



Brady says “Big no” to big changes at Imperial College

Credit: Imperial College London



Ameena Hassan Editor-in-Chief

In August 2022, Imperial College London gained its 17th President: Professor Hugh R. Brady. His predecessor, Alice Gast, came to the end of her contract as Imperial College London President, and has now been awarded an honorary Emeritus Professor title at Imperial, despite the release of a QC report that established that she had bullied one member of staff, and that she had “personally and professionally undermined” a member of College staff.

President Brady was appointed by the College Council, and the student body was not consulted during the selection process. *Felix* sat down with Imperial College President Hugh R. Brady on 14th September. At the time of publishing, he has been the 17th President for a little over two months, and was seen attending the Welcome Fair on Tuesday, 4th October. At the time, he had been in the role for six weeks.

This can't go on

Open letter about bullying sent to senior members of College

Ameena Hassan Editor-in-Chief

At 11:25pm on 6th October, an open letter went out to President Hugh Brady, Provost Ian Walmsley, and Director of Human Resources Harbhajan Brar, along with at least 138 other people requesting that the President commit that “policies, procedures, and processes [relating to harassment, bullying and victimisation] are ‘absolutely’ followed for all staff and students”.

The staff member in question told *Felix* that they felt compelled

to speak out, describing the bullying and harassment at Imperial College as ‘endemic’ and told *Felix*: “In my opinion, I’ve seen too much of it”. They said they knew of “lots of people” who had faced difficult working environments. They also said that things had not improved since the publication of the QC report on bullying by senior members of staff at Imperial, which led to then-CFO Muir Sanderson’s resignation and Alice Gast’s apology for her conduct.

Responding to the article published in this issue of *Felix*, the member of staff expressed surprise and dismay at Hugh

Brady’s view that “no big changes” were needed, but hoped that this did not relate to mental health issues.

London regional official for the University College Union (UCU), Barry Jones, said: “UCU members report an endemic culture of bullying at Imperial”.

The Imperial College Union President, Hayley Wong, in response to this open letter said, “We stand in solidarity with all those impacted by the events outlined in the McNiel report. We look forward

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Q: During this transition time, are there any big changes that you think you would like to make to start off the academic year?

A: Big no, I think the last thing a new President should do is to come into a really successful institution and change things immediately.

Q: I’ve heard rumours that the President’s board and the Provost’s board might be merged. Any comment?

A: Yes, they will be merged. In fact – they have been merged.

The President’s Board and Provost’s Board were merged to form the University Management Board, and first met on 27th September. The next meeting is on

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EDITORIAL

Energy efficiency

This issue was produced thanks to the work of

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Over the last two weeks, I have received 12 different notifications to articles that all read along the lines of “10 ways to decrease energy costs this winter”, or “Save on your electricity bill with these simple ideas”. Some of the recommendations are repeats from previous years: bundling up, not using a kettle unless necessary, sealing drafts.

A large majority of university students live in rented housing on yearly contracts, and as such don't have as much bargaining power to convince their landlords to part with the money required to make major structural changes that conserve the most heat. Replacing an inefficient boiler costs at least £4000, but the average is just under £8000, not including installation costs. The problem with paying high costs now for greater savings later is that this requires heavy investment now from people who will have money later. Crucially as well, landlords are the not ones that suffer from high energy costs. Students in private accommodation protect landlords from rising bills by paying themselves, a difficult feat given that rents in London are already 20% higher than they were last year.

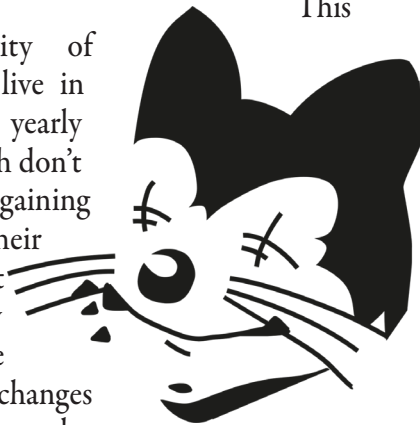
Poor wall insulation, according to Northern Energy, accounts for between 35 to 40% of heat loss in homes. This is massive when coupled with heat loss directly from the roof, which causes about 25% of total heat loss. This then also has to factor in that students can barely afford rent, and favour older homes that are less likely to be well maintained, and live in basement-like rooms that are closer to the ground and hence lose a lot more heat.

