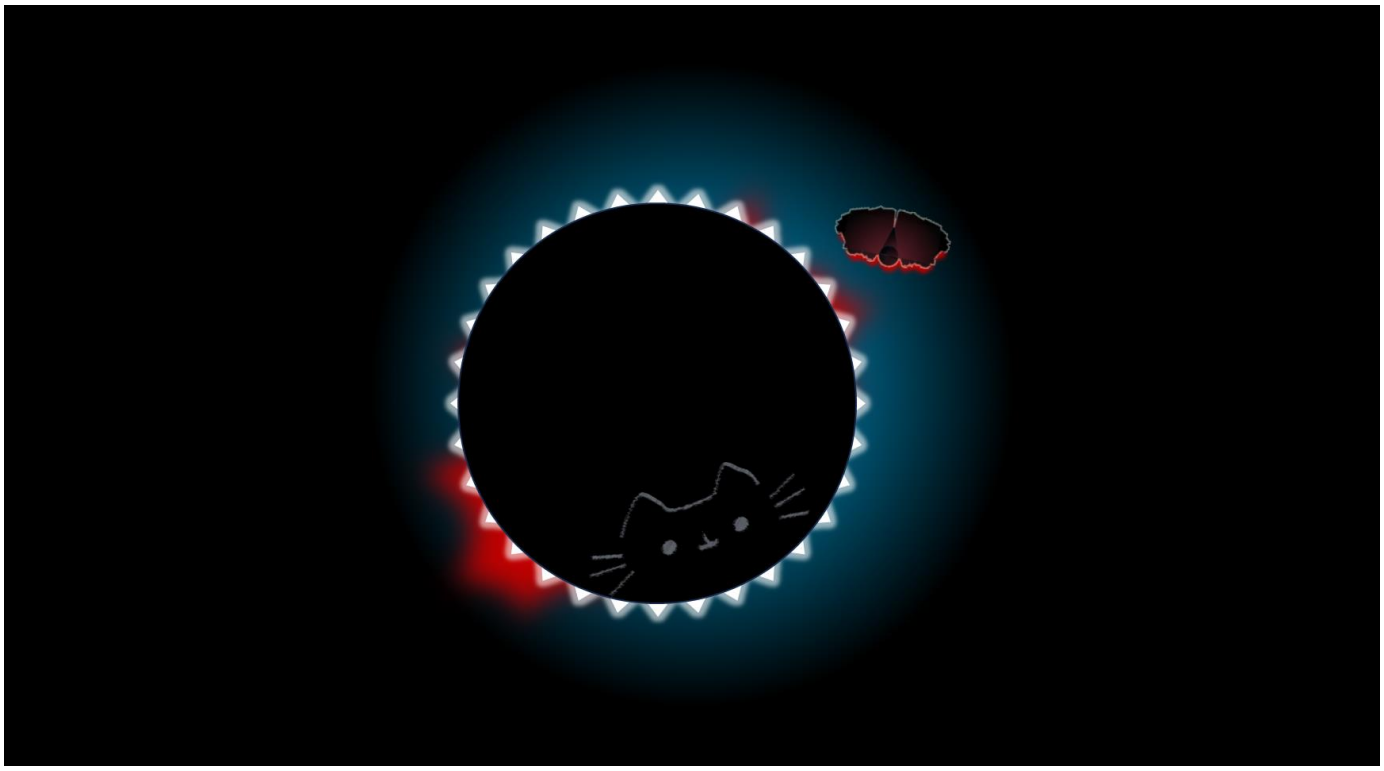
I & Vision Research Centre

Workplace Radiation and Ruby Prominences.
Plus Cats and a Sequence of Reichs.



Eclipse.

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Here we touch on eye health in the modern workplace and the upcoming solar eclipse. In the spirit of workplace eye wellness month and with due attention to the grievous perils of digital eye strain, we're taking a bit of a break from in-depth long-form articles. Breaks are great, you should too.

Workplace Eye Wellness Month

Every year, the organisation Prevent Blindness declares and prepares workplace eye health and safety materials for the month of March. For many industries including eyecare, it can be helpful to go through their list with employees to ensure no one is neglecting their own ocular wellbeing while attending to clients or patients. Despite advances in material science for transparent plastics and lab safety practice & equipment, chemicals and foreign matter in the eye still account for a large portion of workplace eye injuries, around 60% of approximately 18,500 every year in the United States (Hecker, 2024). That type of risk is something to keep in mind even for home kitchen tasks, where one may sensibly use gloves to cut chillis, then absent-mindedly rub the eyes with said hell-peppered gloves.

