggested that blind children may show characteristics of infantile autism). Consequently, several hypotheses have aimed to explain what characteristics of schizophrenia may allow congenital blindness to exhibit a 'protective' effect.

One possible hypothesis, advocated by Dr Thomas Sedlak, Assistant Professor of Psychiatry and Behavioural Sciences at Johns Hopkins Medicine, is that congenitally blind people may have certain enhanced cognitive functions due to their 'brain learn[ing] to use [the] extra cortex in ways that are protective'. As a result of the individual being visually impaired from an early age, their brain may compensate by developing heightened sensitivities in other areas, involving enhancement of auditory, olfactory and tactile senses. These adaptations of the brain are especially prevalent in those born with blindness, as neuroplasticity is greatest at a very young age, when there is the greatest potential for new neural connections to be formed. Thus, this formation of alternative neural processing pathways may be responsible for mitigating the development of certain symptoms of schizophrenia, particularly those relating to cognitive dysfunctions, such as impaired memory skills and difficulty processing the sounds and sources of speech. For instance, patients with schizophrenia often struggle to determine the source of the voice they hear, contributing to delusions. In contrast, congenitally blind people are more receptive to sound localisation, possibly preventing them from developing certain symptoms associated with schizophrenia.

An alternative hypothesis suggests that congenitally blind people may be protected by an inability to receive the false visual cues that are associated with the psychotic symptoms of schizophrenia. Prior to developing psychotic symptoms, patients have been observed to have visual abnormalities (e.g., retina issues, unusual eye movements, and abnormal blinking rates). These abnormalities lead to confusing signals about the external environment being received by the brain, forcing the individual to fill in gaps and make (often inaccurate) predictions about the world around them. They may be unable to detect inconsistencies between their knowledge from lived experience and the sensory information being received in that current moment, causing the individual to fabricate false inferences; many scientists believe this disturbance in perceptions could cause hallucinations. Conversely, scientists hypothesise that when someone is blind from birth, they rely heavily on non-visual cues to navigate their environment, thus conditioning the brain to have certain behavioural and neurophysiological adaptations. For example, it has been found that congenitally blind people have an enhanced NMDA receptor function, associated with the possible higher presence of NR2B subunits, which results in heightened modulatory signals. These can enhance internal prediction precision, leading to a lower likelihood of the development of psychotic symptoms associated with schizophrenia.

Ultimately, although definitive answers regarding this phenomenon are yet to be uncovered, several practical implications emerge from this research. Firstly, findings could signify that visual and cognitive training at a young age centred around augmenting sensory perception, attention, and memory could be a critical method of early intervention for people at high risk for the condition. Furthermore, the research could help individuals already struggling with the disorder manage symptoms through enhancing and focusing on senses other than vision.

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How Does Cartography Offer Us a Connection to the World?

ALICE, YEAR 11

As our world becomes more developed and we rely on technology ever more, our understanding of maps has become less important to our everyday lives. Now, we can navigate the way from A to B by a click of our fingers and people no longer see the importance of any map other than Google Maps. However, I believe that maps offer much more than just providing directions. They provide us with an insight into the way people perceive and connect with the world through different social, cultural and political lenses.

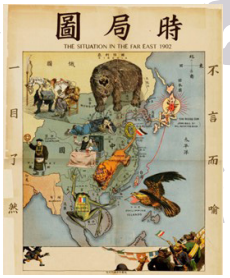
The development of maps has occurred over thousands of years, from early maps that were simply sketches made of the surrounding area, to the much more recent Geographic Information Systems' electronic mapping. The function of maps has changed over time, from recording the location of places of interest, to highlighting the religious significance of the area, to the maps we know today. Maps have been seen throughout history as a method to explore and explain the world. Historical maps depict past interpretations of events and reflect the cultural and social trends of the time. In this article, I am going to discuss the importance of different religious, geographical and political connections that have been forged through cartography.

This is a Chinese map made by cartographer Han Xiaoguag in 2013. In contrast to the standard western Mercator maps, this map depicts China in the centre of the world. The Mercator projection is the standard view of the world, which gives a warped sense of the true size of countries, inflating the size of lands which are further away from the equator.

This map moves away from the Eurocentric view of the world, as China now sees itself as a superpower and therefore attempts to exert this dominance on the world map. This map also explores how tightly packed countries are in the Northern Hemisphere. One of the most striking aspects of this map is its vertical positioning. It repositions Antarctica and the North Pole from the furthest fringes of our cartographical imagination into the centre of the map. This suggests that China views these areas as exploitable in the near future. As mainland resources become depleted, this map suggests China may look to exploit the abundant natural resources at the poles, such as coal and natural gas. Here, we get an insight into China's perceived connection with the rest of the world, in contrast to our standard view, and this offers us an insight into how China thinks about its position in the world.

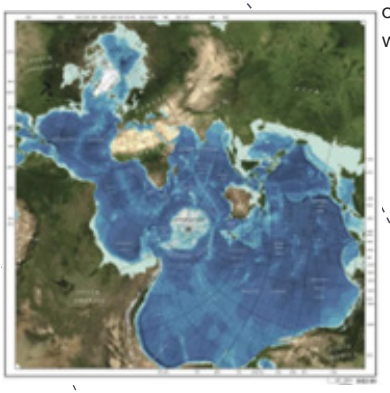
This teardrop-shaped map explores the Burmese view of the world in the eighteenth and nineteenth centuries through the lens of Buddhism. This is one of the first religious maps that moves away from the T-O Jerusalem-centred maps that preceded it. This map explores Burmese Buddhism and the concept of 'nats', which are 37 god-like spirits that were worshipped in Burmese culture. This map shows a central lotus-shaped island surrounded by various smaller islands and rivers. As this is not an accurate geographical representation of them; it is instead symbolic of the perceived connection between the physical and spiritual worlds at that time. This map offers the users a much more spiritual connection than we would normally expect from a map.

This geo-political map, known in English as 'The Situation in the Far East', was crafted by Tse Tsan-Tai as propaganda to warn China of the encroaching western powers.



The animals on the map represent countries that China believes to be potential enemies. The bear is representative of Russia intruding from the North; the bulldog head with a lion's body symbolises the British Empire in south China; and the bald eagle represents the USA approaching the Philippines. China today appears to be adopting further isolationist policies, stemming from Xi Jinping's belief that China is a self-sufficient country in a bid to become a world superpower. This map connects China's political view of Western powers with their encroaching geographical threat.

The next map shows the connection between the oceans that make up our planet, a viewpoint not offered in the standard Mercator map. It emphasises the vast scale of the sea, covering around 70% of the Earth's surface, which is hard to believe from the perspective of the standard map. Bathymetry is this new branch of cartography, studying the underwater depth of the floors of bodies of water.



Previously, it has been a laborious task to chart the ocean, but the introduction of satellite technology now allows us to map vast areas. This map illustrates the connection of all the oceans and their dominance of the planet.

Kunyu Wanguo Quantu is a map printed in China at the request of the Wanly Emperor in 1602 by Matteo Ricci, Zhong Wentao and the translator Li Zhizao. It catalysed the development of geography in China, expanding understanding by presenting a global perspective by including regions unknown to China at the time. This map played a pivotal role in introducing the concept of a spherical Earth to China, moving on from the Chinese cosmological model based on the flat-earth theory. It marked the introduction of European cartographical methods to China and facilitated a cultural exchange between China and Europe. It also depicts China in the centre of the map, reflecting traditional Chinese views of its central status in the

world, and separates America from Asia with the line down the centre, setting them up as two conflicting forces.

In conclusion, it is clear that maps serve a much more important purpose than simply showing us the location of places. They offer a connection between people, places, religions and politics. They are far more complicated and nuanced than their perceived main use of getting from A to B. As technology dominates maps, it is important that we continue the principle of cartography in its broadest form to use these unique sources to understand how different people connect with the world.

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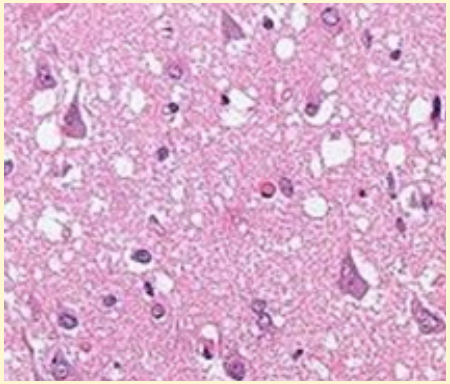
Connecting to Protein Formation: Emerging Treatments for Prion Disease

CHIARA, LOWER SIXTH



Prion diseases are a family of devastating neurological conditions, including Creutzfeld-Jakob Disease (CJD) and Fatal Familial Insomnia (FFI). Academically, they are known as Transmissible Spongiform Encephalopathies (TSEs), for how they create sponge-like holes in sufferers' brains. Until now, there have been no treatments for prion diseases, and the prognosis for those diagnosed has been grim: the median life expectancy for prion diseases, following symptom manifestation, is five months. However, recent breakthroughs that directly connect with the protein-producing pathways in nerve cells offer hope for the future, and the possibility of cures.