There must be a realisation at some point that the London does not have an infinite capacity to absorb people. House building in the areas that people

want to live has been non-existent since the 70's and pushing students ever further out to Acton and beyond is not a solution but profiteering by the College, whose actions in adding 3000 new undergraduate places do not pay any consideration to where these students will live in the following two, three or more years they spend at the College.

This is not a solution for the College. It is an issue much larger than any single organisation, that have pursued rational policies in a market suffering serious aberration. Instead, sacred cows like the green belt and planning and conservation policies must be rationally re-examined. British people love conservation, however, it often confused with environmentalism lending NIMBYs protecting the price of their house a moral fervour they do not deserve. It is essential that the dialogue around house building is not allowed to be polluted by American-style disgust at developers and their portrayal as gentrifiers. This attitude can only drive people out of areas they have lived in for years and condemn them to long commutes.

London can't become a city only for the rich. As we all learnt during the pandemic, London depends on the people doing jobs many look down on and we forget them at our peril. The same thing goes for students. If Imperial wants to remain a place where people from all walks of life can attend, then the current housing situation is a serious impediment.



Statement of Intent

At Felix we believe that it is always in the interest of the students to know. Transparency in the workings of the College and the work of your student representatives is key. Therefore I, the Felix Editor, on behalf of the team promise that:

We will, to the best of our ability, tell you the whole truth and nothing but the truth.

We will keep your confidence and will only publish something you say to us if you have explicitly said that we can.

We will work to expose unfairness and discrimination in all forms that it takes at the College .

We will treat fairly any article sent to us, regardless of point of view, and do our best to work with you to prepare it for publication.

**Signed by Ameena Hassan
Editor-in-Chief**

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25th October.

Q: Is this not a big change?

A: I don't think that's a big change, I think it seemed logical to me after having used the last three months engaging with my colleagues and teammates. Many of them had come to the conclusion that the President [and] Provost Board worked really well for a certain period of time, but given all the pressures on the institution and on the leadership team, that now, more than ever, we need to have a single unified board because the challenges are coming from all angles. We actually had our first meeting this week. We had a residential where we met for a day and a half as a team.

Q: Is there something you're looking forward to doing in the next three to five years?

A: I'm looking forward to leading Imperial during what will be exciting, but equally challenging time. I think it's about building on success. Looking from the outside, from my experience in Dublin, Toronto, Boston and Bristol, on comparing notes with col-

leagues, they comment, you know, "Wow, Imperial is really moving places, that of all the universities in the UK it has probably moved up the ranks by an impressive degree where it's now QS top ten of the world. It's also less well resourced than, for example, highly endowed American universities, or state-backed Asian universities.

Q: Let's move away from changes. Mental health was a major concern of students at Bristol. Is there anything you've seen in Imperial's mental health provision that you think is good, or is there anything you would like to bring to Imperial from Bristol?

A: This is one of the most significant public health challenges facing not just students, but staff as well. I think in universities we are in a privileged position where we can often spot students who are developing mental health issues early, and help support them. We can help them transition to the NHS, but of course we're not the NHS. I'm delighted that some of the initiatives we launched at Bristol are also engaged with at

Imperial. For ex-

ample, the opt-in policy whereas a student can nominate a friend or colleague or a former teacher or parent that we can contact if we deem that they're running [into] some difficulties. One of the things I'll be doing with colleagues is, saying it's certainly possible given all the things that are happening in the world, that this is not going to go away as an issue. Mental health issues among staff members and universities across the world are increasing, so we will be ensuring that we have a whole institution approach to mental health, that all of our initiatives are joined up, coherent, and then networked into the NHS.

