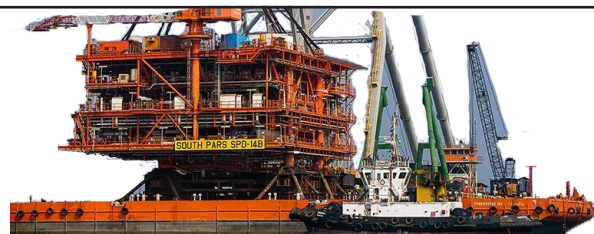


Felix



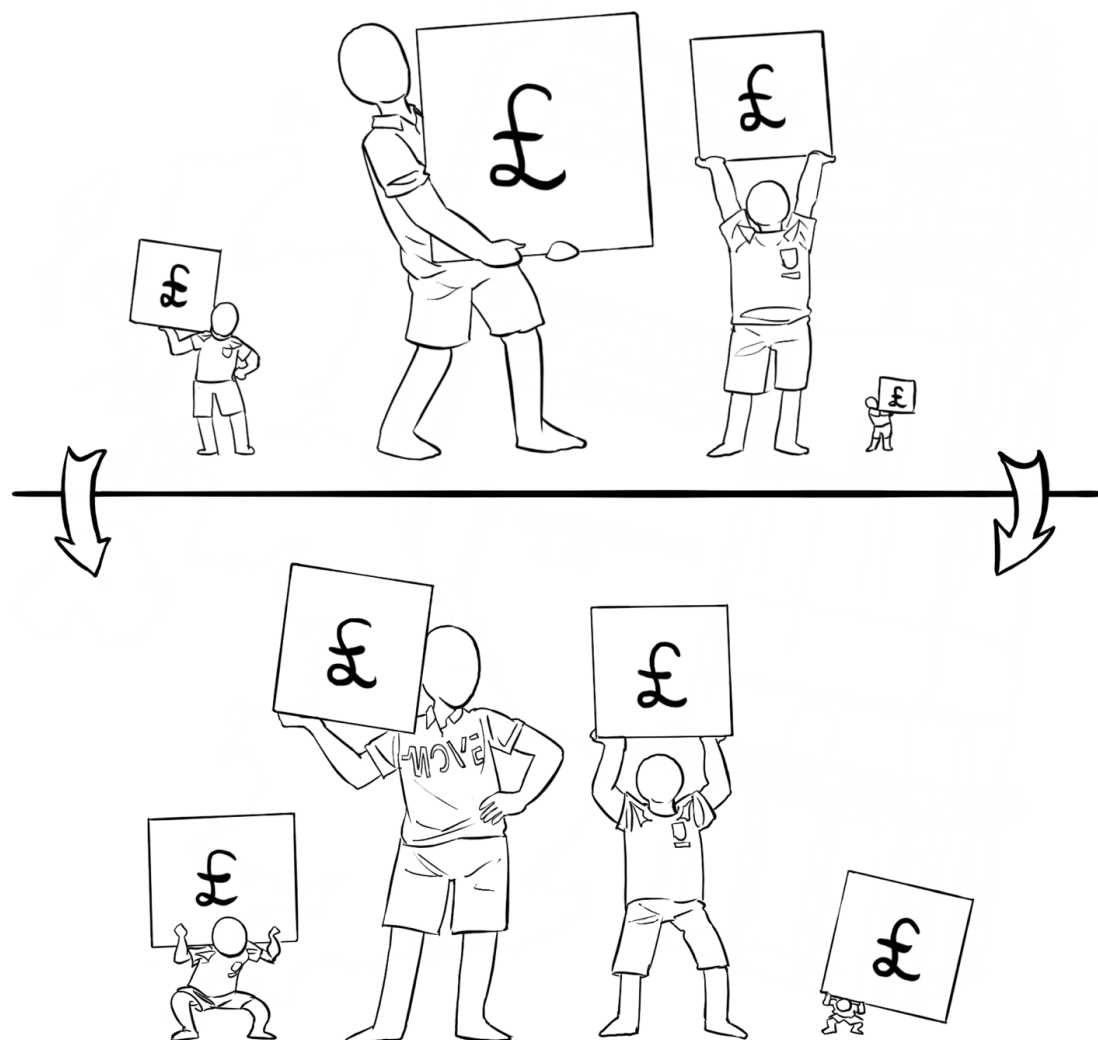
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ISSUE 1803

FRIDAY 10TH JUNE 2022

# Imperial Athletes shake-up may return power to clubs



**Sam Lovatt** Editor-in-Chief

Imperial Athletes (IA), the controversial sports management model introduced less than two years ago, will undergo a huge shake up intended to “give financial power back to the clubs”.

Draft proposals for the new model seen by Felix suggest that IA will be “significantly reduced”, and that IA membership fees will go entirely to Move Imperial to facilitate cross-sport events. It was stressed that these proposals are still in the draft stages and are subject to change.

Having paid the reduced IA fee, clubs will be free to set their own membership costs and 100% of this money will remain with the club. Clubs will also be able to structure their memberships as they see fit. This may include a tiered membership with higher fees for greater support from the club and Move Imperial.

Imperial College Union and Move Imperial will provide suggested categories of spending to clubs, though these only need to be followed at each individual club’s discretion. Many clubs will be able to entirely opt out of certain categories all together.

In the previous model, clubs with greater costs, for example due to transport to the Harlington training ground, paid the same fees as every other club in their membership tier, and the transport cost was paid for out of these membership fees. This has been raised as an issue of contention to Felix in the past as it effectively meant that clubs that had cheaper running costs were subsidising clubs with greater running costs. In the new model, clubs will all pay a basic, cheaper Move Imperial membership fee (suspected to be £5-£10 at the moment),

## Sustainable aviation institute backed by £25 million donation

**Sam Lovatt** Editor-in-Chief

Imperial College will set up an aviation institute, with the goal of helping the aviation industry reach its net zero goals. The institute is backed by a £25 million donation from alumnus Brahmal Vasudevan, who also donated the infamous ALERT statue set to be installed on the South Kensington campus this autumn (it was originally scheduled for this summer, the source

of the delay remains unclear). The £25 million donation is one of the largest in the College’s history.

The Brahmal Vasudevan Institute for Sustainable Aviation will look at all aspects of air travel, including fuel source, aircraft design and airport infrastructure.

“Moving towards zero pollution is a mammoth task and aviation, in particular, is a complicated sector to decarbonise.” said Vasudevan. Vasudevan

is an alumnus of the Aeronautical Engineering department at Imperial and current CEO and founder of the private equity firm Creador. His wife, who is also a benefactor of the donation, is Shanthi Kandiah, founder of legal firm SK Chambers.

The institute will be cross-faculty, engaging the expertise of many scientists and researchers from many different

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# EDITORIAL

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# Imperial measurements

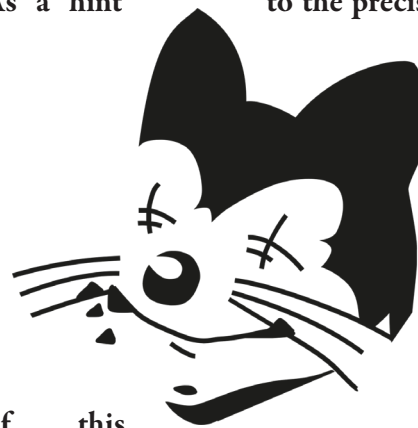
What's the latest in the Tories' "Global Britain" stance, where the UK throws off the shackles of the EU and expands its networks of trade to the far reaches of the globe? Why, to revert to using a measurement system that almost no one else in the world uses, of course. In a frankly embarrassing last attempt to throw red meat that will keep backbenchers on side, the Department for Business, Energy and Industrial Strategy announced last week that it was launching a 12-week consultation on removing the necessity for businesses to list the metric weight of goods when selling them, instead encouraging a reversion to pounds and ounces. Currently, it is completely fine for businesses to list the weight of goods in imperial measurements, as long as the metric weight is also listed.

I imagine this comes across as more egregious to scientists than the general population, but the use of metric units is incredibly convenient and useful. The metric system is a precursor to SI units, or International Standard units, which as the name would suggest are used internationally. Furthermore, the units can all be linked to universal fundamental constants, such as the speed of light in a vacuum, meaning they are universally applicable.

At the risk of telling readers how to suck eggs, let's go over the basic units of both the metric and imperial systems and see how they relate to each other. The basic unit of length is a meter, or the distance that light travels in  $1/299,792,458^{\text{th}}$  of a second in a vacuum. A  $100^{\text{th}}$  of this is a *centimeter*. A  $1,000^{\text{th}}$  of a meter is a *millimeter*. Going up, 1,000 meters is a *kilometer*. The standard unit of mass is a kilogram, 1,000 times more massive than a gram. 1,000 kilograms gives you what is colloquially called a ton, however this can be referred to in SI units as a megagram. Every

conversion between measures on both of these scales is done by a factor of 10.

The Imperial system, meanwhile, could be described as less robust. Whilst there's no recorded "standard" that can be recalculated using fundamentals, the most common lengths used are feet and miles. As a hint to the precision



of this system, a furlong was originally defined as the distance that an ox could plough before it had to rest.

A foot is 12 inches, and a system that worked entirely in base 12 wouldn't necessarily be any less useful than the base 10 metric system. However, the inch is made up of three 'barleycorns'. Dipping its toes into the base 10 pool, the imperial system defines a 'thou' as  $1/1,000^{\text{th}}$  of an inch. Now I bet we're all thinking the same thing. How the hell are we going to refer to the every day length of  $1/17,280^{\text{th}}$  of a foot? Not to worry, the Imperial system's 'twip' has you covered. Going beyond a foot, we find that a yard is three feet. Next up there's the 'chain', at 22 yards long. Back in base 10, a 'furlong' is 10 chains, eight 'furlongs' make up a 'mile' and three 'miles' constitute a 'league'.