Prion disease is short for protein infection, signalling the integral role proteins play in TSE development. Proteins are comprised of amino acid chains, and the chains are folded to have a specific shape that is key to the protein's function. Normally, if a protein misfolds, the body disposes of it. However, for one protein in the brain, PrP, this does not occur. When PrP misfolds, its misfolded form remains in the brain; furthermore, whenever misfolded PrP encounters healthy PrP, it will refold the PrP into its image. The misfolded PrP then clumps together in big, ropy aggregates, which damage or destroy nerve cells, causing the sponge-like brain presentation. In the past, prion disease therapies have sought either to stop PrP misfolding, or to correct misfolded PrP using small molecules or antibodies. However, this has proven difficult, as, even within one disease, PrP can misfold in a multitude of different ways to produce the same symptoms. Since decades of research have still not yielded a viable small molecule treatment of prion disease, pharmaceuticals companies are now looking further up the chain of prion disease mechanisation. In 2016, a study showed that individuals with only one – rather than two – healthy copies of the gene for PrP (called PRNP) had no major neurological, cognitive or developmental abnormalities. This demonstrated that lack of PrP is unlikely to cause major harms in humans, establishing the concept of stopping PrP productionas a viable avenue of treatment for TSEs. In order to produce PrP , an enzyme called RNA polymerase has to first read the PRNP gene and convert its genetic instructions into messenger RNA (mRNA) in a process called transcription. The mRNA then travels to the ribosome – the cell organelle where proteins begin to be produced. The leading approach to stopping PrP production involves destroying the mRNA before it can reach the ribosome. This approach is being led by a company called IONIS, using ASOs (Anti-Sense Oligonucleotides).

ASOs are short snippets of synthetic DNA. They bind to mRNA, creating a DNA-RNA hybrid. This hybrid summons an enzyme called RNase H, which then destroys the mRNA strand, freeing up the ASO to target another mRNA protein. TSE-treating ASOs are specifically engineered to bind to the mRNA that has transcribed PRNP. In 2019, the first promising results from ASO therapy were released: mice injected with ASOs survived 61% to 98% longer than control mice after being inoculated with infectious prions. However, ASOs still have flaws – to achieve deep-brain penetration, ASOs must be injected into the spinal fluid, which is painful and invasive. Furthermore, ASOs are cleared from the body relatively quickly, so frequent ASO injections would be required.

An alternative approach is taken by the company Sangamo Therapeutics, which uses Zinc Finger Proteins (ZFPs) to directly silence the PRNP. A typical ZFP consists of multiple "fingers", each made up of a zinc ion coordinated with two specific amino acids. Each finger recognises three to four base pairs of DNA, and the fingers are arranged so that the ZFPs bind tightly to the PRNP gene. This physically blocks the RNA Polymerase, preventing the PRNP's transcription. Without transcription, the PrP cannot be produced.

The ZFPs are delivered using harmless viruses known as AAVs (Adeno Associated Viruses). DNA encoding the ZFPs is packaged in an AAV. When the AAV enters a cell, it expresses the DNA, causing ZFP to be produced in the body. ZFP treatment lasts much longer than ASOs; however, previously it has struggled with achieving deep brain penetration. Fortunately, recent advances in the modification of AAV's protein shells (capsids) offer a solution to the penetration problem – in 2024, the company Sangamo Therapeutics announced a new AAV capsid that showed robust penetration of the blood brain barrier. This new capsid also demonstrated a 700-fold higher transgene expression than benchmark capsid AAV9 (a 700-fold higher production of ZFPs). ZFPs require far less

frequent dosing than AAVs, so success in their production could mean a much more economic and comfortable treatment for TSE patients. However, this advantage is also a risk – ZFPs could permanently alter gene expression in a detrimental way.

A final method of stopping PrP production is gate blocking, which acts after proteins are produced in the ribosome but before they become functional. After PrP is produced in the ribosome, it is taken to the endoplasmic reticulum (ER) to be folded, in order for it to gain the unique shape necessary for it to function. The gate-blocking approach obstructs a key pathway, called the sec61 protein channel, where ribosomes feed prion amino acid sequences into the ER. Small molecules known as allosteric inhibitors bind to the sec61 pathway, thereby obstructing it. The allosteric inhibitors modify the sec61's shape, disrupting prion protein translocation. Importantly, the inhibitors do not bind close to the sec61's active translocation pore.

This ensures that the other proteins that need to use the sec61 channel can, and only the PrP protein chain is blocked. Gate blocking is far less invasive than ZFPs and ASOs – whilst the other two require injection, gate-blocking molecules can be taken as a pill. However, according to the CEO of Gate Bioscience – the company at the forefront of molecular gating – , this treatment is still three to five years from the clinic.
By considering how PrP forms, scientists have been able to access breakthroughs in the treatment of TSEs. The success of ASOs, ZFPs and gate blocking demonstrate how deepening understanding of basic biological mechanisms can lead to complex solutions capable of solving a range of problems. These recent breakthroughs offer a brighter future – a future where prion disease is no longer a terminal diagnosis.

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Fractured Connections: The Unspoken in The Tenant of Wildfell Hall

ELEANOR, LOWER SIXTH

In The Tenant of Wildfell Hall, human connections are fundamentally fractured; just as relationships are formed, they fade away, and ultimately flicker out. The central relationship of the novel is the courtship and marriage of Helen and Arthur Huntingdon, told through Helen's diaries, which she gives to Gilbert Markham, the narrator of the novel through its epistolary form. Published in 1848, Tenant takes place in a time where women had very few social or legal rights in the institution of marriage, something that the political activist Caroline Norton articulated in her Letter to Queen Victoria in 1855, declaring that 'a married woman in England has no legal existence, her being is absorbed in that of her husband'. This is essentially the fate that Helen suffers, and as her marriage turns abusive as a result of her husband's alcoholism, she finds herself trapped. The breakdown of the connection between Helen and Arthur is not only highlighted through the pair's verbal sparring that takes place throughout, but also the medium of physical contact, allowing Brontë to foreground the lack of female autonomy available to women at the time.

The couple's struggles to communicate contribute to the fracturing of their relationship, with Helen, an artist driven by creative and abstract thought, unable truly to connect with Arthur, who rejects the more complex aspects of her personality. This is evidenced by Helen's diaries, the lens through which we see her relationship with Arthur in the novel, which allow the reader a unique insight into her psyche, the same psyche that Arthur attempts to ignore, with Helen confiding how 'I cannot get him to write or speak in real, solid earnest. I don't much mind it now; but if it be always so, what shall I do with the serious part of myself?' This confession of dissatisfaction comes at the end of Chapter 22, barely halfway through the novel, highlighting the struggles to connect that the couple experience; Brontë directs us towards an explanation of fundamental incompatibility, with Helen's steadfastly principled nature colliding disastrously with the domineering and hedonistic obsessions of her husband. This frustration continues to escalate as the years pass, with their relationship becoming increasingly strained, and Helen laments '[h]ow little real sympathy there exists between us; how many of my thoughts and feelings are gloomily cloistered within my own mind; how much of my higher and better self is indeed unmarried'. The breakdown of their connection is emphasised through the fracturing of their verbal, and thus emotional, communication, which, when it occurs, quickly spirals into chaotic fights, with Brontë demonstrating the limited power of language to overcome conflict. Instead, language is presented as a catalyst for destruction, allowing the worst impulses of both characters, but predominantly Arthur, to materialise and cause further damage. The climax of these struggles comes when communication ceases, and Helen closes their bedroom door in Arthur's face, refusing to continue a fight, a moment novelist May Sinclair described by emphasising how 'the slamming of [Helen's] bedroom door against her husband reverberated throughout Victorian England'. In a society that refused women most fundamental rights in marriage, Helen's symbolic and transgressive gesture of autonomy by refusing communication, and thus the continuation of their connection, is immensely powerful.

Beyond their linguistic disconnect, the breakdown of Helen and Arthur's relationship is also evidenced by the physical contact that takes place between the two. At the beginning of their courtship, Arthur repeatedly seizes Helen's ungloved hand,

without consent, and in violation of the etiquette of the period, with Helen describing how '[Arthur] forcibly possessed himself of my hand; but I hastily caught it away'. Her discomfort with Arthur's possessive nature is apparent from the very beginning, with this being the first of many incidents in which he forcefully and deliberately ignores Helen's boundaries in order to control her body. Touch forms an important part of the tactics that Arthur uses in order to extort a confession of affection from Helen, using physical pressure applied to her hand as a method of persuasion. Since this contact is almost entirely unreciprocated, it allows Brontë to depict the absent connection between the two symbolically; his grasp indicates the very essence of his nature long before his words do, and her rejection of it her true feelings. During their marriage, physical contact continues to shape their interactions and disagreements, such as when Arthur openly ridicules one of Helen's friends, Annabella Wilmot, shocking Helen, which he then attempts to rectify, with Helen describing how '[Arthur] held me by both hands, asserting that he would not let me go till I had forgiven him', and 'after kissing both [her] gloved hands' to seal the promise of reconciliation, 'he let me go'. Here, Arthur continues to manipulate his physicality as a means of domination, using his touch to ensure Helen's forgiveness, and forbidding Helen from any form of resistance.

However, crucially, no physical contact actually occurs, with the gloves acting as a barrier between the couple, preventing any real connection or reconciliation. The medium of touch allows Brontë to express what language cannot right until the end of their relationship, as Arthur eventually dies 'with [Helen's] hand fast locked in his', maintaining his control over her until his final breath. The choice of 'locked' is certainly a deliberate one, with Brontë highlighting how the couple are never able to become equal partners, and Helen's autonomy therefore remains completely restricted until her marriage is dissolved by her husband's death. Whilst Helen is unable to rejoice openly at her husband's death, Brontë's descriptions lead us to view it as an ultimately liberating moment for her, a moment of release and relief.