Even though global workplace eye injuries still amount in the millions every year, we're doing far better than the chemical safety standards of the 20th century. According to Michalovic (2008), this included pipetting by mouth, smoking around volatile solvents, bathing in hydrogen fluoride fumes, and hand-washing with benzene. Even earlier, in 14th Century Florence, dedicated artist Taddeo Gaddi became partially blind after observations of an eclipse, which

he used as inspiration to paint scenes of divine radiance (Pasachoff & Olson, 2014). Granted he probably had no idea what the risks were, similarly for mad hat-makers, Pierre and Marie Curie, and the watch-painting Radium Girls of WWI.

Radium Ladies: Trenches and Wristwatches

Oddly, we owe the norm of strapping time devices to our wrists to the nightmarish experience of trench warfare in the First World War. As Allied and Central Powers exploited terrible new weaponry and sought territorial gains, troops were soon bogged down in several years of stalemate at the frontlines, digging in and down.

Combat realities in the dark and dirt made the fashion of pocket watches impractical for millions of soldiers that had to load and fire rifles quickly. As such, the new 'wrist watches' with luminous numerals were what made it onto the Officer's kit list. Luminosity was another opportune innovation in this age of war before electricity. Special luminous paints derived from radium and polonium, initially for medical use, were repurposed for military ship compasses and aeroplane instruments. This was a huge boon to operating capabilities of combat equipment, and the paint glow took many years and miles of wear to fade. Luminous watches became must-have safety and tactical devices that allowed ground troops to synchronise and manoeuvre according to orders and battleplans, without using lights that gave away their position.

The technology was even adopted into vehicle-mounted X-ray machines for the frontlines by none other than Marie Curie, who was earlier awarded the Nobel prize for her discovery of the radioisotopes (Jorgensen, 2017). Groups of nurses were personally trained to operate the equipment and conduct examinations by Madam Curie and her daughter. It is believed that over a million soldiers benefited from healthcare by these X-ray women, some of who were affected by radiation burns (Ibid.).

Meanwhile, glowing wristwatches produced for the front allowed soldiers to keep time in scotopic conditions. In the factories of the United States the watch dials and numerals were carefully applied by the delicate hands and lip-pointed brushes of young girls, handling and ingesting the radioactive paint. Their good health which was an initial illusion of red blood cell stimulation deteriorated over the months and years, and their occupation was suspected to be the culprit. After years of medical tests and legal efforts, the girls were able to sue their employer in 1928, although this was more with a mind to protect workers of the future. Compensation was pitiful and most of them died soon after from horrific injuries. Although Marie Curie did pass away from an illness that can be associated with radiation exposure, she had never ingested any radium over her course of research or driving around European battle zones. Reportedly, no trace of it was found in her body during later examination (Jorgensen, 2017), although the notebooks and showcase spaces of her and her husband Pierre are classed as radioactive risks until this day.

The legal case of the Radium Girls set a new precedent, and ensured the laws for company responsibility towards employee safety that we have today. Just prior, the times were characterised by initial glorification of radium for health, longevity, and beauty applications, leading to terrible *personal* choices based on scientific enthusiasm and commercial marketing of tonics and topicals. This all changed as the formerly famous, shimmering, glowingly beautiful Radium Girls slowly succumbed to the poisoning, their bones disintegrating from replacement of calcium with radium. Bodily conditions can deteriorate to the extent that one's jaw is easily pulled off, and spines and teeth disintegrate.

There are some silver linings from these tragedies. Global publicity generated by the women's attempts to sue United States Radium Corporation, despite the latter waging a sophisticated disinformation campaign (Kovarik & Neuzil,

1996), did lead to significant general and professional awareness of risks. Shocking pictures and medical data volunteered by the affected women, and therefore heightened alert to the dangers, later fed into safety standards for the Manhattan Project, and of course new methods for glow-in-the-dark watch-making. On the other side of the Atlantic and for rival projects, several attempts of German forces in WWI and WWII to get their hands on radium resources for weapons research and other unpleasantries were repeatedly foiled by the Curies (Kean, 2019). It is possibly a small one amongst several reasons that nuclear power as a Nazi military endeavour was all but given up on by 1942.