Weights use the base measurement of a pound. An 'ounce' is  $1/16^{\text{th}}$  of a 'pound', and a 'dram' is  $1/16^{\text{th}}$  of an 'ounce'. Sensible so far, but the 'grain' bucks the trend, equal to  $1/7,000^{\text{th}}$  of a 'pound'. Increasing in weight, a 'stone'

is  $14$  (not  $16$ ) 'pounds', a 'quarter' is two 'stones', a measurement literally called a 'HUNDREDWEIGHT' is equal to 112 'pounds', and a ton is 2,240 pounds. A brief flirtation with Newton's Second Law defines the 'slug', which is a mass that accelerates by  $1 \text{ ft/s}^2$  when a force of one pound is exerted on it.

Dare we start touting the speed of light as 161875.9 nautical units per second, which, rather than being linked to the universally constant speed of light in a vacuum, is instead linked to the Admiralty Knot, or the nice, round, easy to remember 6,080 feet per hour?

I'm aware that I've made somewhat of a straw man out of the suggestion to start selling fruit and veg by the pound rather than the kilogram, but the global commonality brought about by the metric system is genuinely something utopian that I think should be protected. In 1999, the Mars Climate Orbiter began entering the orbit of the red planet at the climax of a \$500,000 million (today's money) mission, but the probe came too close to the surface and communication was lost, assumedly because it had burnt up. The reason for this, it was later discovered, was that whilst NASA had been working with the metric system, the builder of the craft, Lockheed Martin, had been using US imperial units.

The current mix of imperial and metric units used in Britain today is harmless, and most importantly people are used to them. Whether a road sign is written in miles or kilometres is irrelevant to the construction of the Shard, where units matter a great deal. Pint glasses provide a nice volume of beer to drink, but under no circumstance should be used in titrations.

Let's hope this Imperial drive is just a Jubilee week fad, and nothing more.



*...continued from page 1*

### *Imperial Athletes*

and then charge additional membership fees on top, according to the needs of their members.

The categories of spending suggested by Imperial College Union and Move Imperial fall into several sub-categories:

Category 1a is the cheapest option and consists solely of individual members paying for Move Imperial association. This covers affiliations, events and awards, meaning that the individual has the ability to purchase tickets to sports awards, Varsity (if applicable) and other relevant events. Move Imperial will subsidise further events. Category 1b consists of payment for, and organisation of, coaches to the

Harlington training ground. This will be paid by a club membership additional to standard IA membership, paid by individual club members to the Union, who in turn will transfer the money to Move Imperial to be managed.

Spending on top of this has previously sat within the remit of Move Imperial, who managed the money of sports clubs and allocated spending in areas such as kit acquisition as they saw fit. The new model will return this power to clubs, though the club can still allocate money to Move Imperial to manage certain things, should they choose to. Kit acquisition, training, travel and competition fees can be managed by Move Imperial, though purchases must be approved by the club and will be paid for using the club's money, rather than a wider Move Imperial funding pot. These

expenses can be paid for using SGI, grant and sponsorship funding.

The club will also be free to spend these forms of money as it wants. Events, training and kit purchasing can be organised through the CSP and management group, subject to spending approval through eActivities, as with non-sport CSPs. This gives clubs near complete autonomy over the prices they charge for membership, what members pay for on an individual basis and the generation and expenditure of self generated income.

Issues not addressed in the new model include problems in the acquisition of kit, which have been rife over the last two years according to multiple sport clubs.

A hockey team this year were delivered 15 sets of kit, the one less than the number in a team with no spares or kit for subs. This meant that players did not have their own individual kits and placed a large burden on the team captain, who had to personally wash every kit and bring them to each match.

India Marsden, DPCS, said of the changes "With the clear mandate set by Union Council to give students full autonomy running the clubs, we hope that this change to the model will realise this by giving the financial and managerial power back to the clubs"

## Union Council cancelled

The meeting of Imperial College Union council, scheduled to take place on June 7<sup>th</sup>, was cancelled just a few minutes past the deadline for papers to be submitted last week, due to a lack of motions submitted.

The shock cancellation has divided community opinion. Some say that the lack of submitted motions is down to apathy from the student body, and that many no longer care about the democracy that governs the Union. Others propound that the lack of papers is the inevitable consequence of the Union having reached utopia, where everything is now as it should be, and that there are no worldly events completely unrelated to Imperial College that the Union should take a stance on.

The next council will take place on June 28<sup>th</sup>, where the final reports of the Constituent Union Presidents and the \*cough\* Felix Editor will be assessed and graded.

*...continued from page 1*

### *Sustainable aviation*

faculties across the College. Vasudevan said "Shanthi and I believe that there is no better institution in the world to drive pioneering work in this field, and we are delighted to support Imperial's efforts".

President Alice Gast said "We are deeply grateful to Brahmam and Shanthi for their generosity and vision. They have provided us with an unprecedented opportunity to take on one of the greatest challenges in the fight against climate change".

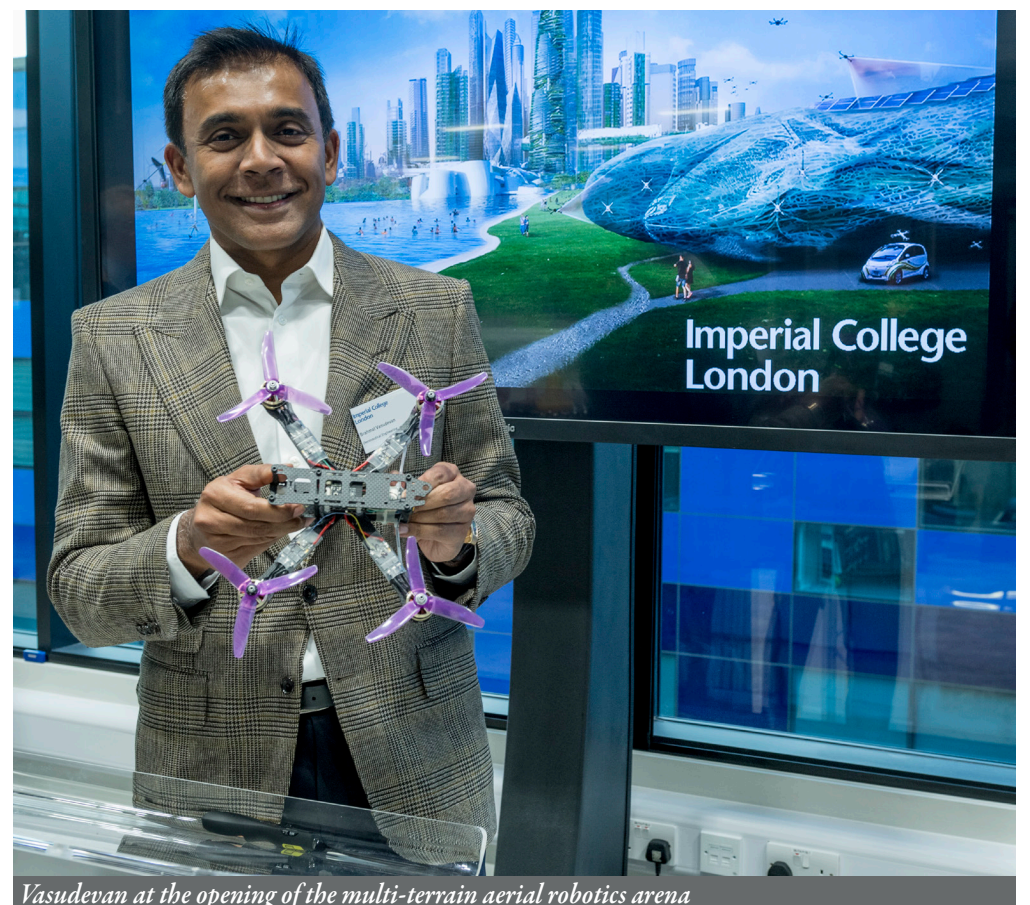
Air travel companies are coming under increasing pressure from the public and governments to reach net zero in emissions, at the latest by 2050. Last year the aviation giant Airbus announced it was confident in developing a hydrogen-powered plane by 2035, but that more

support from government was currently needed.

In 2021 the Department for Transport published a consultation entitled the 'Sustainable aviation fuels mandate', highlighting that a mix of hydrogen, electric and sustainably fuelled aircraft were likely to play a part in the future of net zero aviation. Particularly, it highlighted that long-haul flights would be particularly difficult to power using non-fuel means, such as hydrogen and electricity.

In March it was announced that the Aerospace Technology Institute had been granted £685 million from the government over the next three years to fund innovation research in partnerships with the private sector.

Aviation accounts for 2.5% of global CO2 emissions and 3.5% of total global warming, according to ourworldindata.org.



Vasudevan at the opening of the multi-terrain aerial robotics arena

# The rarest cancer in the world?

► *The only known case of cancer caused by a foreign organism, instead of the body's own cells*

Wang Guo Staff Writer

In Colombia, 2013, a 41-year-old presented at the hospital with fever, cough and weight loss for several months. He was diagnosed with Human Immunodeficiency Virus (HIV) in 2006 but did not follow properly the anti-viral therapy. Doctors carried out biopsies of the lungs and lymph nodes of the patient and observed aggregations of cells, proliferating quickly, an alarm sign of malignant cells... cancer. Unexpectedly though, the cells were observed to be smaller than human cells. Thus, doctors sent the images to the Centers for Disease Control and Prevention. Further studies revealed that a parasitic tapeworm *Hymenolepis nana* had contracted cancer inside the patient, which caused him also to have cancer. It was these cancerous cells that were slowly killing the patient. How did this happen?

HIV is a virus that infects and kills CD4 T cells, which are immune cells essential to activate the immune response against pathogens. Untreated, HIV can result in Acquired Immunodeficiency Syndrome (AIDS), when the count of CD4 T-cells in blood is below 200 cells per cubic millimetre. In the case of the Colombian patient, his CD4 T-cell count was 28 per cubic millimetre. He was in a critical health situation. AIDS had significantly weakened his immune system, increasing his risk of contracting

opportunistic infections.