Q: Let's talk about student engagement. You met with Officer Trustees in late August. You expressed at the time that you'd like to work with them, but so far, they haven't reported having a meeting scheduled. How do you plan

The official unveiling ceremony for the ALERT statue took place this Monday, 3rd October. See page 5 for photos.

on engaging with students?

* We later realized that this meeting occurred on 5th September, 9 days before this interview.

A: I think this was only two or two and a half weeks ago, to be fair. I really enjoyed meeting with them and hearing their plans and priorities. This is the third university that I've been President of, so personally and professionally, I take pride in engaging students as partners in all decisions that affect students. What I hear is the case in Imperial is that students have been really fantastic contributors at Council level; at university senate level, at faculty level, and then within departments. What I found very useful in the past was for members of my team responsible for education and the student experience to sit down with students as soon as they are elected to hear what their priorities are early, and then schedule during the year a number of regular meetings. Certainly in my experience, that's really worked. Equally, if they feel that there is an issue that's brewing, they [should] let us know early. What we usually find very reassuring is the priorities are usually pretty similar on both sides. One of the issues that came up over our residential was the importance of regular and meaningful

engagement with students on all issues that affect them, and I'll be working with [Dr] Peter [Brian, new Vice-Provost (Education and Student Experience)] to make sure those will take place.

Q: What do you think of ALERT?

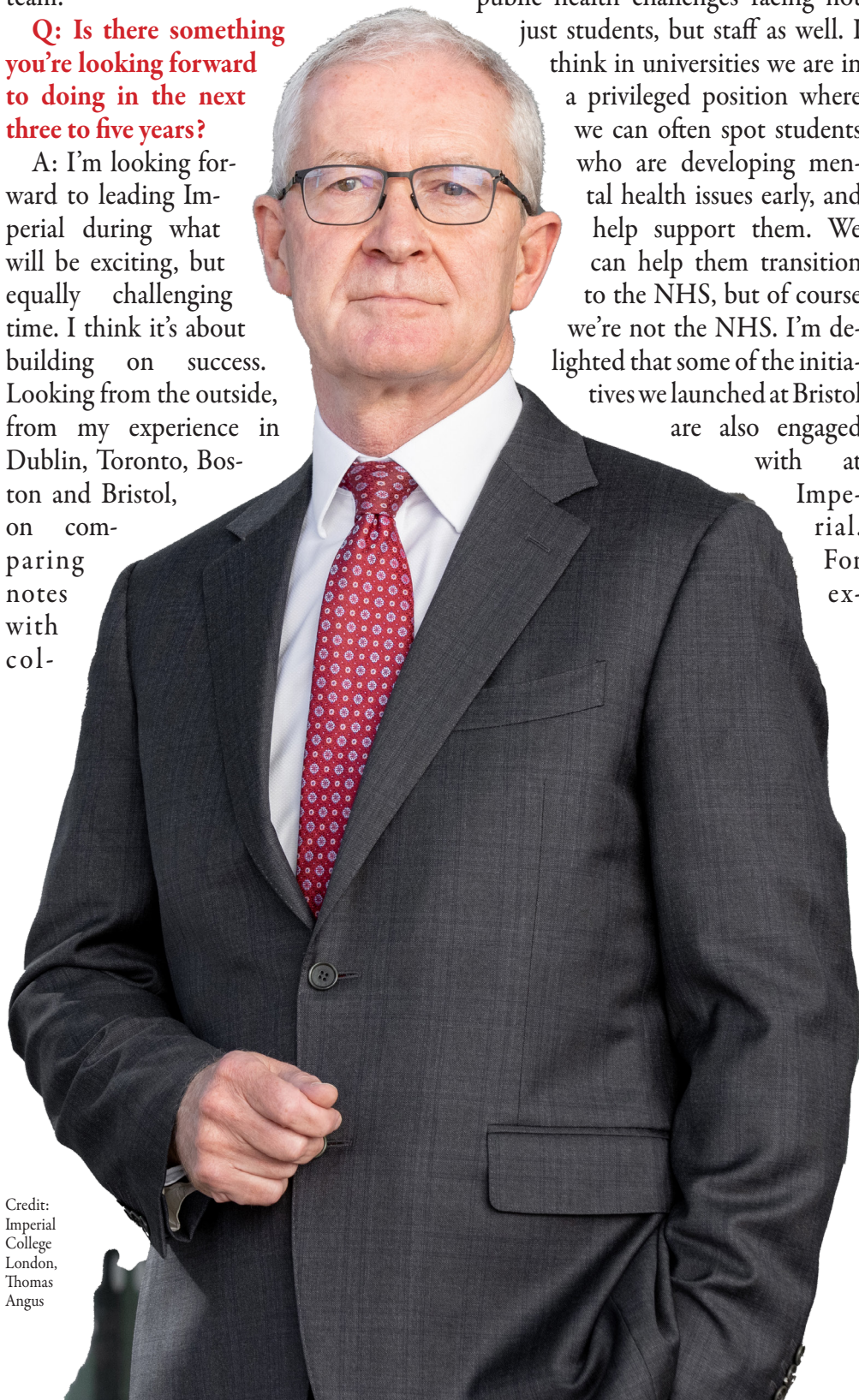
A: [Sir] Antony Gormley is undoubtedly one of the world's foremost living artists and so we're delighted to be gifted one of his pieces of work. I haven't seen it yet, and I imagine like any piece of art is supposed to be inspiring and challenging in equal measure. No two people look at one piece of art in the same way. What I'm hoping is, as part of our effort to make Imperial a much more permeable institution, so it's not just engaging for our students or staff, but also for the local community, alumni, and people further afield.