Many consider Tenant to be one of the first feminist novels, due to its radical depictions of female autonomy and behavior. When Helen ultimately leaves Arthur and takes their son with her, she not only violates strict social conventions, but also English law, something that made the novel incredibly controversial at the time. In Victorian England, marriage was viewed as the most private of spheres, and was a heavily veiled institution, something that Brontë criticises from the start of the novel through her depiction of Helen's naïvety and frustration during her courtship with Arthur. However, by the end of the novel, that veil is lifted, with the sensitive and hidden realm of domesticity becoming demystified, and the novel's shocking realism highlighting the intensely political nature of the private worlds of women. Brontë's diligent commitment to illuminating these struggles was part of a wider shift in the nineteenth century towards increased female participation and representation in literature, and her role in this, and dedication to realism, made her one of the most powerful novelists of the period, despite her tragically short career.

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How to Physically Alter Your Brain Chemistry: The Power of Human Connection

GABRIELLA, LOWER SIXTH

It is no secret that we thrive on human interaction. The average person will interact with 80,000 people in their lifetime. Of these 80,000, we will only know about 10% by name (Roser, 2023). With each interaction, our brain hunts for hidden similarities, hoping to form a connection to the new individual.

This desire to form meaningful connections to those around us is a trait shared by almost the entire animal kingdom. Interactions with those of our own species not only allow us to find a mate, but also help to provide us with shelter, food and other basic means of survival. Therefore, our brains have evolved to be wired to hunt for connections with fellow humankind. Interestingly, humans express a unique desire for monogamous relationships; most human societies reinforce the belief that people will find one lifelong partner. Whilst we do not yet understand why this is the case, it has been theorised that monogamy was initiated in prehistoric times so that males could protect their infants from competitors who may kill them in order to mate with their mothers (Senthilingham, 2016).

Interactions that "alter our brain chemistry" are defined as moments which cause significant shifts in emotions, thoughts and behaviour. This often leaves us feeling closer to the person we shared the interaction with.

But what promotes this neurological desire to form connections?

When we interact with others – whether it's a bond over a shared favourite movie, a realisation of a mutual friend, or falling in love at "first sight" – a whole series of chemical reactions are triggered in the brain. One such chemical is the hormone oxytocin, commonly nicknamed the "cuddle" hormone, due to its release being triggered by feelings of love. Produced in the hypothalamus and released by the posterior pituitary gland, this hormone is associated with increased trust and relaxation, allowing us to feel more connected to those with whom we bond. Oxytocin is produced during attraction, enhancing relationships between individuals, which is evolutionarily advantageous, as it encourages us to reproduce and pass on our genes (Biggers, 2018).

Another hormone contributing to good mood is dopamine, the secretion of which accompanies feelings of pleasure and happiness. It is, therefore, released after positive interpersonal interactions, meaning we feel rewarded when we form connections. However, it is also beneficial to our body physically, aiding with movement, sleep, heart rate, kidney function and our ability to pay attention (Watson, 2024). Serotonin, another natural mood-boosting hormone promoted by positive human interaction, improves memory and reduces stress. Low levels of any of these hormones is linked to increased risks of depression, anxiety and insomnia; thus, maintaining good relationships is perhaps the most important factor in living a happy, healthy life.

Mirror neurons are another part of the brain affected by human interaction. They allow us to initiate and understand the actions and behaviours of those around us. A simple example is yawning: when we see someone else yawn, mirror neurons in the brain are triggered, and in response, we yawn, too. Mirror neurons help to explain why we begin to imitate the mannerisms of those with whom we spend ample time. Our brain is constantly learning as we try to understand our complex world and therefore, repeated exposure to a behaviour will be unintentionally registered by these

neurons and mimicked by us. Scientists also believe mirror neurons allow us to feel empathy, and we may understand the thoughts and emotions of others by simulating them in ourselves as if we were experiencing the same thing (Sutton, 2023).

Human interaction can also alter our brain chemistry through the formation of meaningful memories. Long-term memories are formed when the hippocampus (a region of the brain) retrieves information from the working memory and begins to change the brain's physical neural wiring. This neuroscience is incredibly complex; however, at the most basic level, our brain operates similarly to an electric circuit. Neurons transmit messages to each other across synapses (small gaps between cells in the brain) through the release of chemicals known neurotransmitters. When one neuron continually stimulates another, their connection strengthens, meaning that it becomes easier and easier for them to stimulate each other as time goes on. This results in the formation of a memory. The stronger the emotional significance of an experience or interaction, the stronger our cognitive ability to remember the event long term.

When we form a new memory, our brain essentially reshapes itself. Perhaps, as a species, it is the power of our memory that sets us apart from all other life on earth. Memories allow us to adapt to and understand the world around us. They also remind us of who to trust, allow us to form meaningful connections, and enable emotions as powerful as love and hatred. However, our memory is a skill that needs to be constantly exercised. Unlike most cells in the human body, neurons cannot be regenerated, so our brain and memory must be constantly stimulated to ensure neurons and neural connections do not disappear. Therefore, we rely on emotionally significant interactions to preserve our brain health and ensure that our memory – and intelligence – does not begin to deteriorate.

While our brain is pre-wired to perform its overall function, the people we choose to surround ourselves with can change our own behavioural patterns and alter the release of essential chemicals in our brain. Long term, surrounding ourselves with those who evoke positive responses will allow us to live happier, longer lives and decrease our chances of developing degenerative neurological conditions; it is claimed that social isolation increases the onset of dementia by 60% (Alzheimer's Society, 2023).

The hormones that influence how we feel are immensely important in supporting our brain health and longevity as we grow older, so the connections we make truly do alter our brain chemistry.

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Mirror Life

GRACE, YEAR 11

Mirror organisms are a curious concept. Recently brought to the attention of the public by a group of researchers, reflected organisms such as these were said to be both uncontrollable and dangerous. But the medical benefits of mirror molecules certainly seem attractive, as does the concept itself: the synthesis of artificial life, both entirely similar to the regular sort, but entirely separate and distinct, unable to interact in the same way.

The concept of "mirror" biology was originally conceived by Louis Pasteur and remained as a pure hypothetical until 2016, when the first mirror protein was synthesised. What mirror life actually is depends on a concept called chirality, which refers to the direction in which polarised light skews when beamed through a pure solution of the molecule.

Most organic molecules on Earth have "handedness," or chirality, so that they do not have the same structure as their mirror image. This is a fundamental concept to life on Earth: almost all molecules in nature, such as proteins, amino acids, and DNA, are chiral. The chirality of a molecule influences how it interacts in biological systems – for example, the molecule carvone can either smell like spearmint or caraway, depending on which way it is flipped. Thalidomide is another example: on one side, morning sickness relief, but on the other, devastating birth defects. On a more consequential scale, this means that a mirrored version of the molecule would not interact in the same way as the regular molecule: "right-handed" mirror proteins (proteins are left handed) would not be able to be broken down or used by the body in the same way, if at all.

The synthesis of mirror molecules is not particularly new – many molecules, such as polymerase and glucose, have already been synthesised in a lab, following advancements in synthetic biology. However, actual cell synthesis, whilst possible to an extent, is far more difficult due to the complexity of the material being synthesised. Building true mirror cells, therefore, would be an almost extraordinarily complex task, possibly requiring funds of up to £500 million to even build a single one. Current advancement includes DNA synthesis of up to 1500 base pairs, which is hardly a single cell, although the enzyme that catalyses this has been successfully completed. However, continued research into the concept of mirror life and molecules may well prove to have a range of applications and benefits to the field of medicine.

Some drugs may bind to different target receptors and provide different effects, depending on their chirality, known as entianomers. Occasionally these effects may vary to the extent that one variety is not needed: if the ratio of useful to non-useful is less than 1:1, it may be a candidate for an entianopure drug. A mirror organism such as a bacterium would create the needed entianomer if it is not produced by regular life, which would behave differently in the body and be far easier to produce than careful laboratory synthesis, atom by atom. Similarly, mirror aptamers, which are RNA molecules, are currently undergoing trials for conditions such as diabetes. They have similar properties of diagnostic and therapeutic value to regular RNA aptamers, but are very resistant to decay by nucleases, which destroy regular RNA due to their structure. This would create the possibility of long-lasting drugs with greater therapeutic value, and again, these would be far easier to produce.

However, there have been growing concerns about the possible Pandora's box that is mirror organisms. In December 2024, scientists argued that mirror cells could pose a fundamental threat to life. A mirror cell such as a bacterium, although unable to feed on regular substances, could replicate uncontrollably, especially

cyanobacteria, which feeds on sunlight and non-chiral substances. This could quite easily revolutionise and destroy life as we know it, as the mirror organisms would be able to take over entire ecosystems and convert food sources into mirror food, as regular biological checks on uncontrollable development (such as pathogens or even introduced toxins) would have little to no effect whatsoever on the new life. Even if they were not initially able to find enough food, mirror bacteria, it has been proposed, may well eventually be able to evolve the ability to convert regular matter to mirror matter, leading to devastating consequences for ecosystems and the environment. Possible consequences warned against by the team in 2024 also include the risk of a pandemic.

Ultimately, however, it's not just the concept of mirror cells that is so frightening and worrying. It's the idea of synthesis itself: the idea of creating any artificial life, whether harmful or benevolent, is to most people frightening and largely unethical. The synthesis of artificial life has major security and safety issues, and, as mentioned before, mirror cells, if ever created, could cause a pandemic or ecological devastation, which would probably make them a candidate as a bioweapon. It may also swing in the other direction. Clear-cut cases of life-forms that it is not a particularly good idea to create may well influence and affect general attitudes to synthetic or artificial life, which could otherwise have a range of benefits, especially in the field of medicine and biotechnology. It's unlikely in the near future that something as dangerous as a mirror-cell epidemic will be synthesised, but a far more nuanced area of development regarding other artificial life may well play out as an issue of contention in the future.