AIDS allowed the parasitic tapeworm *Hymenolepis nana* (*H. nana*) to thrive and proliferate in his gut. Around 75 million people worldwide carry of *H. nana* in their guts. In some developing regions of the world, as many as one in four children have this parasite. *H. nana* is contracted by ingesting faeces from infected humans, rats or beetles through, for example, contaminated food or dirty hands. The infection is generally asymptomatic but can cause serious complications in people with weakened immune systems, such as HIV patients or steroid consumers. This is because their immune systems cannot eliminate the parasite effectively. In addition, *H. nana* can remain in the gut for years, waiting for its moment – hence why it is considered an opportunistic parasite.

After the double infection with both HIV and *H. nana*, several aggregations of abundant, highly compacted cells started appearing in different parts of the patient's body. These cells were undifferentiated – they had yet to develop into a particular variant – and divided very quickly. Both of these characteristics are signs of cancer. However, tests for human cytokeratin and vimentin, biomarkers of cancer, returned negative results. The cells could not be of human origin. The abnormal cells fused frequently, forming multi-nucleated cells. This elicited the hypothesis that the response was an amoeba, since amoeba tend to fuse with

one another. However, by mid-2013, sequencing techniques had shown that the DNA of the abnormal cells belonged to *H. nana*. Unfortunately, the patient died only 72 hours after this revelation. It had taken the researchers months to establish the origin of the cells.

The main reason for the delay in diagnosis of infection by *H. nana* was that the abnormal cells were considered too 'primitive' to be associated with worms. Cases of infection and proliferation of parasitic worms in humans are well studied, but typically the worms have recognisable and specialised tissue. *H. nana* developed cancer inside the patient through neoplasia, rapid, abnormal growth of cells within the body. Neoplasia has been documented in many species of invertebrates, but never before in multicellular parasites like *H. nana*.

Why did *H. nana* develop cancer? Because of the indirect action of HIV. This virus debilitated the immune system, which could no longer control and eliminate the population of *H. nana*. Consequently, *H. nana* was able to multiply exponentially. With an increasing rate of multiplication came an increase in the rate of DNA replication and cellular division. DNA replication is not perfect – there is always an error rate associated with it.

The increase in the number of replications increased the number of these errors. There was therefore an increase in the number of DNA mutations, which in turn led the tapeworm to develop cancer.

The unfortunate patient's luck could not be worse. The probability of being infected with HIV is 0.04% through unprotected sex, which

Photo credit: Centers for Disease Control and Prevention, Public Domain



is the most common method of HIV transmission. *H. nana* affects 75 million people worldwide and the global population is 8 billion people. Therefore, approximately 0.01% of the global population has *H. nana*. The probability of *H. nana* contracting cancer is rarer still!

There is no other such cases like this – making it potentially the rarest cancer in the world. It could be argued that the cancer was developed by the worms and not the patient. However, the patient died specifically because of the cancerous cells of the worms - not due to the worms themselves. The cancerous cells formed in undifferentiated aggregations and duplicated rampantly, consuming the resources of the body and asphyxiating surrounding functional cells, exactly as expected from normal cancer development.

In summary, the rarest cancer in the world is a tapeworm that contracted cancer in the body of a patient with AIDS and caused him also to have cancer.



# How to secure your digital life

► *Marc Richly concludes his three-part series on encryption with a final piece on securing your data*

**Marc Richly** Tech Writer

Want to secure your the data in your daily life? Here is the long-awaited guide!

## Messaging

Most of our communication nowadays happens via messaging apps, first and foremost WhatsApp (WA). These apps offer different level of security.

WhatsApp secures content data (i.e., the message itself), but shares meta data with other Facebook companies to enhance their services (limited in EU by GDPR).

A good alternative is Signal. Signal is owned by the non-profit Signal Foundation, which is heavily backed by WhatsApp co-founder Brian Acton. Alongside E2EE, Signal implements the zero-knowledge encryption (ZKE), reducing meta data to the bare minimum.

There are also other apps that have E2EE but are simply not that widely used and hence not recommended in this article; a messaging app is only attractive when others use it too.

This leads to the biggest problem with switching to alternative messaging apps: many of your friends may not be reachable on them.

If you can move your frequent communication (for example, with your close

est friends and family) from data-hungry apps such as WA and Telegram to alternatives such as Signal (see table below), you can significantly improve the security of your digital life. Organisations like Meta (owner of Facebook and WhatsApp) will no longer have the same access to the meta data from your personal communications.

## Email

Most email providers such as Google and Outlook have implemented transport encryption as a standard. Nonetheless, Google, Outlook and other such providers can still read your messages (implying emails are in general less secure than say, WhatsApp).

Type	Encryption	Info
S/MIME	E2EE	Company standard for encryption, usually connected to minimal costs to run certificates. Both – sender and recipient - need to install SMIM certificates.
PGP	E2EE	Free version for private users. Both – sender and recipient - need to install PGP certificates.
Dracoon	Transport of files; compiles with GDPR, E2EE	Good alternative to encrypt files E2E. Open source. Nonetheless, you must trust the third party as any further tool in a chain is also a potential risk.

Encryption services for email and attachments

There are two standards for E2E encryption of emails – S/MIME and PGP. The problem with these is that both – sender and recipient – need to install certificates first before one can start exchanging encrypted emails.

A good compromise is to encrypt at least email attachments with services

such as Dracoon (dracoon.com). Here, instead of attaching a file to an email, you share a link. This is not only more secure, but also a great solution for larger files. You get up to 10GB of free cloud storage – and this can be E2E encrypted.

If you want to add S/MIME to your College email address, please get in touch with the ICT Service Desk or Google for S/MIME Imperial College.

## Cloud

OneDrive, Dropbox, Google Drive are all similar in data security. Due to their scale, data on these platforms are generally well-protected against hackers

little research you can find cloud options you feel comfortable with and that you trust.

## Hard drive

Losing your laptop or having it stolen can mean that your data is not only lost, but also that strangers might have access to it. Windows and Mac both offer system integrated encryption of data that in general offers a good level of protection.

If you want to go for an open-source option with advanced encryption methods, VeraCrypt (a software from 2013) is a popular standard. This especially makes sense for data you do not access daily (such as pictures).

Hope you liked the guide! Please let me know if you adopted some of the ideas (mar21@ic.ac.uk)! If you are more interested in securing your digital lives, here are two links: [privacyguides.org](http://privacyguides.org) and [techlore.tech](http://techlore.tech)

*Neither the author nor Felix receive any income for any of the recommendations in this text. All opinions and recommendations expressed in the article are those of the writer and do not reflect the opinions of Felix.*



Type	Encryption (for messages, calls, videocalls)	Info (ownership, country   code availability   background)
Signal	E2EE + ZKE, so minimal use of meta data	Signal Foundation, USA   open source   Generally, highly approved by data specialists.
Threema	E2EE + ZKE, so only minimal use of meta data	Threema, Switzerland   closed source   Good reputation, but only local distribution of app.
iMessage (for Apple users only)	E2EE	Apple, USA   closed source   Apple also collects meta data, but on a lower level than Meta.
WhatsApp	E2EE	Meta/Facebook, USA   closed source   Meta collects personal data, app usage etc (meta data), in US WA data also gets linked to FB/ Instagram profile (mostly forbidden by GDPR in EU).
Telegram	Transport, E2EE only if manually turned on for single chats	Closed source, generally not considered secure, but often used by political marginalised groups as Telegram limits its cooperation with governments
Messenger	Transport, E2EE only if manually turned on	Meta/Facebook, USA   closed source   Meta collects personal data, app usage, and potentially has access to content of messages.
WeChat	Transport, no E2EE	Tencent, China   closed source   Chinese based app, not common in EU, US. Bad privacy reputation, data gets shared with Chinese government.

Messaging apps and encryption

and data leaks. Nonetheless, in theory, the companies themselves, and governments (in most countries by an official court order) can access the data, too.

A possible solution is to encrypt one's data before uploading it. A good software package (freeware, open source) is offered by a German company, cryptomator.org.

Cloud companies can (and do) analyse meta data of your cloud usage. If this is a concern, you can also look out for smaller, privacy-focused cloud companies, such as dracoon.com (Germany-based), sync.com (UK-based), or tresorit.com (Switzerland based). There are lots of rankings on the internet. After a

Type	Encryption	Info
OneDrive/Google Drive/Dropbox	Transport (encrypted at rest, encrypted in transit)	Mostly closed source
Cryptomator	E2EE (so only you can access the content data)	Open source. This is not a cloud itself, only a software to encrypt data for the cloud
Dracoon/sync/tresorit	E2EE, often some form of ZKP.	Often beating big players in terms of privacy, smaller cloud services generally have less functionality compared to larger cloud companies

Cloud encryption services

## SCIENCE

# The opioid epidemic and the future of pain treatment

► *James Desmet traces the roots of the opioid epidemic and explores developments in pain medication*

James Desmet Science Writer

According to the WHO, opioids globally are responsible for nearly 70% of drug-related deaths, with more than 30% of opioid deaths being caused by overdose. The WHO estimates that 115,000 people a year die of opioid overdoses in the United States alone. However, despite the dire consequences, many of the strongest opioids are on the WHO's list of essential medicines for certain diseases. Continued use of these drugs, even to treat debilitating diseases, is a major issue for the developed world. So, what is being done to resolve the problem, and what is its origin?

When opioids travel through the bloodstream, they can pass the blood-brain barrier and bind to a family of receptors called mu-receptors in the brain. The interaction between these receptors and opioids triggers the same feeling of pleasure received from activities such as eating, exercise and sex. This rewarding feeling can become a strong motivator for repeated use of opioids after pain has subsided. It often leads to opioid abuse.