Knowledge and safety standards have changed a lot in traditional work environments like labs, manufacturing, and construction, but we also have new ocular hazards to contend with as more activities and occupations digitalise. As one academic phrased it, radium was the iPhone of the age, and we're uncovering several unpleasant truths about our digital devices now. They're not ionising radiation like the phototoxic bands ranging from UV to solar inferno, but there is still light-mediated as well as biological clock (and sometimes emotional) damage.

Computer Vision Syndrome (CVS) & Digital Eye Strain

For modern labour forces, training employees to habitually take breaks from work and entertainment screens can make a big difference to eye health, especially CVS and digital eye strain, and their interactions with dry eye disease. The latter can be quite debilitating, and from a pragmatic employer's perspective could lead to productivity and work day losses if not managed. Eye strain and dry eye are easier to treat if environmental risks are mitigated and intervention by an eyecare professional comes early.

One of the more peculiar recommendations in the International Labor Organization's (ILO) document 'Eye health and the world of work' (ILO, 2023, page 17) is to replace incandescent bulbs with light-emitting diodes, despite rising evidence that the blue-rich spectral composition of the latter may be significantly impacting circadian rhythm and ocular health (Ibid., p. 35). As far as blue light risk, attention is typically focused on that emitted from device screens as opposed to interior and urban design choices (e.g. in Hecker, 2024).

Of course, work spaces are amongst several zones that people interact with. Attending to environmental hazards and protective habits in our homes, at leisure, and when out and about can greatly influence ocular comfort and disease risk. There are a few simple ways to do that when it comes to computer vision syndrome and eye strain.

It should be noted that overuse of digital technologies doesn't just affect our eyes, but also our necks, backs, and brains in the sense of sleep and even psychiatric disorders (Guo et al., 2020). On the other hand, it has been found that use of smartphones and the internet are stress management tactics for many individuals, and there is room to keep capitalising on modern benefits of our devices while mitigating the negative consequences for our minds and bodies (See Stankovic et al., 2021). The easiest way is cultivation of good viewing and movement habits.

50.8 – Move About – 20 – 20 – 609.6

The prevailing advisory known as the 20-20-20 rule is alas, based on the imperial system. It states that every twenty minutes, one should take a twenty second break to gaze at least twenty feet away, which converts to 609.6 cm, or a 20 – 20 – 609.6 rule in metric. Using the latter might actually make for a better jingle.

Other aspects of ergonomics include setting up a computer screen to be at least 20 inches away (50.8 cm) and below eye level, with suggestions to avoid contemporary 'static' working habits that contribute to eye strain as well as upper body scrunching and tension (ILO, 2023). Increasing the contrast on computer screens is another way to ease ocular workload.

That's not the only protocol around, though. One variation suggests 30 minutes of distant, unfocused horizon-gazing for every 90 minutes of work, outside or through an *open* window for a full dose of sunlight. Healthy and strong back muscles for posture, jaw relaxation, as well as tracking distant moving objects are more small ways to improve a lifestyle characterised by lots of sitting and close-up viewing.

Some of the measures may not be what employers want to permit, for example greater employee agency in configuring office spaces. To start with, everyone in or having easy access to fresh air and unfiltered sunlight may not be possible. If given easy instructions as to eyecare optimals, ergonomics would involve some ability of employees to adjust their work light levels and position as well as visual display terminal properties, distance, angle, and position. Low ambient humidity for things like mold-control and central cooling and heating policies are other contributors to dry eye and computer vision syndrome, but cannot be changed by workers (See Pavel et al., 2023).

However, at the employee level, keeping accurate prescriptions for refractive errors to reduce risk of CVS are definitely within their control. Blinking is too. Interestingly, smartphones have been associated with the highest severity of CVS in medical students in a 2021 study and dry eye in children, so controlling these diseases goes beyond the work environment, requiring informed self-regulation and healthy choices.