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The Influence of the Homeric Epic Tradition on Later Literary Genres

ISABELLA, LOWER SIXTH

The Homeric epics are foundational pillars of the Western literary canon. They tell of gods, wars, heroes, and implacable wrath, and have provided the basis for narrative storytelling, structure and literature since their creation. Homeric reference, themes and language have greatly influenced later genres of literature, and have subliminally and explicitly shaped humanity's perception of itself.

The Iliad formed the foundation for the education of young men in Classical Greece, known as "paideia". Thorough knowledge of the Iliad was believed to form a solid moral and intellectual basis for a good citizen of the city-state, and throughout Greek history was debated and taught as an example of many things, including rhetoric and poetry, nobility, ethics, and what was expected of a man. There was significant debate around the ethos and mindset promoted by Homer in the 5th Century BCE; for instance, where Sophocles interacted with Homer in a way that endorsed the individualistic, morally uncompromising heroic temper, Euripides used his tragedies to subvert and refute these ideas. Sophocles' Ajax mirrors the character of Hector from the Iliad: there are explicit parallels in their attitudes to shame, honour and death. Hector is begged by his wife, mother and father not to fight Achilles, and to withdraw back into Troy, but Hector refuses, saying that he would feel ashamed before his fellow Trojans were he to back down, and that he would feel "womanly" were he not to fight Achilles, although he knows he will die in the duel. Ajax, too, after he has realised his crime and madness in slaughtering a flock of sheep instead of his Greek comrades, is begged by his wife not to die, although in this case it is death by suicide; however, for both characters, their sense of shame and honour compels them to take drastic action and eventually die to maintain or restore their masculine sense of honour and die a "good death". Sophocles explicitly draws parallels between the two characters, examining the heroic temper, honour-based systems of behaviour, and the function of masculinity. Euripides, on the other hand, questions the validity of the Homeric heroic temper, with plots like that of the Hecabe, where the ghost of Achilles demands the sacrifice of the princess of Troy, Polyxena, as a 'geras' (war prize) for him at his tomb. Despite Hecabe's rhetorically persuasive pleas to the contrary, Achilles' honour is deemed more important than Polyxena's life, and she is sacrificed at the command of the unsympathetic Odysseus. In including the central heroes of both Homeric poems, the Iliad and the Odyssey, and portraying them so cruelly and superficially, Euripides questions the callousness and violence of the heroic temper. Overall, the Iliad and the Odyssey were greatly connected to the genre of tragedy, and their central messages and themes were greatly debated within these works, whether they were endorsed or rejected.

When considering the Homeric poems in relation to later literature, one cannot ignore their impact on historical and literary narratives of later wars. Herodotus seeks to reinterpret Homer and the Trojan War narrative, blaming the war between Greeks and Trojans on an escalation of previous conflicts involving princesses on each side being stolen from their homelands. This war, Herodotus argues, is a foundational moment in the establishment of hostilities between East and West, a precursor to the Persian Wars in the 450s BCE. Thucydides, too, when talking about the Peloponnesian Wars of the 430s-410s BCE, references the Trojan War campaign as a parallel to the doomed Sicilian Expedition of 416BCE, and uses highly evocative Homeric language to describe the disastrous retreat of the Athenians, to give

the episode epic pathos and importance in his narrative. In other literary genres, especially tragedy, the devastating effect of war on noncombatants is examined. In The Trojan Women by Euripides, for example, Euripides presents the stories, fears and sorrows of four women, Trojan royalty reduced to slavery after Troy's fall. This reinterpretation of the Homeric story, focusing of the voices of the oppressed, not only reflects Euripides' questioning view of the Homeric ideal, but also his criticism of Athenian actions in the Peloponnesian Wars on the island of Melos, which the Athenians had invaded, then killed the men and enslaved the women and children. Through this connection between epic, the common literary currency of the ancient world, and tragedy, the uniquely Athenian art form able to offer new voices and perspectives, Euripides was able to create a new kind of vehicle for social commentary and criticism.

Finally, Homer's poems were and still are foundational for language and poetic tradition. The richness and grandiosity of Homer's language is adopted by Aristophanes in his play 'Wasps' when he compares himself favourably to his rival Kleon, cast as a monstrous figure of Homeric proportions, and also by Socrates in the writings of Plato and Xenophon, both as part of a culture of using Homeric references in educated conversation, but also to strengthen points and attack one's enemies. For example, Socrates uses a quote from the Iliad to implicitly compare his rival Protagoras to an impious Achilles and slander his name. Furthermore, the Roman satirist Juvenal used hyperbolic Homeric comparisons in his satires ironically to undercut and attack the subjects of his writings.

However, not all instances of Homeric language were deployed so aggressively or insultingly; the lyric poet Sappho reinterpreted the Homeric Aphrodite in her love poetry, elevating her to a martial goddess who would help Sappho in her campaign to win her lover's heart. John Milton makes comparisons between the stories of Adam and Eve and Achilles and Patroclus, creating hugely impactful parallels between the pitiable fate of one partner (Eve, Patroclus) and the subsequent misfortune of the other (Adam, Achilles). Additionally, he uses the trope of the perfect Homeric epic hero, contrasted with the flawed tragic hero, in the characterisation of Christ and Adam respectively, to reinforce his theological message in his epic poem.

Homeric patterns continue in the modern literary canon as well as the ancient world. Far from being relegated to the past, the epic tradition has been adapted to the modern age in modernist novels such as James Joyce's Ulysses and even in popular culture in cinematic epics like Star Wars. The connection between the Homeric epics and later genres of literature is hugely influential in the Western literary canon, and has been widely reinterpreted and reshaped to create a thriving and vibrant tradition of allusion and reference.

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One Thousand and One Nights: A Tapestry of Cultural and Temporal Connections

JESSICA, LOWER SIXTH

The soul of storytelling rests in its power to connect. Within every story, bridges are built - between writer and reader, between each word and page. Yet there are few stories, or collections of stories, that embrace their capacity for connection more profoundly than One Thousand and One Nights. Each narrative that is spun within this compilation forms its own thread, and together they are united to reveal an alluring tapestry of tales that has bound storytellers, writers and readers across time and space. These words have transcended individual eras or peoples; instead, they exist as stories without borders that still echo in our minds today.

One Thousand and One Nights is an accumulation of tales, connected by a unifying narrative thread, or framing device. This frame story is a spellbinding narrative in itself. King Shahryar discovers that his brother's wife has been unfaithful, and later comes to the same realisation of his own wife. Sullen and resentful, Shahryar decides that all women are the same. This leads him to marry a succession of virgins, only to execute each of them the next day before she has the chance to dishonour him. The cycle is repeated to the point that the Vizier can no longer find any virgins – that is, until his daughter, Scheherazade, offers herself. But Scheherazade does not succumb to the typical fate of a bride in her position. On the night of their marriage, Scheherazade begins to tell the King a story but leaves him on the edge of his seat by not reaching its conclusion. The King, curious as to how the story ends, delays her execution by an additional night. But the next night, upon finishing her original story, Scheherazade

begins to tell another. With each dawn, Scheherazade guards herself against death, wielding words as her greatest weapons. The worlds that unfold before our eyes lure the reader, alongside the King, into a world of mystery, where reality suddenly seems unimportant. This goes on for one thousand and one nights, until, though versions differ on the details, Scheherazade is pardoned, and her life is spared.

But the story of this sweeping narrative's origins is perhaps the most interesting of all. To trace its path to the collection that is recognisable today will require us to migrate from East to West, to venture between languages, cultures, and eras. Our journey begins in ancient India, where the roots of the text's central tales started to take shape in brief and simplistic forms. These stories roamed the land on the backs of wanderers and wayfarers, eventually arriving in Persia, where they were translated and native stories were added to a collection under the title The Thousand Tales. By the ninth century, the words had penetrated the Arab world and were compiled in Cairo during the Islamic Golden Age. The tales have undergone translations, alterations, and additions with each sojourn, but these processes only appear to have enriched the stories, to have let them reach their fullest potential. The earliest substantial manuscript of the Nights dates from the late fifteenth century, yet it only reached the West with Antoine Galland's French translation, published in twelve volumes between 1704 and 1717. Galland did not strictly stick to the script: he implemented new stories that he had heard from the Syrian storyteller Hanna Diab. Some of these additions would evolve into the collection's most famous works, including Aladdin's Lamp and Ali Baba and the Forty Thieves. From there, the Western world would become enchanted by these distant tales, whose authorship may have been unknown, but whose immense influence would swiftly become apparent.

'I would wear a mask with pleasure. I would love to change my name. The Arabian Nights which I adore occupies more than a quarter of my head.' These are the words of the French writer Stendhal, and he can hardly be described as anomalous in his experience of the Nights' beguiling charm. Countless writers have been dazzled by these stories, including Byron, Coleridge, the Brontës, George Eliot, Flaubert, Voltaire, Tolstoy, Pushkin, Proust, Yeats, Poe and Twain, to name but a few. Charles Dickens was particularly forthright about his captivation with the collection, referencing it directly in his works The Old Curiosity Shop and David Copperfield. George Gissing, author of Charles Dickens: A Critical Study, writes that 'Dickens seems to make more allusions to the Arabian Nights than to any other book or author… Where the ordinary man sees nothing but everyday habit, Dickens is filled with the perception of marvellous possibilities. Again and again he has put the spirit of the Arabian Nights into his pictures of life by the river Thames…' It is this spirit that has touched the Romantic writers of Europe, sparked the 'rags-to-riches' narrative of the United States, and given rise to the genre of magical realism in Latin America. Wherever you come from, it is almost impossible that the spirit of the tales has not touched you, in one way or another.