A catalyst for this problem was that in the 1990s and early 2000s, pharmaceutical companies aggressively marketed the use of opioid drugs. One of the biggest culprits was the now-discredited company Purdue Pharma, owned by the Sackler family. Purdue targeted and persuaded physicians to prescribe opioids and quickly increase their dosage, ensuring almost certain opioid addiction. This was sold to the physicians on the pretext that opioids were not addictive if taken for genuine pain. Furthermore, flimsy 'evidence' was provided to back up the claim. In this manner, the path to addiction was almost assured, resulting in the ongoing opioid addiction crisis. On April 2nd 2019, in something of an acknowledgement of their role, Purdue Pharma pleaded guilty to charges of misleading the public with their opioid marketing.

In order to try to combat the issue of opioid addiction, scientific research has expanded rapidly since the beginning of the 2010s to find alternative, non-addictive pain medications. In recent years, there have been significant

research breakthroughs using a variety of approaches.

One particular methodology which is being developed involves the pH of injured tissue. A number of different types of injured tissue within the body, includ-

“

## IN RECENT YEARS, THERE HAVE BEEN SIGNIFICANT RESEARCH BREAKTHROUGHS USING A VARIETY OF APPROACHES

ing muscular damage and bone fractures, have a lower pH than healthy tissue. A research group at the Zuse Institute Berlin have sought to capitalise on this with a series of compounds whose pKa (tendency to lose or gain a hydrogen atom) closely matches the expected pH levels of wounded tissues. The Institute has developed molecules that are only active in the specific pH environments associated with targeted wounded tissues. This is a common practice used in medicinal chemistry, with the inactive form of a drug being known as a 'prodrug'.

The idea behind this is that it will prevent side effects associated with current opioid pain medications – much smaller concentrations of the active drug will be present in the body, and only

at the sites of injury. This means it will not be binding to the mu-receptors in the brain; the prodrug will not be converted to an active drug in the brain, thus so long as the prodrug itself does not bind, the addictive nature of the drug should be significantly lowered. Several drugs have been shown to relieve pain by this mode of action. The efficacy of these drugs is set to be tested in clinical trials commencing in 2023.

Another approach that is showing promise involves targeting specific sodium channels within the body, vital to relaying pain to the brain. One such compound is Vertex Pharmaceuticals' VX-548. This drug aims to selectively inhibit the NAV 1.8 receptor, which plays a key role in relaying pain signals to the brain. It is known that people with mutations in this receptor can experience extreme pain, even in the absence of injury. Blocking this receptor may prove to be an innovative alternative to opioid pain medication. However, due to its extreme similarities to other sodium channels, lots of candidates have shown dangerous side effect and toxicity profiles.

Despite these challenges, the recent clinical candidate of VX-548 is showing promise, having outperformed a placebo in phase II clinical trials. "These results

are terrific, and the side effect profile is very good," says Professor John Wood, a neurobiologist who has studied the biology behind NAV 1.8 blocking.

It is important to note that VX-548 still needs to pass phase III clinical trials and gain subsequent approval from agencies such as the FDA. This is no small step; over 40% of all drugs entering phase III trials never make it to market. Most commonly, this is because of unwanted side effects or safety concerns.

With opioids having killed many and destroyed the lives of many more, the possibility of effective alternatives taking the place of opioids is an exciting prospect. However, while the opioid problem this world is facing may soon become a thing of the past, the impact it has had on the lives of those affected will live on for decades to come.



FRIDAY 10TH JUNE 2022

ARTS

THE BLYTH CENTRE AT 20

AN INVITATION TO THE FIRST EVER  
FELLOWSHIP EXHIBITION page

10

Edited by:  
ALEXANDER COHEN  
ALEX JACKSON

# *The Blyth at 20* — bringing music, art and science together

FEATURE

**CELEBRATING TWO  
DECADES OF ARTISTIC  
AND SCIENTIFIC  
COLLABORATION AT  
IMPERIAL.**

The Blyth Centre represents a core aspect of the music and visual arts scene at Imperial; and 2021 marked the twentieth anniversary of the Blyth Centre as the College's much-cherished resource for artistic and scientific collaboration. There has been a lot going on over the academic year: and the Centre is excited to announce its first ever exhibition of the Blyth Fellows' recent work!

The anniversary launched with a marathon 14-hour multi-media art installation in the College Main Entrance, centred around Erik Satie's eccentric piano work, *Vexations*. "Many agree on a common sequence of reactive stages to the work: fascination morphs into agitation, into all-encompassing agony; but participants who withstand that phase enter a state of deep tranquillity." Attendees of the exhibition described a thrilling performance --- as if they were hearing sound for the very first time.

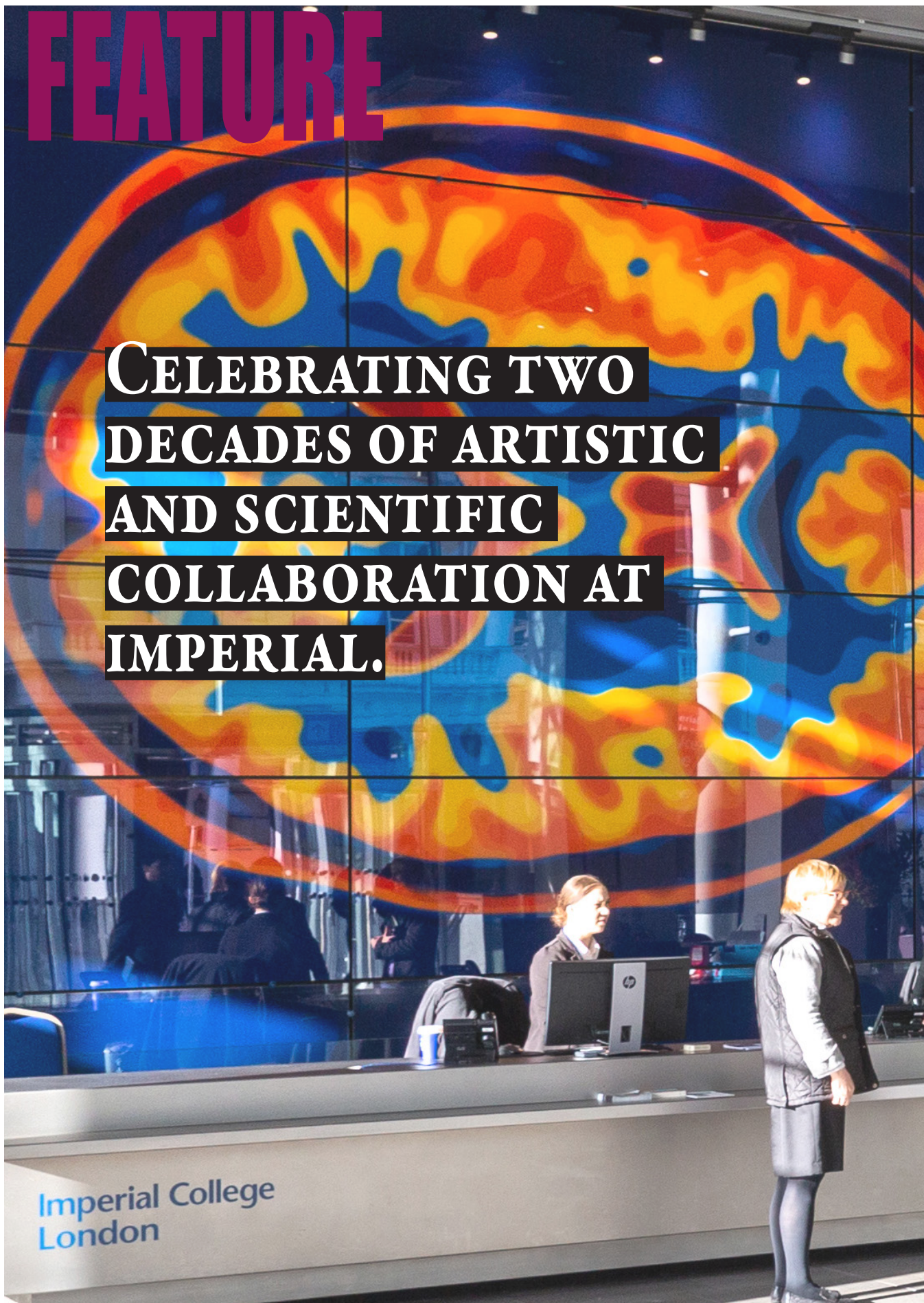
The autumn term brought music and art together again for Orlando Consort's lecture-recital *Listening to Pictures*. "A visual and aural feast featuring some of the greatest composers and painters of the early Renaissance."

The lecturer, Tim Shephard from the University of Sheffield, vividly reveals how "Renaissance art is full of sound – angels sing from altarpieces, ancient deities compete in musical contests, and music provides an essential backdrop to sensuous, amorous encounters."

Director of the Blyth Centre Oliver Gooch argues that one of the most beautiful examples of mathematics in musical motion is J.S. Bach's *Goldberg Variations*. In a collaboration between mathematician Marcus du Sautoy and pianist Charles Owen, the *Sounding Symmetry* exhibition examined how the ideas of symmetry are at work throughout the thirty variations of Bach's work.

Finishing off the year, the immensely popular *Supernova* exhibition in the Blyth Gallery, curated by guest artist Sarah Kogan, was a must-see event.

2020 saw the RCA Imperial EDI commission, an exhibition of extended portraits of Imperial's community created by Royal College of Art students and alumni, showcased before the pieces become an important part of the College's permanent art collection. In March, music and medicine came together with Professor Robert Winston's *Musical Analysis*. Alongside violinist Jacqueline Roche, Lord Winston examined "the particular relationship between music and the medical conditions of classical composers."



## ARTS

Credits: Photo/Martha Nahar



PhD student Zhengli, better known as Ribbon Guy, on the Queen's lawn.

The Blyth Centre's 20th anniversary is due to culminate this June with the Blyth summer party on the Queen's Lawn (pictured above).