There are hundreds of infographics that can be printed as posters, but some degree of understanding, grasping the main principles of how to keep our eyes and bodies healthy, is preferable to blindly following rules. It could be beneficial to organise corporate eyecare appointments or a consultation event with an eyecare professional that is a good communicator. There is a lot of opportunity for creativity in terms of workplace and medical infographics as well. Consider how the bland and earnest motivational posters of offices past were (and frankly should be for employee protection) morphed into early memes, the Demotivators. Crafted by Despair, Inc. starting 1998, these are still popular today. More food for thought: According to data from organisational psychlogy, motivational posters are kind of deliberately invisible, as in not perceived consciously. They simply prime an unwary audience for certain behaviours without serving as much of a rally point or distraction. So is the style really suitable for deliberate actions and habit cultivation?

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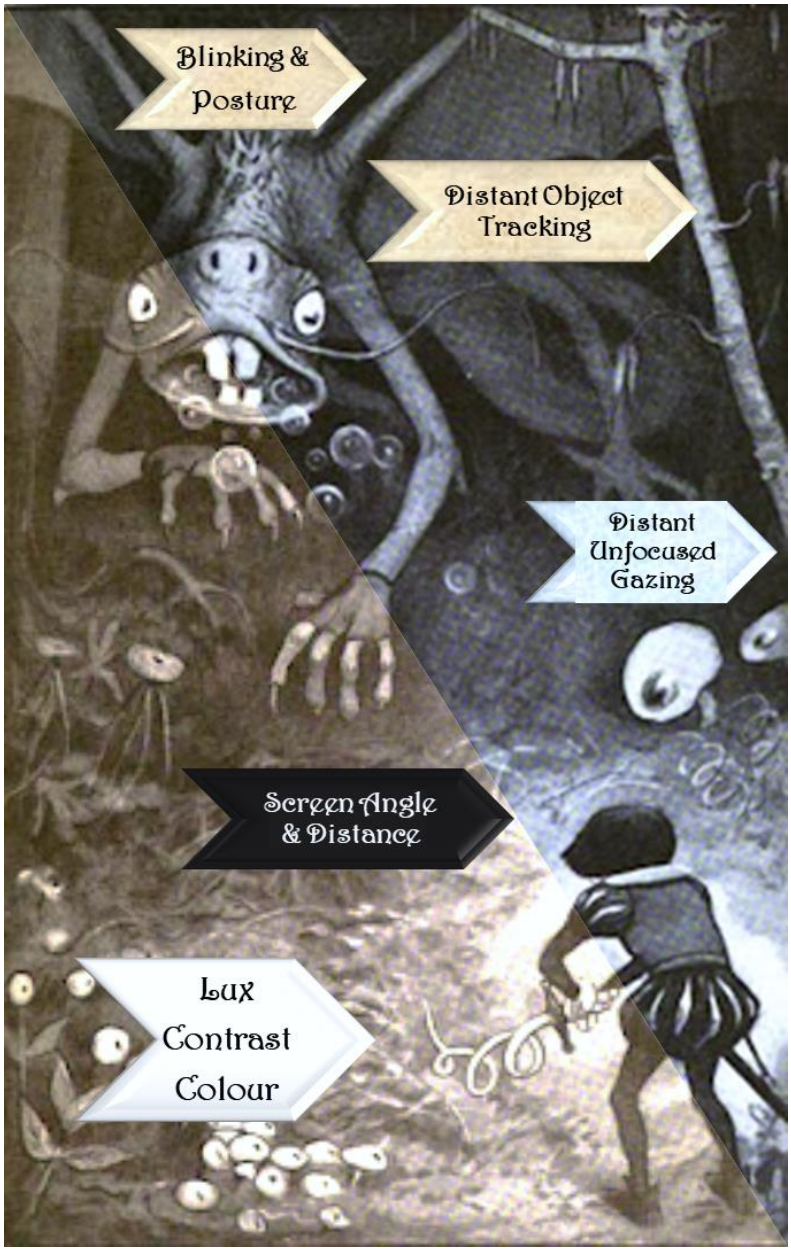
A poster published in 1971, of Sammy the Siamese Cat dangling deperately off a bamboo pole, with 'Hang in there, baby' beneath his little kitten feet was relatable, funny, cute, and comforting (See Purtill, 2018). Nowadays, any office is able to use a host of internationally accessible technologies to create some eye wellness posters with fun pics their for personal use, or share them in internal social spaces. Hiring an artist from anywhere in the world to create a custom piece would cost around $20, plus a bit extra for a quality print. No guarantees as to humour, so you'll have to manage that in-house.