The Argentine writer Jorge Luis Borges believes that the magic of the collection stems from the title's suggestion of infinity. When we say 'a thousand nights' we tend to mean a series of nights that will never end. To add one to this is to reach infinity and beyond, forever and a day. The aptness of such a title is clear, for the Nights, though having been crafted over the course of millennia, are still not finished. They never will be. For the eternity of these tales is a product of the everlasting human expression of creativity, and the immortal power of the word. There will always be new stories to tell, new meanings to emerge, and new hearts to stir. Yet what will forever bind us is a singular thread, spun by a woman many moons ago. Her voice still resonates, for within her tales lies infinity. In his introduction to a German translation of the Nights, Hugo von Hofmannsthal writes: 'Here is a poem on which more than one person has worked, but it seems that it originated from one soul. It is a whole, it is a complete world.' And what a world, indeed…

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The Connection Between Memory and the Senses

LILIA, YEAR 11

Have you ever wondered why certain smells, tastes or sounds make you think of a memory that brings up strong emotions, or perhaps remind you of a childhood experience? The taste of pizza coupled with the sound of rain makes me remember a huge rainstorm four years ago when I was home alone and getting frightened.

This happens because of the way the brain decodes information about a taste or a smell or a certain sound. It does this via electrical impulses that pass through the olfactory bulb and the auditory nerve, both parts of the brain's limbic system, which are near to the amygdala and the hippocampus. The amygdala and hippocampus are mainly responsible for processing emotions and forming memories. The connections between memories and the senses are strong, and they can be both positive and negative. The senses stimulate the nervous system, and the stimuli can be especially powerful when a certain smell or taste or sound is connected to a negative experience, causing stress and anxiety.

Smell is connected to memory. When you smell something, the olfactory receptors detect the chemicals in that object, and the information about them is sent to the brain through the olfactory nerve to the olfactory bulb, which forms a part of the limbic system for the brain. The olfactory bulb is close to the amygdala, which generates emotions, and to the hippocampus, which stores memories. This means that emotionally significant memories may have certain smells stored with them. This often goes unnoticed until a person experiences that scent again, which then triggers the memory connected with that smell. This mechanism is thought to work

as smell is one of the most developed senses for humans under the age of ten.

This connection between smell and memory is now being explored to help dementia patients restore some of their memory functions. This is called reminiscence therapy, and it is when patients are exposed to potentially nostalgic scents such as the aroma of a hot dog stand, which may help them to remember more about their past. Loss of scent has also been accepted as a marker for people who may start to develop Alzheimer's disease within a few years. This is because memory and scent are so intricately linked that a decline in a person's ability to smell – without any specific reasons for the change, such as an injury – can be linked to a gradual decline in memory.

The good news is that a person's sense of smell can be improved over time by focusing on noticing different scents. This sort of scent training can help people regain a stronger sense of smell, which in turn helps to improve memory. The scent-memory connection is especially useful for helping a person to remember experiences for a longer period of time by once again exposing them to the scents connected to those memories.

Like smell, sound can also affect memory. Those effects can be positive or negative, depending on how loud the noise is, and other factors. For example, noise can increase alertness and general activation, which has a greater effect on people who are sleep deprived, as the noise stimulates them to be alert and prepared to receive information. Exposure to background noise, however, can reduce performance accuracy and working memory, even though it does not affect performance speed.

Background noise can decrease productivity, especially for people working next to constant disturbances, such as busy roads or construction sites, causing people to find it harder to remember important information or making them get distracted more easily. This effect is increased with the amount of noise, which can cause unnecessary stimulation of the nervous system. In this way, high noise levels can lead to greater stress and anxiety and long-term memory defects. According to Wang et al, exposure to noise pollution over time can be a risk factor for neurodegenerative disorders and cognitive impairment. This highlights the strength of the connection between noise and memory, as hearing too much noise can cause long term memory problems that cannot be cured.

Whether noise or sound is positive or negative for memory is up for debate because, while causing adverse effects in some cases, noise can also increase attention to different stimuli, helping bring up certain memories for people. The effects of sound on memory are also influenced by other things, such as genetic predispositions to disorders and various lifestyle factors, which means that different people will react differently to noise exposure, as far as their memory is concerned.

When it comes to other sensory experiences, taste links to memories as the gustatory receptor cells send the information about the food to the insular cortex of the brain. This in itself does not necessarily affect the memory stored. However, the smell of the food, which is stored near the amygdala and hippocampus, is also used by the brain to achieve an overall sense of taste. This means that taste can be attached to certain memories indirectly. This is especially true of memories connected with a strong sense of emotion, which was useful in the past to make sure that humans did not eat anything that had made them ill previously. Restaurants and food manufacturers can use this evolutionary mechanism to try to evoke strong positive emotions by helping customers to relive positive childhood experiences by imitating the smell, texture and taste of their old-time childhood favourite foods (even though the ingredients might be completely different).

Chef Bryan Voltaggio once served a panel of neuroscientists mock oysters, prepared to have a similar taste, smell and texture to the real deal. Although they were not eating actual oysters, they still had the experience of remembering the past times they had eaten oysters. In this way, an evolutionary trait of humans can be used to make a meal more memorable and heartening. This mechanism also plays out on a subconscious level when you might want to eat foods that you have associated with positive memories to help you to feel uplifting emotions (like chocolate, which you might have gotten as a treat at parties or for good behaviour as a child).

In conclusion, memory has a strong connection with taste, smell and sound, which is an evolutionary characteristic of humans that helps us recognise things that could be good or bad for us. The connection with taste and smell is usually seen as more positive than negative, evoking childhood experiences and warm memories. However, noise can have damaging effects on memory, especially when a person is exposed to louder sounds for long periods of time. The emotional connections between the senses and memories are often used by doctors to research neurodegenerative diseases and by businesses, who want to tap into their customers' emotions to help sell goods and services to more people. These connections are truly fascinating. As we learn more about them over time, we can understand how they can be used to our advantage, including to help cure disease and improve mental and emotional wellbeing.

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Victim-Perpetrator Connections in Crime: How Connections Affect Legal Responses

MAIA, YEAR 11

Victim-perpetrator relations in crime are vital in showing how the criminal justice system responds to these situations, ranging from how willing a victim might be to report a crime to the reliance on evidence and the manner in which legal cases end. Victim-perpetrator relations vary, depending on, among other things, whether they are between close friends or relatives as opposed to if they are strangers to each other. Knowing these factors is crucial to the provision of effective legal interventions that are timely and reactive to the emotional state of a victim.

For crimes that have been committed by strangers, victims tend to develop a sense of anxiety towards people in general. This can worsen to the extent that it becomes difficult for them to work with law enforcers or even report the crime itself. The fear, confusion and anxiety that commonly accompany such a crime can impact the victim's way of engaging with the justice system. The impression that the crime was random and perhaps will not be prosecuted is also likely to discourage them from pursuing the case. In such cases, law enforcers tend to concentrate more on collecting physical evidence, reporting the crime, and identifying the person responsible.

While it is important to provide identification and prosecute the offender, this prioritisation does not always allow for adequate emotional support that the victim might need, particularly for sexual assault or violent crimes. The trauma suffered by the victim is often dismissed in favour of gathering evidence, which may lead to victim-blaming or a sense of abandonment. The lack of emotional connection between the victim and offender in stranger-connected crime complicates this. The absence of a pre-existing relationship means there is less emotional attachment that would motivate the victim to report the crime, hence making it challenging to investigate. There are generally lower reporting rates in these cases, and this hinders prosecution.

On the other hand, offences involving family, such as domestic violence, child abuse, or elder abuse, present the justice system with another, unequal set of challenges. Family relationships tend to create emotional, economic, and social ties which render it more difficult for victims by making reporting such offences challenging. Victims tend to be fearful for the safety of themselves or their family and friends or are economically tied to the offender. Such emotional ties tend to deter victims from reporting the crime or even, in some cases, result in a victim defending their own abusers. In family-based crimes, the legal process may be complicated by such emotional dynamics. Prosecutors may discover that the victim does not want to testify or has been emotionally manipulated on behalf of the abuser. This emotional bond will undermine legal proceedings, especially where the victim may not want to remove contact with the perpetrator or has forgiven them. The long-term psychological and social impacts of family-based crimes can be detrimental to the victim. The relationship between the perpetrator and victim complicates the identification of a crime, especially if the offence is committed in the victim's residence, which is typically regarded as a safe environment. Most victims of domestic violence, for instance, are likely to excuse or downplay the crime, and so the process of building a case becomes a challenge.

Offences among acquaintances, where the offender and victim are not related but are familiar with each other, contribute another layer of complexity. Victims in such incidents may not report the crime, since it may impact their relationship with the perpetrator, or they may feel a sense of guilt or embarrassment. They might fear tarnishing their reputation or feel embarrassed to have gone through the crime. For example, if the perpetrator is a familiar to the victim, it might be especially difficult to report, due to the emotional connections. Acquaintance crimes are among the challenges, since the case tends to rely solely on the victim's testimony, which is potentially compromised by the emotions regarding the victim-offender connection. The law must be careful in these cases, balancing the trust that the victim has had with the offender against the emotional toll that testifying would entail. Legal responses to acquaintance offences also frequently involve addressing damage concerns and compensation. Victims in these types of situations are less likely to want compensation, especially if they feel it would lead to intimidation or if they have been manipulated by the perpetrator. Threats or social pressures in these cases can also discourage the victim from reporting the offence and cooperating in the legal process.