"Join us for an afternoon showcasing the multifarious talent of our music societies and get creative with the beautifully simple art of block printing with Louisa Loakes. Food, drink and good cheer will be in abundance so join friends and colleagues to round off our anniversary in style."



**PRINCE ALBERT CREATED  
ALBERTOPOLIS WITH  
THE VISION OF BRINGING  
TOGETHER MUSIC,  
ART AND SCIENCE IN A  
MEANINGFUL WAY; WE  
[...] CELEBRATE THAT  
EXTRAORDINARY VISION.**

**OLIVER GOOCH**

DIRECTOR OF THE BLYTH CENTRE

## Exams or not...

Check out all the latest Arts content on the Felix Website!



## You're invited to the FIRST EVER Blyth Art Fellowship Exhibition!

The Blyth Art Fellowship enables Imperial students to fulfill their artistic desires through training, mentoring, and a materials stipend.

This year, the Blyth Gallery is excited to host the two fellows: Andrea Perez Navarro, and Rosalind Crosbie as they showcase their work they have been producing throughout the academic year.

This event will also mark the 200th exhibition at the Blyth Gallery hosted by our Head of Art, Mindy Lee.

**2 Artists. 20 Years. 200 Shows!**



## What's coming up? ...and get involved!

**OTVETKA** by Neda Nezhdana.

Available from the **30th May** on the **Finborough Theatre** YouTube channel.

*"This war is not just on territory but inside us all. Cities being bombed, yes, but the brain is bombed even more. Cyber-attacks, fake news, fabricated terrorism, election fraud..."*

**#VoicesFromUkraine**

**The Throne** by John Goldsmith.

World premiere on the **23rd June** at the **Charing Cross Theatre**.

Mary Roscoe and Charlie Condou star in a new comedy by award-winning TV and film screenwriter John Goldsmith.



Photo/Carla Evans

**Gloriana** by Benjamin Britten.

A very special Jubilee Performance at the **English National Opera** on the **8th December**.

Originally written to celebrate the coronation of Queen Elizabeth II in 1953, this concert will be staged this year in celebration of the Queen's Platinum Jubilee.



**Under 21s come free!**

But book early to avoid disappointment.

**Jitney** by August Wilson.

Opening the **9th June** at **The Old Vic** for a one month run.

*"It don't always turn out like you think it is. You don't always have the kind of life that you dream about. You know what I mean?"*

Jitney explores the bond between eight men as they live, love and work in a racially segregated, post-Vietnam America.

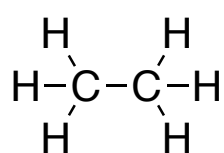


# Zeolites as the future for alternatives to cryogenic distillation

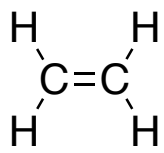
Marie Mori Environment Editor

Ethylene (also known as ethene) production is arguably one of the most important organic chemical processes in industry—its worldwide production is larger than any other organic compound and is projected to reach 300 million metric tons by 2025. Ethylene is a key feedstock for many chemical reactions, including polymerisation, the single largest use of ethylene. The polymerisation of ethylene produces various plastics, specifically polyethylene (PE), which is used in a wide range of essential everyday products, including packaging film, shopping bags, and housewares.

However, ethylene production is



ethane



ethylene

also one of the most energy-consuming processes today. The current method of producing ethylene involves steam cracking, which breaks down long, saturated hydrocarbon chains into smaller compounds such as ethane and ethylene. These molecules must then be separated, which has long been a challenging industrial process due to their similarity in structure and volatility. The current method largely used is cryogenic distillation, an extremely energy-intensive process due to its high pressure and extremely low temperature requirements. The purification of just ethylene and propene accounts for 0.3% of global energy consumption—decreasing the energy intensiveness of this ethylene separation means reducing the carbon footprint of a tremendous number of plastic products worldwide.

Research for alternatives to cryogenic

distillation have been ongoing in recent years—for instance, the adsorptive binding of ethylene to transition metal centres has been studied. However, these processes are not optimised for ethylene separation, as they can cause alkenes to oligomerise and block the pores within the material. Other methods that have been discovered lack the selectivity and efficiency required to expand them up to an industrial scale and decompose quickly due to contaminants.

However, a promising alternative has been found in zeolites. In a publication in *Science*, researchers at Instituto de Tecnología Química collaborated with the ExxonMobil Research and Engineering Company to discover a new method that separates ethylene from ethane, with remarkable selectivity. This method uses ITQ-55, a pure silica zeolite with an unusual structure—the first of its kind—that allows for its extreme flexibility.

Zeolites are porous and crystalline materials, with structures usually built from sites composed of silicon and aluminium atoms bound to oxygen. Soft hinges at the oxygen atoms connect these sites to compose the secondary building units (SBUs), making zeolites flexible. SBUs are arranged in rings of different sizes, which in turn make up the full structure. This produces a framework in which the porosity of zeolites can be changed by altering the SBUs and pore dimensions to be tuned for different applications. For this reason,

zeolites have many uses in catalysis and as commercial adsorbents. Another advantage of zeolites is their non-toxic and non-corrosive properties—even if a zeolitic material were to be washed away in a river, the acidic sites in zeolites are in pores so tiny that aquatic organisms would not be able to access them.

ITQ-55 is a pure silica zeolite, meaning it is built only from silicon sites. According to the researchers of the

different properties and shapes will diffuse through the pores of zeolites at different rates—this concept is called shape selectivity. The study found that the ethylene adsorption rate to ITQ-55 was much greater than that of ethane and that the heart-shaped cages in the structure hinder the diffusion of the rounder-shaped ethane by two orders of magnitude, while allowing a more facile diffusion of ethylene, which has



Plastic bags are made from polyethylene, which requires the process of cryogenic distillation.

study, pure silica zeolites are preferred as they have no acid sites and so are not prone to the oligomerisation of olefins the way the existing separation methods are. It is distinctively composed of heart-shaped cages interconnected by eight membered rings. Its pore width is less than 2nm—if the framework were completely rigid, molecules would not be able to diffuse through the structure at all.

ITQ-55 can separate ethylene and ethane through the process of preferential diffusion. Molecules with

a flatter structure. In this way, ITQ-55 can act as a molecular sieve, separating ethane and ethylene like a chef sifting flour. The material seems stable for long periods, too—the adsorptive properties remained unchanged for three months. This is important as the durability of a material is a critical consideration for upscaling to industrial purposes. The remarkable selectivity of ITQ-55 is also due to its unprecedented flexibility; the material accepts molecules that are almost 1 Å larger than its pore size. Therefore, when molecular diffusion

## ENVIRONMENT

occurs, the ethylene molecule can brace the rings in the zeolite structure open to force itself through.

While this discovery is significant in and of itself, in practice, it is yet to be commercially valuable. More research must be conducted into the zeolite, and optimisations of the existing ITQ-55 can be investigated to further increase its selectivity and efficiency. It is estimated that if ITQ-55 is commercialised

to industrial scales, it could reduce the energy intensiveness of ethylene separation by up to 25%. In terms of the bigger picture, the mechanism by which ITQ-55 can separate ethane and ethylene may be applied to other important olefin separations. Discoveries of this kind are especially of the essence with the pressing climate emergency—global plastic production does not seem to be slowing down any time soon, and new methods

to decrease our carbon emissions from the plastic industry must be prioritised.

“Our end goal of replacing cryogenic distillation is a long-term challenge that will require many more years of research and tests in and outside the laboratory”, Gary Casty, head of ExxonMobil Research and Engineering Company’s catalysis section comments. “Our next steps will be focused towards a better understanding of the potential of this

new zeolitic material.”

# Enough. No to the Jackdaw gas field.

Nell Pates Environment Writer

On the 1<sup>st</sup> June, Shell was granted permission to develop Jackdaw, a new gas field in the North Sea. According to a tweet by Kwasi Kwarteng, the Secretary of State for Business, Energy and Industrial Strategy, the move is ostensibly to ‘protect energy security’.

Grahame Buss, who worked at Shell for 33 years and was their principal scientist, has written a piece for the Independent that explains in detail why this is unrealistic. In short: this development will not lower bills during the cost-of-living squeeze or provide security. Instead, it will serve mainly to increase profits for Shell and lead to CO<sub>2</sub> emissions, worsening the climate crisis that this government claims it is committed to addressing.

**Here are just a few indicators that the politicians backing this development may not have the environment’s best interests at heart:**

- Kwarteng has accepted payments from fossil fuel investors but would like us to believe that he is fully behind the transition to green energy.

- Prime Minister Boris Johnson only conceded publicly in 2019 that climate change is real. Before then, he

wrote columns for newspapers denying human-driven climate change as nonsense. However, he changed his mind after receiving a briefing from Sir Patrick Vallance, the government’s chief scientific advisor, that explained in 11 simple slides how serious the situation is.

- If you are thinking: ‘Wow, that presentation must have been impressive!’ you should know that Angus Rose, an environmental activist, went on hunger strike in March with the simple request that Sir Vallance present the same information to all ministers and broadcast it to the public. Angus starved himself for more than five weeks, sitting

outside parliament every day, while Greg Hands, Minister for Business, Energy and Industrial Strategy, ignored him.

**As for Shell...**

Shell’s environmental statement for the Jackdaw field would be funny if it weren’t so dangerous.

The statement considers multiple aspects of the project: the physical presence of new rigs, disturbance to the seabed, emissions to air, discharges to sea, and underwater noise. Using criteria they have written for themselves, they claim that all of these will have only ‘minor’ and ‘slight’ impacts on the environment. They assess that none of

these actions will have any impact that might ‘persist or require cleaning up’—none of them.

This is nonsense.

**‘Blood on your hands’**

This proposal was rejected in October 2021 on environmental grounds. Protesters launched rallies this weekend, including painting ‘blood on your hands’ on a government building. Greenpeace may launch a legal challenge to the development, calling it a ‘desperate and destructive’ move.