Public Domain: Jabberwocky, illustrated by Peter Newell in 'Through the Looking Glass' by Lewis Carroll (1902) [Edited]

Now you know some tactics like consistently staring far away, at features near the horizon, unfocused, in many directions, or tracking the path of a distant bird, being sure not to crinkle your thoracic and cervical spine (See Bruhl et al., 2023) like a dying cockroach. Instead of posters or the outdoors, you may even opt for gazing responsibly at distant celestial bodies to give near-focus muscles a bit of a break.

8th April Solar Eclipse

Aside from lots of computer work, do you know what else is harmful for your eyes? Staring at the sun during an eclipse. Apparently people still do that. So if you're in North America on the 8th of April, and unless you're 100% sure you're 100% in the 100% solar obscuration zone, you'll need to wear special eye protection and use solar filters for photographic equipment as well. Even if you're in the sweet spot, make sure to remove your glasses for the 'totality' period only, which will last from 1 – 4 minutes depending on your location.

The 'path of totality' for this solar eclipse extends from Mexico to Canada. You can read about the special beauty of viewing a total eclipse event here, and if you're unwilling or unable to physically watch this one, there are going to be plenty of high resolution pictures and trackers available online.

Art for Science

Before we had sophisticated eclipse photography, we had paint. When scientists realised the value of eclipses for studying the sun, it became important to find a way to document observations for rigorous study, a task that technologies of the 1900s, around the time of WWI, were not fit for. Colour photography had been invented, but could not capture important nuances in the shade and brightness of the corona. So, in 1918, an artist was invited to hop over to the East Coast with a team of astronomers and accurately record what he saw. After brief training in professional eclipse-viewing, Howard Russell Butler used a firsthand view and rapid shorthand notes to paint the very first accurate image of a solar eclipse.

In 1923, he documented an even more spectacular eclipse event where the sun peaked over the craggy surface of some lunar mountains, yielding a brilliant circular burst known as Baily's beads, or the diamond ring effect. This threw into sharp relief Galileo's early telescopic observations that the moon was not merely a smooth, perfect circle in the sky, but a lumpy, somewhat oblong oval agglomeration that was once perhaps part of 'us'. The lumpiness is what gives the analogy of cheese, and pareidolia-precipitated myths of an enormous rabbit on the moon.

Another sighting in 1925 completed the eclipse triptych, which meant that Butler's 1932 eclipse has had significantly fewer eyes on it. It seems nobody likes a quadriptych. Nevertheless, in 2017 Princeton University Art Museum featured a special collection of all eclipse-related artworks by Howard Russell Butler and a few other artists from around the world. Several more examples of the eclipse in art are listed in Pasachoff & Olson (2014), intersecting with religious works that are also often presented in triptych formats. Unfortunately, none were found depicting the story of the old man gathering firewood on Sabbath, who was punished by being curse-blasted off the planet. Cue *Mare Nubium* surprised face.

Other stories insist that the moon is where Cain was banished, while more recent tales like *Iron Sky* keep its dark side as a space base for the Fourth Reich. It's not that much of a stretch, since scientists from Nazi Germany were responsible for much of the technology used in the lunar landings as well as nuclear weapons.

Cosmic spectacles and novel technologies are similarly inspiring. According to NobelPrize.org, we have nuclear weapons to thank for modern art in the West, while in Japan the bombing of Hiroshima and Nagasaki shifted the cultural array of myths, monsters, apocalypse, and media styles (Holborn, 1983). It also precipitated a significant lifestyle shift into electronics and online spaces for many young Japanese. They in turn have been partially blamed for the phenomenon of internet cats (White, 2020), a key feature of past and present cyberia.

We have not always been so focused on observational data or accuracy. Our long history of art, eclipses and otherwise, is typically symbolic and instrumental, to generate an emotion or way of thinking in the observer, or simply to depict when one is at a loss for words. But what happens if the artist has words, but has never seen a tiger or a giraffe?

Cat as Art & Cryptic Beasties

Now for some restorative levity. Use of computers and devices has come with mass consumption and dissemination of feline-associated materials. According to Bustillos (2016), this is due to their nature as walking contradictions: Poise & panic, sublime & ridiculous, beauty and disaster, we have accorded cats the honour of internet domination. All hail the Nyan, Maru, Pusheen, and Hosico.