For the police, dealing with crimes of complex connection requires more than legal understanding. It requires an understanding of human relationships and the psychological effects of victimisation. Trained officers can be taught to recognise symptoms of emotional manipulation, fear, and uncertainty among victims, especially when these are brought in from previous relationships with the perpetrator. Moreover, lawyers dealing with such cases must be able to offer victim support, as opposed to just legal aid. This may include working with victim support organisations that provide them with emotional support to help them understand and cope with the trauma they have experienced. In cases of crimes in the family or among individuals known to the victim, one must ensure that the mental health of the victim is prioritised while, at the same time, the justice process is not compromised.

Victim-perpetrator connections are essential to consider when deciding the reporting, investigation, and prosecution of a certain crime. Regardless of whether the victim recognises the perpetrator or not, the emotional and psychological connections between the victim and the perpetrator can determine whether the victim is willing to report, whether there is evidence, and whether proceedings will be successful. Victim-perpetrator connections are essential to improve the criminal justice system's response to a crime.

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Blood Libel, Blockchain, and a 'Huge Tolerance for Unreality': How the Far-Right and Cryptocurrency are Connected

MOLLY, LOWER SIXTH

Only about 16% of Americans hold or trade crypto, but reports struggle to find a prominent American far-right figure not using it. An advocacy group, The Southern Poverty Law Centre, has identified over 600 cryptocurrency addresses used by members of the far right.Libertarianism is the reason behind and an essential facet of cryptocurrency culture. The most fundamental appeal of cryptocurrencies is their decentralisation and lack of supervisory authority. On both sides of the political spectrum, radicals are more likely to be wary of institutions like banks and governments, seeing them as unjust and hostile to their objectives. However, the far right is often particularly concerned with the notion of the struggle for financial independence. The affinity of the right wing with cryptocurrency is twofold: ideological and practical.

Ideology: Antisemitic conspiracies often fixate on the over-emphasis of Jewish power. Conspiracies include the concept of 'Jewish decide' (the belief in the collective responsibility of Jews across time for the death of Christ). There was also the Blood Libel (medieval accusations of ritualised murder and the use of the blood of Christians and children in Jewish practice).

Anxieties about Jewish power coalesce around notions of a secretive global financial operation. The Protocols of the Elders of Zion was an antisemitic forgery published in 1905 that perpetuated the myth that Jews control the world and politics. The pervasive conspiracies about Jews sewn through history create an overall narrative that a Jewish cabal enacts a malicious, domineering agenda through manipulation of the media and banking systems.

Since the early twentieth century, the Ku Klux Klan, neo-Nazi and other white supremacist groups have promoted the claim that Jews control the Federal Reserve. Therefore, the idea of a financial circuit that runs independent to mainstream institutions is particularly attractive to those who perceive the latter system as a marionette of malign Jewish interests. In fact, it is in the interest of those with a stake in crypto's popularity to sell it as the frontier of economic freedom, to frame it as a weapon to take back power from a default which many believe confiscates value from the people to whom it actually belongs. Distrust in financial systems is by no means inherently anti-semitic or extremist, but the narratives of Bitcoin and of the far right feed into one another. The ideologies shared by many on the far right, which conclude that governments and financial systems as we know it will be destroyed or will inevitably crumble, 'primed neo-Nazis to embrace cryptocurrency's promise early' (Megan Squire, SPLC).

It should come as no surprise, therefore, that far-right figures were prominent amongst early crypto investors. One of these was Greg Johnson, an influential figure in the pro-'ethnostate', white nationalist movement. He picked up Bitcoin for the first time on January 19th 2012, making him the first known figure in the movement to invest. He has a website, Counter-Currents, which has since been turned into a hub for extremist discussions and a forum for the solicitation of donations to the movement in cryptocurrency.

In a livestream, Johnson spoke to those who perceive cryptocurrency as lacking in real world value, urging them to send Bitcoin to him. He said, 'I'll hold it, I'll stack it, I'll keep it… I have a huge tolerance for unreality'. Cryptocurrency fits into an ideological framework that demands an alternative to mainstream institutions. But beyond that, the mentality that is necessary to engage in fascism, which is based on lies, perhaps lends itself to a willingness to tolerate the intangibility that puts many off cryptocurrency.

Practicality: On August 11th 2017, far-right groups from across America congregated to protest the removal of a Confederate statue in Charlottesville, Virginia. The following day, a white supremacist drove his car straight into a crowd of counter-protesters, killing one of them. In the fallout, Paypal, Apple Pay, Google Wallet, Visa Discover, Patreon and two credit card firms all suspended a host of extremists' accounts. Shut out by terms of service forbidding raising money for hate causes, far-right groups searched for less regulated ways to raise money.

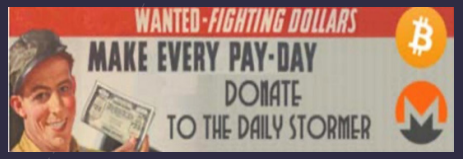
Far-right individuals use their websites and social media platforms to advertise their crypto wallets and ask for donations. This has proved incredibly successful for many. The far-right podcaster Stefan Molyneux, another early investor in cryptocurrency, has received over $1.67m in bitcoin, and Andrew Anglin, the publisher of the neo-Nazi commentary site the Daily Stormer, has reportedly received over $3.8m.

A post on the Daily Stormer states, 'When we can finally control our own finances without needing to rely on the central k*** banks, we can start repairing. And start up the ovens of course'. The authors of these horrific statements likely have more money than can be tracked by Hatewatch. Individuals like Anglin have pushed their audience toward the privacy-focused token Monero since its release in 2014.

Behind the Daily Stormer have followed numerous extremist organisations. The National Justice Party, a white supremacist group with ties to the pro-Kremlin propagandist Charles Bausman, only accepts donations in Bitcoin and Monero. Bausman is currently in Moscow, having left the US after attending the January 6th Capitol insurrection. Interestingly, although it's difficult to substantiate a correlation between the events, one month before the January 2021 Capitol Riot, 22 alt-right groups and personalities received over $500,000 in Bitcoin from a French donor. Sites for cryptocurrency exchange are a crucial part of the funding of extremism.

Overall, cryptocurrency as a concept is not fundamentally extremist, but it is fundamentally political. Satoshi Nakamoto, the anonymous founder of Bitcoin, was concerned that traditional companies were overly reliant on the trustworthiness of banks and governments. In the words of David Gerard, a cryptocurrency analyst and author of Attack of the 50 Foot Blockchain, 'Bitcoin started in right-wing libertarianism'. He notes that 'this is not at all the same as being a neo-Nazi subculture. That said, there's a greater proportion of Nazis there than you'd expect just by chance, and the Bitcoin subculture really doesn't bother kicking its Nazis out'.

The Bitcoin subculture isn't alone in its negligence. It is clear that vigilance when it comes to far-right activities has rarely been more crucial. Elon Musk fancies himself a 'techno-libertarian', a label adopted by many in the cryptocurrency space. But when he throws his arm out, flat-handed, at a 45-degree angle, straight, the layers that conceal a great many far-right, techno-fascist operations begin to peel away.



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The Underlying Theory of the Universe

PJ, YEAR 11

I often question whether I could live my life without ever desiring understanding – if I could traverse the hours and days never questioning my existence, never questioning the principles behind the phenomena I observe taking place in the world around me. Could I be complacent while looking up at a vast expanse of stars that stretch across the night sky, never considering my place and simultaneous insignificance as I stare at our corner of the universe? I truly don't think I could, for I believe it is a deeply embedded human tendency to desire understanding. "The fact that [the physical world] is comprehensible is truly a miracle". The words of Albert Einstein ring true, for it is truly incredible that we as the human race possess the ability to deduce the laws of the universe around us. And yet, will we ever be able truly to comprehend our universe? Some physicists believe there is a grand underlying theoretical framework to answer this: a 'theory of everything'.

But what exactly is this mysterious framework of the universe? What this mainly refers to in physics is the unification of the four fundamental forces of the universe – or, more broadly, the unification of Einstein's theory of general relativity, which describes gravity as the curvature of spacetime and the macroscopic world, with quantum mechanics, describing the other three forces of the universe and the microscopic world.

But what exactly are these fundamental forces that scientists are attempting to unify? There are fundamental particles governed by fundamental forces that make up our universe, and the fundamental particles typically occur in two groups: quarks and leptons. Each of these groups contains six particles related in pairs, or 'generations'. The more stable and lighter particles make up the first generations, while heavier and less stable particles male up the second and third generations. However, these heavier particles will quickly decay to more stable and lighter ones. Now, moving on to the fundamental forces, there is the strong force, which is (astonishingly) the strongest, that only acts over short range and subatomic particles. It is the force that binds quarks together to make protons and neutrons, and then further holds those protons and neutrons together to form the atomic nuclei. Secondly, there is the weak force, which again only governs over subatomic particles and short distances, but is responsible for converting protons to neutrons and vice versa. There is then the electromagnetic force, which has infinite range, and then finally, the gravitational force, which also has an infinite range but is the weakest of the four. The first three forces result from the exchange of force carrier particles, and the quantisation of these three forces is one of the defining features of quantum mechanics. These particles are the gluon, W and A bosons, and photon respectively, with the particle for gravity having not being discovered yet, as we can't yet fit gravity into the Standard Model because trying to observe gravity at these small scales (like the theoretical graviton) is where theory begins to break down.