The government is responsible for properly managing emissions, and it is failing.

The UK does not need additional fossil fuel, and the world cannot sustain it. Further exploitation of the North Sea must be prevented.



Photo: Wikimedia Commons

**CRYPTIC Crossword Grid**

1		2		3		4		5	6		7		8
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10													
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18					19		20						
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26													
27							28						

**Across**

- 1) Stocky, e.g. [4 4]
- 5) Essential curry ingredients. [6]
- 10) Site to which the Golden Gate Bridge is a connection [3 9 3]
- 11) "My \_\_\_\_\_", said by a knight to a king. [5]
- 12) Race car's print. [5]
- 13) Technicolour yawn. [5]
- 15) Sea creature with spines. [6]
- 16) Part of currently annexed European region. [7]
- 18) Brain part, \_\_\_\_\_ oblongata. [7]
- 20) Sharp, on-it. [6]
- 21) Skeuomorphs, e.g. [5]
- 23) Means of entry. [5]
- 25) Famous patchwork elephant from children's book. [5]
- 26) You use it to smell. [9 6]
- 27) Happenings. [6]
- 28) Trips over one's words. [8]

**Down**

- 1) Hubbub. [6]
- 2) He's played the titular role in an 8-part saga. [6 9]
- 3) It's just to the left. [5]
- 4) Card game in which one can go "bust". [7]
- 6) Strutted. [5]
- 7) Volume unit. [5 10]
- 8) U-2, e.g. [3 5]
- 9) Outdoor lunch. [6]
- 13) Hairlike structures in the intestines. [5]
- 14) Bondage for poultry. [5]
- 17) Bear or human, e.g. [8]
- 19) "Spring into \_\_\_\_\_." [6]
- 20) Word following data or psycho. [7]
- 22) Term of endearment for old relative. [6]
- 24) Implied. [5]
- 25) Where Moses grew up. [5]

**Across**

- 1) £5 she mixed up in a frenzy. [8]
- 5) Goes to pitch across, but must halt. [4 2]
- 10) Deputy Oscar? [6 2 7]
- 11) Episode of Top Chef lasting this long. [5]
- 12) Live in Chadwell Heath? [5]
- 13) English family all about being tidy. [5]
- 15) To the letter, follow her vegetable dish recipe? [6]
- 16) In a bowl, stir soundly to stiffen it. [7]
- 18) Dog that might scare mum frozen? [7]
- 20) Pa's gotten mixed up with that posh poet. [6]
- 21) She sounds cornered! [5]
- 23) Hack off about a pound of rock. [5]
- 25) Write music for playful short gavottes. [3 2]
- 26) Without the French, historical bibles would be full of dubious prose in Canada. [7,8]
- 27) It's that most serious Rutherford, so I hear. [6]
- 28) Sin of which children are innocent? [8]

**Down**

- 1) Look after decaying woodland. [6]
- 2) It's looking terminal for Her Majesty! [8 7]
- 3) Salad cream from the farm. [5]
- 4) The motivation is multiform [7].
- 6) It'd agitate the many inside, even though they're shy. [5]
- 7) Put down your wine glass where your opinions are considered? [5 2 3 5]
- 8) Some fifty odd forerunners took a break, which was broken up by the little ones. [8]
- 9) The "little beast"; you might pick it out of the gun series. [6]
- 13) Dreadful rash ending up on the face causing irritation. [5]
- 14) Superstars? [5]
- 17) Can I do it without my father, so good-natured? [8]
- 19) Soft scuffle with short one. [6]
- 20) I heard the psychologist was gutted when he saw the graph's shape. [7]
- 22) Beads in a sorry state. [6]
- 24) Stitches up the unrest. [5]
- 25) Body part often numb in idiots? [5]

**REGULAR Crossword Grid**

1		2		3		4		5	6		7		8
							9						
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**REVERSE CRYPTIC**

C: See the guy who threw it to knock them out. [7]

A: CLOBBER

R: \_\_\_\_\_

C: Get a point in the game with lots of holes. [6]

A: SPONGE

R: \_\_\_\_\_

\_\_\_\_\_

C: The French city produced a lot of money, I hear. [8]

A: BORDEAUX

R: \_\_\_\_\_

\_\_\_\_\_

CATNIP

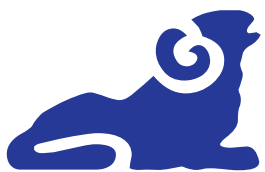
# Future headlines on President Hugh Brady we've already put money on coming true with Betfair

1. Huge Brady - President spotted making use of the facilities at Ethos gym
2. Hugh-ge News - Brady announced as president-designate of Imperial College
3. The rock from which you were Hugh-n - Brady plans to continue pursuit of Gast's plans in becoming a global university
4. I'm still alive but I'm Brady breathing - IC President spotted doubled over after running for a bus
5. Hugh Brandy - IC President bolsters Presidential salary by accepting sponsorship from Hennessy

6. Hugh Braided - IC President returns from Caribbean holiday with hair-style described by multiple students as "the most on-the-nose example of cultural appropriation they've ever seen"
7. Hugh Neighdy - IC President spotted riding horse around Hyde Park, pursued by security in buggy
8. Boo Brady - President's Halloween costume gives many students a fright
9. Coup Brady - Armed academics storm Westminster, spearheaded by a camouflage-clad Imperial College President
10. Who Brady? - 89% of Imperial College students don't recognise

the name of their college's incoming president

11. Kew Brady - IC President signs mutually beneficial research agreement with Kew Botanical Gardens
12. Yew Brady - IC President tweets support for planting trees in and around the IC campus
13. Zoo Brady - IC President spotted at London Zoo nine weekends in a row - motives as yet unknown
14. Always watching over Hugh - IC President takes up permanent residence at the top of the Queen's Tower



**ARIES**

This week you question whether love is land



**TAURUS**

This week you are reported to Prevent when your support for a "new, clear world order" is misheard



**GEMINI**

This week you receive a golden ticket to the Boston pee party



**CANCER**

This week you ask your tutor "how's your weak bean?"



**LEO**

This week helicoptering your penis doesn't manage to distract your girlfriend from having just found out about all your affairs



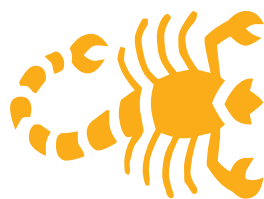
**VIRGO**

This week, in a fit of ecstasy after winning a pint race, you eat the glass



**LIBRA**

This week you find out that you've been posting all your mail into a dog poo bin for the last five years



**SCORPIO**

This week your suggestion to haze freshers by getting them to down a cup of cold sick goes down like a cup of cold sick



**SAGITTARIUS**

This week the cost of filling up a tank of petrol reaches £100 but you still don't notice it when you fill up your Range Rover



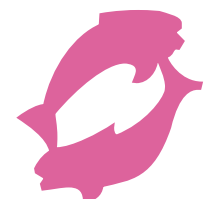
**CAPRICORN**

This week asphyxiation from a panic attack doesn't get you as horny as being choked does



**AQUARIUS**

This week marks the fifth in a row that no one's noticed you've locked the homeless man in the cellar



**PISCES**

This week a paper clip will have to suffice where you once used a belt

FRIDAY 10TH JUNE 2022

# MUSIC

Edited by: TARA PAL CHAUDHURI  
JOE RIORDAN

## DON'T MISS THE GIG!

25TH ANNIVERSARY  
SINFONIETTA @ THE  
GREAT HALL  
ON 12TH JUNE  
2022, 3PM

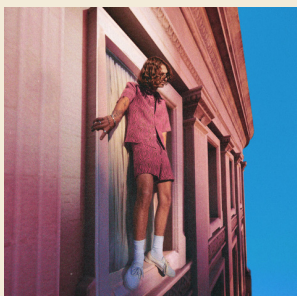
COME TO THE GREAT  
HALL THIS SUNDAY  
TO SUPPORT THE  
IMPERIAL COLLEGE  
LONDON SCHUMANN  
CELLO CONCERTO, WITH CONDUCTOR,  
WILLIAM CARSLAKE AND DANIEL CAPPS.



## Album of the Week

### Highway by Kid Bloom

I remember listening to 'Prom?' by Kid Bloom before he had a functioning YouTube channel. I fell in love with the wavy guitar and 80s synthy vibe that, surprisingly, sounds more 'authentic' than the many bedroom pop groups who try to mimic that mood now. Luckily, his sophomore album, *Highway*, returns with the same foot-tapping disco sound that backdrops his dreamy harmonies. Something about his music's recurring kick-snare drum sequence is feverishly magnetic. Remember to give a listen to 'Cowboy', 'Yellow Line', and 'Keep Up' – with pink neon lights.



## TODAY IN MUSIC HISTORY

IT'S RAY CHARLES' 18TH DEATH ANNIVERSARY BUT WE'VE GOT A BUNCH OF BIRTHDAYS: JUDY GARLAND, JOEY SANTIAGO (GUITARIST FOR THE PIXIES), JIMMY CHAMBERLAIN (DRUMMER FOR THE SMASHING PUMPKINS). IN 1966, JANIS JOPLIN SINGS FOR THE FIRST TIME WITH THE BIG BROTHER HOLDING COMPANY AT SAN FRANCISCO'S AVALON BALLROOM. SHE HAD NEVER ENJOYED OR THOUGHT SHE HAD ANY TALENT IN SINGING BEFORE SHE TRIED HER HAND AT PSYCHEDELIC ROCK – WHICH IS VERY FORGIVING OF THESE IDIOSYNCRASIES.

## Gig Reviews

### The sound of the *Silent Alarm*

*Bloc Party live at Alexandra Palace*



View online here!