There is a deep lore to the internet's cat conquering. If you're interested, Stanford University Press has published a book about it: *A Unified Theory of Cats on the Internet* (White, 2020). Kitties are described as instruments of 'semiotic guerrilla warfare', and as symbols of 'pathos, anger, and alienation' and 'pointless online sociability'. Suffice to say in the context of mental strain and CVS, cat videos seems to be a major way the modern workforce bonds and mentally recuperates from human existence. In some instances like #BrusselsLockdown (2015), they have even been used to fight terrorism. We also like badly drawn cats, because that is almost more amusing and quite the medieval throwback.

WWII examples of photo-unrealistic style are the paintings of Morris Hirshfield, including the 'strangely compelling' Angora Cat, chanced upon by curator Sidney Janis and now nestled safely in the Museum of Modern Art (MoMA). Hirshfield's animal works are *almost* surrealist, anatomically clumsy, and became eclectically but not wildly popular like his former work designing women's boudoir slippers (Stanska, 2024). Like Marie Curie, he was born in Poland and had a complicated relationship with the press, his early shows and works quite controversial. However, as one critic put it, it didn't matter that things were unintentionally drawn terribly (which is probably why they're so charming) it was that he 'made a new world; a bold, revolutionary, colorful world of unsophisticated perspective and curiously shaped inhabitants,' (In Chernick, 2022). More museums have been featuring his paintings in recent years after decades of obscurity, as part of cultural heritage and more vivid stylistic trends. Another reason for the resurgence of absurdity like Hirshfield's cat art is the need to break out of our hyper-technological and hyper-achieving realities. Lo, perchance a renaissance of medieval art and meme has begun.

Consider the creepy little lion on the Visconti-Sforza tarot card for strength (but remember, sinners could get blasted to the moon), or even better, a medieval bestiary. Bestiaries were meant to educate in a couple of different ways. Based on historic texts, Aesop's fables, and Christian tradition, these books used animal drawings based on a large degree of interpretative and artistic liberty to teach natural and moral lessons (Stanska, 2023A). For example, the Uranoscopus was a fish with a lone eye atop its head, for single-minded sight and focus on the divine. As nobody had travelled much and Instagram wasn't on the table, both real and entirely fantastical beasts made it onto the pages.

Very consistently but without documented reasons, lion scribblings of this era are particularly hideous. It could be hypothesised that this is due to them being born dead (Morrison & Grollemond, 2020).

According to Stanska (2023B), a type of page margin doodle called 'drolleries' served the same purpose in the 13th to 15th century that memes and animal fails do now: crafting a 'culture of laughter' in an attempt to make the regular world more bearable. These prominently featured savage rabbits (no relation to the lunar one) while classical maps would showcase an array of sea monsters built upon the descriptions of sailors. If you are lacking in adequate cat pics for your workplace posters, the Smithsonian's ocean division offers a few cryptid options. Could the office do with a precautionary polypus poster, because digital eye strain can sink corporate ships? No? A sea pig to beware medical misinformation? Or if you go the literary route, a hanging banner about keeping a sharp eye out for the Jubjub bird? You do you.

Conclusion

When we think about computer vision syndrome or digital eye strain, there's a tendency to reduce it to a physical affliction, like a cut, bruise, or sprained ankle. However, these diseases occur largely because we're using a pre-electricity body: its cells, muscles, and all such adaptive arrangements, to navigate newfangled rectangular socioeconomic realities. This doesn't just overuse the very few muscles and tissues involved, but leads to an imbalance in overall mental and physical function as human activity is nudged further and further into digital territories.

To reiterate for the ironically online reader's benefit, it would be great to take more breaks from digital devices and spaces, mitigating harm as well as controlling the tendency towards dependency. After all, although plenty of people have been asking lately, 'What happens when the machines take over', from artificial intelligence to lethal autonomous weapons systems, has anyone asked recently, in light of our trying and uncertain times, 'What happens when the machines stop'?

Think about it, and in the short-term make sure you're considerate towards your eyes at work *and* while watching cat videos.

Disclaimer: *The material presented is for informational and entertainment purposes only, in summary of recent news and events. It neither reflects the views nor constitutes professional advice of the organisation. The major sources used are referenced below.*

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