The Standard Model of particle physics encompasses and relates the first three forces of the four. It has been established as a well-tested theory, as it is able to predict and explain many natural phenomena. Although it is the best description of the subatomic world, it excludes the force of gravity. It also does not provide answers to questions like what dark matter or energy is, and it is likely only part of the bigger picture of our comprehensive understanding of the universe.

But why do scientists believe there may be a 'bigger picture', or a 'grand unification theory', if currently, general relativity and quantum physics cannot be related? James Clerk Maxwell recognised similarities between the field of electricity and magnetism, as they are essentially just two aspects of the same thing (a changing electric field creates a magnetic field, and vice versa). And so, he developed his theory of a single electromagnetic force. Furthermore, scientists then began to develop links between electromagnetism and the weak force. This was supported by several examples, such as the discovery of the weak neutral current, and the discovery of the W and Z particles, which are carriers of the electroweak force. The electromagnetic and weak forces only act on equal terms at high energies, which could suggest the possible unification of other forces at even higher energies. There is already a lot of evidence to suggest that the strong force becomes weaker as energies increase. Therefore, it could be possible at very high energies (like those possible very briefly after the big bang) that the strong, weak, and electromagnetic forces are the same. So naturally, it's theorised that at even higher energies, gravity could be included. And of course, we know they must coexist, as we are able to do quantum mechanics on this planet, which has gravity.

There are already some proposed suggestions for a theory of quantum gravity. One example is string theory, which dictates that the universe is made up of tiny, vibrating strings. Another is loop quantum gravity, suggesting Einstein's spacetime stems from quantum mechanics. String theory is built on quantum field theory, and includes the Standard Model, which loop quantum gravity is not able to do in the same way. There is also a perspective of quantum gravity inspired by string theory that involves gravity and spacetime emerging from a network of entanglement, and specifically

GRAND UNIFICATION THEORY

from a boundary known as the 'quantum horizon'. The validity of string theory also has issues, such as requiring several more dimensions (six), the existence of which we currently have no proof, and the fact that many aspects are far from understood and have no experimental evidence. There are also arguments against the expected, neat, all-encompassing 'theory of everything' after years of searching, and that we should just except a hierarchical ordering of theories.

If this mathematical and ordered 'theory of everything' is ever found, from it we could garner more truths of the universe that may change the course of human history and technology. But even then, can we truly call it 'a theory of everything'? It cannot explain the actual meaning or of our existence, the depth of human emotion, our inane preferences and irrational thoughts. If found, it may have immaterial effects on our everyday lives, or it could change our lives forever. Maybe the search is futile. Maybe the more we understand, the more lost we become. And yet, we still keep reaching for even a modicum more of that understanding, even if we will never grasp it.

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A Plague on All Your Humours: How 50 Million Deaths Led to the Demise of a 2000-Year-Old Theory

ROMILLY, LOWER SIXTH

Hippocrates (460-370 BC) is often regarded as the father of medicine, and each year, thousands of new doctors around the world voluntarily take the Hippocratic Oath. The Oath commits them to the highest levels of professional conduct; chief amongst them is the principle of "do no harm". As well as inspiring excellence, this ceremony should also warn us against hubris – because one of the medical theories we also associate with Hippocrates was both amongst the longest-lasting and the least effective in medical history: the dogma of humours.

Hippocrates is credited with developing the foundational theory of the humours, as described in the Hippocratic treatise 'On the Nature of Man'. In it, he proposed that health depended on the balance of four bodily fluids or 'humours': blood ('αἷ μα'), yellow bile ('ξανθ χολή'), black bile ('μέλαινα χολή'), and phlegm ('φλέγμα'). An imbalance of humours (dyscrasia) was thought to be the direct cause of all diseases, while a proper balance (eucrasia) was associated with good health. The qualities of the humours were, in turn, believed to influence the nature of the diseases they caused.

Roughly 500 years after Hippocrates' articulation of the humours, the Greek and Roman physician Galen (129-216 AD) expanded on the theory in his work 'On the Temperaments'. Galen also incorporated Empedocles' (495-435 BC) theory that the humours corresponded to one of the four natural elements (air, fire, earth and water) into a broader understanding of human physiology and applied courses of treatments for reducing or increasing their concentration.

Blood corresponded with the element of air, and was associated with a sanguine temperament, warm and moist qualities, and an optimistic, lively, social, energetic, and cheerful nature – though with a proneness to impulsivity.

Yellow bile was linked with the element of fire, and associated with a choleric temperament, warm and dry qualities, and an ambitious, aggressive, or irritable personality. Excess yellow bile was believed to cause fevers and digestive issues.

Black bile was tied to the element of earth, and associated with a melancholic temperament, cold and dry qualities, and a reserved, thoughtful, or depressive nature. Too much black bile was thought to cause melancholy or sadness.

Finally, phlegm was related to the element water, and a phlegmatic temperament was associated with cold and moist qualities, and a calm, sluggish, or unemotional disposition. An abundance of phlegm was linked to respiratory illnesses and lethargy.

Galen popularised treatments aimed at restoring humoral balance, including bloodletting and purging, and emphasised the role of diet, exercise, and lifestyle in maintaining health. His work helped to ensure that humoral theories and medical practices spread far and wide and were taught throughout the Middle Ages, influencing both Arabic and European scholars such as Alfanus of Salerno (1015-1085), who collated Greek and Arabic medical knowledge with Christian theological perspectives.

Then came the Black Death.

Arriving in October 1347 at Messina, Sicily on Genovese trading ships coming from the Black Sea, the plague epidemic ravaged Europe from 1347 to 1352, causing the deaths of an estimated 50 million people.

The world had never before encountered a medical emergency of the scale and severity of the plague, and so many doctors looked for solutions that were rooted in humoral theory. Common attempts to treat the plague therefore included bloodletting (to reduce fever) and purging with emetics or laxatives (to remove toxins). Herbal remedies consisting of various aromatic herbs were applied to cleanse the body and ward off bad air. Fumigation, or burning substances to purify the air, was another widely used treatment.

At the time, the Church was at the centre of most academic endeavour and scientific research, and so medicine and religion were intertwined. So, along with humoral treatments, physicians applied their superstitious beliefs, religious explanations, and alternative remedies. Some believed that the plague was a divine punishment, leading to mass public penance and other desperate measures. For instance, the flagellants publicly whipped themselves, hoping their suffering would atone for humanity's sins and end the plague.

Many also sought protection through pilgrimages, fasting, donations to the Church, amulets, charms, and magic potions. Others carried posies of herbs and flowers, while astrologers even attributed the plague to planetary misalignment and offered treatments coordinated with the position of the planets. Some approaches were more successful – for instance, cities such as Venice held ships in isolation for 'quaranta giorni' (40 days), which gives us the term 'quarantine.'

The failure of humoral theory to limit the devastation caused by the Black Death helped to prompt a re-examination of classical medical practices, leading society to become slowly less dogmatic about established medical theories.

In fact, medical practices did not truly embrace an evidence-based approach until

Francis Bacon popularised the 'scientific method' in the seventeenth century. It then took until the nineteenth century – another 200 years – before the French biologist Alexandre Yersin discovered the true cause of the plague. His identification of the bacterium Yersinia pestis and the subsequent development of antibiotics mean that modern outbreaks of the plague claim as few as 500 lives in a five-year period, in stark contrast to the 50 million dead in the fourteenth century.

The psychiatrist Thomas Szasz (1920-2012) observed, "when religion was strong and science weak, men mistook magic for medicine; now, when science is strong and religion weak, men mistake medicine for magic."

So, while thousands of doctors each year still take the Hippocratic Oath, we should also remember the Ancient Greeks' lessons about hubris. Just as humoral theory was abandoned, recent history shows that accepted medical practice is still being overturned as new evidence emerges. Advances in areas like ultra-processed foods and the effects of artificial sweeteners on the human body challenge previous assumptions, reminding us that science is an ongoing process of discovery. A healthy scepticism - one that fuels rigorous research rather than outright rejection – remains our best safeguard against mistaking medicine for magic.

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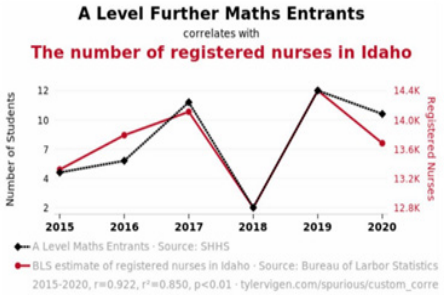
Choose Further Maths to Save Lives in Idaho

SHIVANI, LOWER SIXTH

When you reach Year 11, you will be asked to narrow your subject choices down to three or four.

Many factors will inform your decision, but the more altruistic amongst you may consider choosing Further Maths in order to protect the fine citizens of Idaho. If you are not sure whether to believe me, just take a look at the chart. It shows the number of students taking Further Maths at South Hampstead alongside the number of registered nurses in Idaho.



This year's theme asked us to explore "Connections". In maths, and more specifically statistics, we try to quantify the connectivity of data by calculating correlation. People with responsibility are constantly having to make decisions with real consequences, perhaps medically, financially, or politically. Collecting data and analysing the correlation can help the decision-maker opt for a particular path or can be used retrospectively to justify a previous choice.

It is therefore vital that we understand: how and why we are collecting the data; how we are constructing tests and measures; and how we are analysing the results.

To return to our Sixth-Form options example, the chart shows a striking visual connection between the data, and by using some relatively simple statistics, we can show that the two data sets have a 92% correlation. There is less than a 1% chance that two random sets of data could be quite so correlated.