Written by **Sam Lovatt** Editor-in-Chief

Arriving at Alexandra Palace last Saturday, the sunset casting sepia hues over the Victorian architecture, I was hit by a barrage of nostalgia. There to see Bloc Party live for the third time in my life, echoes of my seminal experience with them six years ago, and the actual car crash that occurred on the drive back from the gig, came creeping back (though that's for another article). Furthermore, I was there with one of my oldest friends, both of us fans of the band for over a decade, and upon seeing the past-their-prime crowd we assumed that most others were operating on a similar tenure.

Formed in 1999, the band that finally landed on the name "Bloc Party" broke into the indie rock scene in the early 2000s, with their debut album *Silent Alarm* receiving the NME Album of the Year and the PLUG Awards' Indie Album of the Year. Their follow-up *A Weekend in the City* peaked at number 2 in the UK album charts in 2007. The demographic of the crowd clearly pined for these glory days.



Photo credit: Sam Lovatt

I had never been to Ally Pally (as the kids these days are calling it) before, and I was more than pleasantly surprised. Far beyond the standard gig venue, the Palace boasts multiple wings that play host to a variety of outlets. Perhaps ten or more food and drink stands plus a sizeable merch stall filled the central hall, which leads onto the "Great Hall" where the stage stands.

A few pints and a cringingly overconfident support act out the way, the lights dimmed, too much ecstasy from the crowd, and the huge projection of a venus flytrap adorned the stage's backdrop.

Kicking off the gig with back to back songs from the recently released *Alpha Games* album, the crowd's longing for the past became clear - whilst the catchy and rhythmic 'Day Drinker' and 'You Should Know the Truth' spawned a sea of head bobbing, just the opening notes of the 2007 track 'Hunting for Witches' turned the tide into a frenzied mosh.

The negatives of an indoor venue quickly became apparent, and by the end of the third song myself and my bloc compatriots looked as if we'd all just stepped out of the shower. The "old songs good, new songs okay"

motif continued throughout the set, and the band were well aware of it from the beginning. The *Alpha Games* track 'Rough Justice' was even announced by lead singer Kele Okereke as a "breather", so the crowd could cool off before the ecstasising 'Waiting for the 7.18' came on afterwards.

I would be hard pressed to write a better set list for the band than what they played that night. A perfect mix of melodic tracks that true fans could sing along to, combined with regular head-bangers which turned the crowd up to 11 and left you short of breath after a three minute mosh.

The encore was more than anyone in the audience could have bargained for – five classics and perhaps the catchiest track off the new album crescendoed with their very first hit, 'She's Hearing Voices', aired in 2004 before their debut album. Seventeen years after their debut album hit the charts, it is hard to overstate how good Bloc Party still are.



Photo credit: Sam Lovatt

# COMMENT

» **HAVE AN ARTICLE IN MIND?**  
EMAIL YOUR IDEA OR PIECE TO:  
COMMENT.FELIX@IMPERIAL.AC.UK

Edited by: KHAMA GUNDE

## Canning diet soda

► *To stop the damage to my health, I had to confront the ghosts of my past*

Anonymous



Even thinking about why I started drinking diet soda knocks me down. The sadness of actually doing this to myself is hard to grapple with. It is profoundly offensive to me that I poured poison into my body for six years because, as a teenager, I had no reliable stress outlets, and no support to which I was entitled.

My predicament is not like those of drug addicts, or alcoholics, but I do relate to their stories of years lost, opportunities not taken, relationships missed. I feel sad that I would often lock myself away, hoping the diet soda would help me sustain yet another impossible diet, refusing traveling, work experience, family evenings, social events.

It has been six years since I ripped open the lukewarm eight-can pack of Pepsi Max for the first time, and drank every single one in less than four hours.

During the week I had no access to the stuff, but on the weekends, I would buy massive packs and drink them all.

This really frightened people who were looking over me at the time, but I went to every extent to continue my habit. There was something of the ethereal about finally doing something remotely disgusting enough to actually deserve their neglect and their disdain.

This is not uncommon among sufferers of eating disorders. We often come to rely on these drinks (eventually) because it tastes nice, and the caffeine gives you a buzz, like fireworks, like ice crystals growing in the veins.

I decided to try dropping the stuff to see if I would feel better. No harm in trying.

**First week. No cans?**

At first, I wanted to try dropping the stuff cold turkey. At the end of the first day, I had a massive bout of overeating, with a massive headache too. Yes, yes, the pain in the head recalls the narrator's psychological pain, etc etc. For four days I held on. Then I did more research, and learned that it would be better to cut down gradually. And after reading

yet another internship rejection e-mail (probably because of my visa), I caved, bought an eight pack with my usual massive product haul... and set aside four cans.

I have a pleasant dream. The skyline in the late afternoon is crooked and bent at an angle, it's all rotating, but I know where I'm going. I go up the stairs, and I open the door, and even after all these years, there is no awkwardness. Long have I asked for this time, wrote about it and described it against logic, against hope, against even failure and silence, like pressing a button again and again – and here it is. I have described it and asked it into being. And there is enough time. There is so much time, I asked and asked and asked for time, and here it is. The words, the words are there, in my head, and I am faithful to them, but I am silent. And because we are silent together, I know the words are true.

Four cans on Thursday, Friday, Saturday, Easter Sunday.

Locking up the Easter chocolate in my university locker does not stop the beast. So I commute through the city, on the bus, at 10pm to get to the locker and free the unlikely prisoners. Nothing helps. The cravings are everywhere. I could have chosen not to act on them – but why would I want to? What is the POINT of all of this, anyway?

**Second week. Three cans each day.**

I have been overeating so much that I can feel a visible difference all over my body. Is this even worth it? I force myself to think in the long term. How many times have I achieved short term gains, only to surrender it to the cavernous beast? No, persevere.

**Third week. Two cans – glasses – each day, because I'm off to see my family and they don't have cans there.**

My old friend. The cold, bubbling, sizzling blanket all around my mouth and teeth, the icy feel of the glass as I conquer another concept, solve another equation, write another coursework. My old, dear friend. 'My songs of old earth's dreamy youth'. Memories, when a sip of the icy drink was a rebellion. When my old friend and I hunched over a problem,

a challenge, until the spine bent incorrigibly and the stomach rotted and teeth fell out. When we conquered the world and solved the issues and mounted the stars. An entire module was barely a thought, and an hour was a minute. Even in dreams, I would recount the things we read together.

Who can replace my friend? I cannot bear the thought of going when my friend is not with me. All the world is at my feet, but where is my friend?

Then, the setting sun. As now, over the city, the tender twilight descending.

**Fourth week. One can a day.**

And what a difference.

I wake up and I feel fine, I don't have cravings, I don't want to eat. But to finish the challenge, I put the can in the freezer for 40 minutes. And when I drink the solitary can, I feel it immediately – the desire to eat, the tiredness, the fatigue, the hunger. I don't finish my last eight-pack. I throw out the last remaining can, without going onto week five.

**Fifth week. None.**

I struggle still against the cravings and the stress. I read online, more and more, about the harms of these drinks. Six years... six years. How can I have done this?

And how could I have realised that doing this was harmful, and the reasons for why it was harmful, without doing it? It's impressive that some paraphrased Terry Pratchett has actually stuck to my brain. It wasn't until this point that I understood just how much aspartame had been interfering with my ability to concentrate. Before, I would really count myself lucky if I was able to push through a book without getting distracted. Now, each and every day, finishing narratives is becoming easier. I actually finish the horror narrations that I used to love, get to the end of twitter threads, finish stories that are longer than 10 pages...

Time is slowing down. I blinked away two wasted years, putting cans into the freezer and setting a timer when things got difficult and boring. But finally, I can do things at a suitable pace.

**Sixth week.**

I used to stay up every day until mid-

night, drinking, hunching, glaring, waiting to eat. But now I fall asleep well before. My appetite and my concentration are increasing. I am enjoying stories, audiobooks. Before, a platter of sushi, topped off with a tub of ice cream and an entire loaf of bread was nothing, and now I actually realise that I've been eating entire full plates of raw fish like I was paid to do it.

**Seventh week – NOW.**

The bad thoughts are still with me, but the headaches are gone. With each day that passes, my focus and my appetite improve. And still, I cannot hide that I am haunted. It takes 28 days for aspartame to really leave the body, and now I almost don't want it to.

I'm fine most of the time – REALLY fine, and this, it turns out, is what it's like to be fine. But something moves in the air, the pavement glints, the grass shivers – and immediately I am brought back, and I see it clear before my eyes. How the sun shone through the glass in my old room. I could turn my head and see it straight before me – not so, never so in my rooms here in England – and think to myself, feet and feet above the glistening snow, 'I will remember this', for some reason. Or a clear, open road, and so many cars, and I want to look at every single one. My favourite songs, which say things that only your mother tongue can say to you.

Sometimes, I remember a different evening to that one, in the relentless, merciless, setting sun, and then the clutches are on my chest again, and there is so much to say, but no way to even begin, there is no time, and no one listens. The pressure will tear me apart, but I can't start to say it. I don't know what to say. I want to run back and say something, anything, and I know that if I put it into words and fill my mouth with arguments, I can fix everything. I will be heard. And nothing that people say about me will stand a chance against my words.

I know what to say now, but the language is dead.

Is this how it will all end? In the setting light?

I cannot get over my deep sadness. It's like a separate part of me, a whole human being that I carry on my back. But I don't want to do this to myself anymore.

Six years of damage to my body. But three weeks ago, I drank my last drop.

# The sugar crisis

► *Rat studies have suggested that sugar is just as addictive as cocaine. Is high sugar consumption really that bad? Comment writer Justin Macharia offers his opinion.*

**Justin Macharia**

Comment Writer



A few weeks ago, it was my 20<sup>th</sup> birthday. Instead of celebrating this grand occasion — the beginning of the third and, arguably, the most influential decade of my life — in a spectacular fashion, I opted for a quiet, normal indulgence — birthday cake. I lacked the will to bake my own so I figured that I would buy one from the supermarket. However, the supermarket varieties seemed too bland and boring for the prices that were offered. I also decided that cake was too unhealthy, however I was not going to forgo at least a minor indulgence for my birthday. In the end, I came to the decision that Sainsbury's brand, freshly-baked chocolate chip cookies were my treat of choice.