At this point, you may be starting to wonder how the 16-year-olds' subject choices in a Northwest London school could be affecting healthcare in a Northwest US State. Or you may be wondering where the sleight of hand is that has produced such an obviously spurious result.

The answer lies on the website of Tyler Vigen and his spurious correlations. Input any data and the website searches over 25,000 variables to find a good match. If you look at enough variables, you will find something significant. Our A level data also correlates highly to nuclear power generation in Hungary, and Bill Nighy movies. If I had chosen Latin, there is a 94% correlation with air pollution levels in Butte, Montana.

The lesson here is that correlation does not equate to causality.

In a world where we seem to be collecting more and more data, it is inevitable that we will see more and more coincidences suggesting connections that just are not there.

Of course, confusing causation and correlation is not new. In 1924, Dr Sidney V Haas, was working in a hospital in New York, looking into the effects of diet on children with coeliac disease. He believed that eating bananas would help break up starches and alleviate the symptoms. Dr Haas gave eight out of his ten coeliac patients a diet consisting mainly of bananas. The symptoms of the fortunate eight improved greatly, whilst the other two patients died.

Dr Haas's banana diet became the standard treatment for the best part of two decades. However, during the Dutch famine of 1944-5, coeliac patients improved dramatically when there was no flour available to make

bread. When the flour returned, so did their symptoms. It was only then that they realised that it was the lack of gluten, and not the bananas themselves, that was helping the patients. It is worth noting that the banana diet had worked, albeit for the wrong reasons.

Conversely, there are occasions where a strange and seemingly coincidental set of data can show a connection that would have been obvious if only it had been noticed. In 1998, notorious serial killer Harold Shipman was caught after he had attempted to alter the will of his final victim. After the subsequent investigation and the revelation that Shipman, a GP, had killed up to 218 of his patients, questions were raised as to how he had remained undetected for so long.

The number of deaths in Shipman's practice was abnormally high, especially when compared to other practices in the local area (to allow for local factors like a cold spell or a flu outbreak in the area). His patients also demonstrated a higher-than-average tendency to die in the early afternoon – when Shipman often carried out his home visits.

Statistician Sir David Spiegelhalter played a lead role in the public enquiry. He suggested that had an appropriate quality control system been collecting and analysing the mortality data, Shipman would have been flagged up as needing investigation. He could have been detected much earlier, potentially saving over half of his victims.

Often, we do not need to have the complex statistical skills needed to spot a problem with the way data is collected and analysed. Caroline Criado-Perez, in her book Invisible Women, points out several examples of how data is collected based on the average male and is then applied to everyone. This leads to worse outcomes for females in car crashes because seat belts are designed for the average male, and women suffering heart attacks being misdiagnosed, as their symptoms typically present differently to male symptoms.

Similarly, medical equipment should be calibrated for all ethnicities. Many health problems can be monitored using an oximeter to measure the level of oxygen saturation in red blood cells. However, the device works by sending beams of infrared light through the skin and measuring the level of absorption. Patients of black or Asian ethnicity showed a higher average reading than those of white ethnicity, potentially leading to serious misdiagnoses.

It is inevitable that we are going to see more data collected as we enter an increasingly digital age. This will enable us to explore and analyse the different connections and hopefully find ways to improve decision making in many different fields.

It is vital that we ensure our data is collected in sensible ways; that we understand any bias built into the process; and that we do not just blindly accept that correlation equates to causation. Choosing Further Maths may help you acquire the statistical skills to achieve this, but it (probably) will not save lives in Idaho.

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Spirituality and the Senses: The Decadent Attraction to Catholicism Examined Through Oscar Wilde's The Picture of Dorian Gray

SOPHIA, LOWER SIXTH

"I believe in God, Mozart and Beethoven, and likewise their disciples and apostles; I believe in the Holy Spirit and the truth of the one, invisible Art... I believe that through this Art all men are saved, and therefore each may die for Her of hunger... Amen!" - Richard Wagner

Three weeks before his death, Oscar Wilde proclaimed that "Catholicism is the only religion to die in" and was amongst a wave of Decadent artists who converted to Catholicism throughout the late nineteenth century. On the surface, though, much of Catholic doctrine seems morally incompatible with the Decadent doctrine of hedonism. Why, then, did a seemingly rigid religion preaching love, charity, and virtue attract so many of the subversive, pleasure-seeking aesthetes of the fin de siècle?

The Victorian era was an age of rising secularism, which went hand in hand with an increase in scientific thinking about human nature and the world, exemplified by figures such as Charles Darwin and his Theory of Natural Selection (On the Origin of Species). Accompanied also by the rise of Realism in literature, secularism encouraged a focus on the 'real' world, that which can be seen and touched and methodically proven to exist. Joseph McQueen, building on Charles Taylor, argues that secularism is not the death of religion, but the rise of a "disenchanted, materialist" way of thinking with "no reference to the transcendent or divine." By viewing secularisation in this way, he concludes that the aims of Wildean aestheticism and Roman Catholicism clearly converge. Aestheticism presents just as powerful a challenge to this version of secularism as Catholicism: it is a philosophy that prizes above all the sublime and otherworldly sensations and experiences provoked by art, and rejects the banality of reality. In The Decay of Lying, Vivian, the voice of Wilde, illustrates his doctrine that "Life imitates Art far more than Art imitates Life" by arguing that "people see fogs, not because there are fogs, but because poets and painters have taught them the mysterious loveliness of such effects", claiming that "they did not exist until Art had invented them." Art, for Wilde, enhances our perception of the world, and draws back the curtains of rigid rationality to reveal new, unreal visions of the world, like the ones for which Dorian feels "a wild longing... that our eyes may open some morning upon a world that had been refashioned anew in the darkness for our pleasure, a world in which things would have fresh shapes and colours,... a world in which the past would have little or no place." Vivian's pronouncement that "the growth of common sense in the English Church is a thing very much to be regretted" laments the Anglican rejection of the transcendent mysticism that characterises transubstantiation, the worship of relics and saints, and the belief in the Immaculate Conception.

Wilde also illustrates the Decadents' spiritual and aesthetic attraction to Catholicism throughout The Picture of Dorian Gray, but particularly in Chapter 11, when Dorian becomes an intensely decadent, Des Esseintes-like character. Dorian seeks to "find in the spiritualising of the senses" the "highest realisation" of a "new scheme of life". The act of using the senses to search for or, indeed, to create spiritual meaning is extremely important to Roman Catholic worship: from the burning of incense to transubstantiation during Communion, Catholic rituals attempt to access the soul through the senses and to unite them, or, in Lord Henry's words, "to cure the soul

by means of the senses, and the senses by means of the soul." During Mass, Dorian is stirred "as much by its superb rejection of the evidence of the senses as by the primitive simplicity of its elements and the eternal pathos of the human tragedy that it sought to symbolise." It is the experience of sensing itself that allows us to reach towards the sublime and the divine, in the hope of momentary transcendence, in both Catholic worship and the worship of Art; in both cases, the worshipper must reject the mundane, mortal world that they construct by means of the senses in order to access the immortal realm of spiritual and aesthetic fulfilment. As Peter Chadwick argues, both Decadence and spirituality "aimed to energise and free the human spirit for those weary with industrialisation": in order to be free, the spirit must be finely attuned to every sensation and emotion whilst separating itself, whether physically, like Des Esseintes in À Rebours, or spiritually, like Dorian, from the unemotional and numbing industrial modern world.

For Dorian, Catholicism is, of course, an aesthetic as well as a spiritual antidote to the "dim roar of London… like the bourdon note of a distant organ" and the "vulgar" realism of the nineteenth century that Basil Hallward laments as an "ideality that is void". The church provides an escape from the ugliness of industrial London: Dorian has a "subtle fascination" with the "jewelled lantern-shaped monstrance with that pallid water that at times, one would fain think, is indeed the 'panis caelestis', the bread of angels, … the fuming censers, that the grave boys, in their lace and scarlet, tossed into the air like great gilt flowers". By focusing on the materials and colours of the ceremony, Wilde treats it as Art: the censers, which he compares to "great gilt flowers", are fascinating and aesthetic not because they are like flowers, but, importantly, because those figurative flowers are gilded by human hands, turning them into works of Art, rather than simple, natural components of Life. Dorian's "special passion for ecclesiastical vestments, as indeed he had for everything connected with the service of the Church", is yet another example of him conflating Catholicism and Art. His vestments are decorated with religious scenes, such as "the coronation of the Virgin" and "the Passion and Crucifixion of Christ", but Wilde describes them mainly in terms of the beautiful images of nature which are wrought into the cloth, such as the "cope… of green velvet, embroidered with heart-shaped groups of acanthus-leaves, from which spread long-stemmed white blossoms, the details of which were picked out with silver thread and coloured crystals." Again, Dorian experiences Catholic objects with aesthetic pleasure, as they once more succeed in depicting the beautiful, enhanced, and undying vision of nature that only Art can successfully portray.

Catholicism, like Aestheticism, is a vision of a mystical, sacred world, where mortal humans can have contact with the spiritual and transcendent through ritual, and where everyday objects like statues, bread and bones become sacred through ceremony. In a review of À Rebours, Barbey d'Aurevilly echoed what he had said to Baudelaire after the publication of Les Fleurs du Mal, warning Huysmans that "it only remains for you to choose between the muzzle of a pistol and the foot of the cross." The two Decadents both chose Catholicism over martyrdom: it is the far more Decadent choice. After all, there is much more certainty of spiritual and aesthetic fulfilment knelt on a church's "cold marble pavement" than buried in a cold stone grave.

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