Falling victim to the sway of a late-night snack, I indulgently ate one of the cookies. I vaguely knew that snacking just before bedtime was a bad thing, however I did not know the exact reason for this. When bedtime came, I fell asleep naturally. Unfortunately, I was soon to be made aware of my grave error. In the middle of the night, sometime around 1 am, I suddenly woke up. Usually, I would be apathetic about such an awakening — maybe a vehicle alarm or a roaring motorbike engine was responsible. However, this time, no matter how hard I tried, I could not fall back asleep. Regardless of the number of tosses and turns, rhythmic breaths, or imaginings of a distant, quiet paradise, I could not return to my slumber. Furthermore, not only was I awake, but I was alert; it was like I had not slept for only 2 hours. In the morning, I felt lethargic and tired, and wished that I had never eaten that cookie.

Whilst sugar is often branded as harmful and unhealthy, it is essential for the proper functioning of the human body. At a fundamental level, sugar forms the backbone of our genetic makeup, with

DNA being composed of innumerable deoxyribose-containing nucleotides. Not only does sugar play a role in our genetics, but it serves as the primary source of energy for all living organisms. It therefore must not be viewed with complete disfavour. However, the worrying form of sugar — added sugar, which makes its way into our food and drinks — does deserve its bad reputation.

In the past, sugary treats were reserved only for the rich. During this period, the bulk of the human population persisted on a diet rich in vegetables and fruit — food which can be cultivated with relative ease, and which reduced the need for travel. In fact, the birth of agriculture paved the way for modern societies; the loss of the need to travel allowed families to congregate into communities — first came the village, then the town, and ultimately the city.

It was only years after the industrial revolution of the 1700s that the techniques required to process sugar on a large scale became available. However, technology was not the only factor that played a role in the proliferation of sugar. Sophisticated distribution networks were necessary for the invasion of sugar — a crop grown in warm regions such as the Caribbean — into western Europe. The lack of such networks created a scarcity of sugar in Europe, and with scarcity comes increasing prices. The profitability of the sugar trade thus caught the eye of past western powers, namely France and Britain, and spawned many of the conflicts in the West Indies in the 18<sup>th</sup> and 19<sup>th</sup> century.

Once sugar was introduced to the western world, its consumption grew larger and larger, reaching a peak, in 1961, of 47.3 kg per capita in the UK. However, in 2019, the sugar consumption in the UK was just 29.8 kg per capita. What happened? A quick and simple answer would revolve around purchasing power. The costs of living outpaced wage growth during the decades that elapsed

between the 1960s and today. Accounting for inflation, the cost of tuition is higher and the costs of home-ownership are higher. This argument might seem convincing, but if you have ever visited a supermarket, you would think otherwise.

Of all the snacks found in a supermarket, custard creams are my favourite. In a Tesco's store, a packet of 32 custard creams is worth 40 pence. One custard cream biscuit, according to the packaging, accounts for 4% of your recommended daily sugar intake — and the unhealthiness of this is signposted in red. 40 pence will not make a dent in anyone's budget, and sugary snacks are generally very cheap in comparison to healthier alternatives. The decline in purchasing power per capita is therefore not responsible for the fall in sugar consumption. The difference between the 1960s and today is that we are now aware of the consequences of high sugar consumption. Healthy-eating campaigns and Weight Watcher's ads have morphed our taste for sugar from sweet and succulent to poisonous and toxic. This change in social taste is ultimately responsible for the fall in sugar consumption, to the benefit of us all.

The real danger of sugar is that it is just as addictive as many of the mainstream illegal drugs — I will use cocaine as an example — yet it is much cheaper. A quick internet search will reveal that 3.5 g of cocaine costs between £95-120, amounting to a price of £27-35 per gram of cocaine. One custard cream in the Tesco's pack of 32 contains 3.4 g of refined sugar, amounting to a price of 0.24 pence per gram of sugar. The unit price of cocaine is therefore 13,000 x the unit price of sugar. An addiction to cocaine would therefore drive you into bankruptcy, as it often does for many of its addicts, whereas an addiction to sugar would hardly place a financial penalty on the sugar addict. This cheapness of sugar, combined with its potency, makes

Photo credits: Wikipedia Commons



it a deadly threat to the poorest members of society, who lack the financial power to buy healthy food.

Despite our thorough understanding of the sugar crisis, not much is being done about it. This has a simple explanation. For any problem that demands a change in public policy, nothing will be done to fix that problem unless there is a political incentive — more votes — to do so. Making it tougher for people to buy their favourite food, whether it is unhealthy or not, hurts the consumer and hurts the supermarkets, although it would be for the greater good of society. The government must therefore proceed with caution on this matter.

Unfortunately, the approach that policy-makers must take is unclear. Action could come in the form of a sugar tax, which has already been applied to soft drinks in the UK, or sanctions on supermarkets which offer discounted snacks and buy-one-get-one-free deals. All approaches would likely be met with fierce resistance from the consumers and from the powerful companies that benefit from the sugar crisis. Despite these obstacles, action must be taken to clamp down on high sugar consumption. A substance that impairs cognitive function, renders it consumers prone to mental disorders, and is just as addictive as a class A drug should not be found for 0.24 pence per gram on the shelves of Tesco.

## SPORT

Edited by: AMANDA BARDEN  
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# Bias and Brutality: Liverpool Fans tear-gassed and beaten at Champions League Final

Niamh Heneghan Sport writer

As excitement grew and viewers tuned in to the highly anticipated Liverpool vs Real Madrid Champions League final, the promised night to remember instead became a nightmare.

Broadcasted across the world, UEFA's dishonest message of a delayed kick-off due to 'late fans' and 'fake tickets' left a sour taste when breaking news notifications told a different story of chaos and despair. Reports flooded in of thousands of Liverpool fans penned within the stadium grounds, suffering as police released tear gas and pepper spray, and beat people indiscriminately.

## Watching a Nightmare Unfold

Set for a 9pm (CEST) kick-off, Real Madrid and Liverpool fans arrived hours earlier to queue for entry into the Stade de France. Separated down different sides of the grounds, it soon became apparent that there was a disturbance in the Liverpool section where fans were not being let in. Encountering multiple checkpoints where fans were stopped abruptly without reason, there were concerns about the lack of communication between fans and marshals. Along with this, unusual policies regarding security had only female fans searched and patted down. Fans who reached the final ticket validation turnstiles faced further confusion as the gates were not opening as they should. Fans were informed that tickets were fake; tickets that had been validated prior to reaching the final section and were most definitely not fake, were suddenly no longer working.

As more fans poured off the trains and into the grounds, poor organisation left crowds building in the heat. Only a few fans were finally allowed to enter through the last checkpoint, though this was a slow process as they were instructed to crawl under the non-functional turnstiles. This backlog significantly delayed the movement

of the crowds and caused more issues as tickets were now being individually validated by frustrated security. As the crowds continued to build into a crowded space, fans attempted to keep calm and communicate with each other to prevent crushes – a human kindness soon to be met with police brutality.

## Chaos

As large throngs of fans queued at the gates, agitated security called in armed police who released tear gas into non-aggressive crowds and fans near gaps in fences or at turnstiles were pepper-sprayed. Some young children were attacked before their parents could move to protect them, hurt by authorities that were meant to help keep people safe. Perhaps more horrifying, riot police were deployed against the peaceful crowds and fans were left cowering as those around them were beaten bloody. As dismayed shouts and pained screams rang out, fans remained calm despite the terror and tried to protect themselves against the gas with scarves and flags. As the onslaught continued and reports continued to flood social media, fans at home no longer cared who won as the safety of their loved ones took priority. As the match began, many fans were never granted entry into the stadium, and those that did described feeling 'shell shocked'.

Liverpool did not win the match and Real Madrid scored the only goal of the game. Towards the end of the match, police armed with automatic weapons flooded the Liverpool end of the stands despite few guarding other sections of the pitch. When the full-time whistle rang, Liverpool fans moved to flee the stadium, faced with dangerous barriers on stairs and no direction, they feared what awaited them. That no one suffered major injuries is a testament to the fans' united patience. On descending towards the exits, local hooligans were seen throwing flares into the grounds. Despite it being clear that none of the Liverpool fans had thrown these flares

due to different clothing and location, fans faced further violence as multiple tear gas cannisters were opened upon the crowd. This was the final insult that made it clear that the brutality towards the Liverpool fans had nothing to do with their behaviour but was instead biased specifically towards them.

## You'll Never Walk Alone

As police and UEFA destroyed the trust of fans through their lies and brutality, the support Liverpool supporters showed towards those who were attacked was representative of the true spirit of football.

Liverpool fans came together to support one another in the long queues. They remembered other stadium disasters where football fans have died due to poor organisation, incompetence, and lack of humanity, so they stayed calm and attempted to protect those around them. Images and videos have been shared of their bravery (standing between their aggressors to protect children, those with disabilities and the elderly), their compassion (washing the eyes of those who were pepper sprayed), and their unity (remaining calm in horrific circumstances and sharing what

they had to protect people). Many more tales of kindness will filter through and we should embrace them, as in those hours of chaos, the Liverpool fans exemplified that they will never walk alone.

## The Future of Football Events

As investigations are carried out, ensuring that the incident will be swept under the rug by UEFA and French authorities, I hope that people will remember the humanity of those they claimed brought such brutality upon themselves. Should we not fight for the safety of fans attending games? If normal and innocent people acting peacefully when queuing for events can be attacked without consequence, things will not change. As we look to the future of football events and watch communities of fans attempt to heal both physical and emotional wounds from the past weekend, I hope that we will also grow united so that all can feel safe when watching the sport they love.



Police in riot gear (credit: Envato Elements)