Q: According to the Financial Review 2020-21 document, there was a statement that Imperial "has a high reliance on the Chinese students...make up 19.3% of the student population". Is there anything you would like to do based on this?

A: [Rather than] the goal of diversifying, I prefer to approach that from an educational point of view. We're seeking to create a learning community that is reflective of the world into which our students will graduate and live and work. Most of our graduates live and work in very diverse communities. Diversity [makes for] a better research environment. As you know, China is a huge part of our world and we have many really smart Chinese students. There are undoubtedly tensions between the China and the UK and US at the moment, but we have to be cognizant of those tensions and concerns.... We need to continue to build a magnet for the best Chinese research challenges.

Q: Do you think there should be better provisions for students from home countries?

A: Widening participation was one of my priorities in Bristol and Dublin, and I'm very encouraged that it's on the radar of the management team and every department that I visited. ...look at what the numbers look like in university wide faculties, departments, and can critically review the programs we have in place already and ... if necessary, be willing to be quite radical in what we need to do.



Q: With the cost of living becoming such a massive concern for students, are there any plans for Imperial to make increased provision for those who need support?

A: It's a really good question. I suspect, given cost of living crisis, inflation, energy, that we may see more students seeking support than in previous years. Imperial has a Student Support Fund and hardship funding, and we'll be monitoring that very carefully and making sure that the fund is fit for purpose in terms of the criteria.

Q: Would you be concerned about the quality of research being affected because of postgraduates and undergraduates being priced out of living and working in London?

A: What I do know is that one of the great draws of Imperial is not just its educational and research excellence, but actually its location in what I think is the world's best city. When you look at it subjectively, [we] still are attracting really fantastic students. If it becomes an obstacle to recruitment and our retention, then we will ask 'what should we be doing?'

Q: Follow-up: I know of PhD students who say that they are "doing the entire PhD over Teams because I can't afford to travel in". This could disproportionately affect students from a widening participation background.

A: It's definitely something to look at. Having said that, what COVID has enabled us to do is fast forward in terms of our digital capabilities... PhD experience or indeed the general experience is that the multimodal, I think, that works really well - that it's in person combined with digital educational research... certainly as I tour departments, see if that comes up as an issue.

Q: Would you want to have more casual meeting with students beyond, for example, targeted focus groups?

A: I think there is a place for both, and getting a combination of the formal and informal is something I enjoy, so you will see me wandering on campus. I hope I'm viewed as approachable and visible.

President Brady was visible at Welcome Fair earlier this week, as he visited various booths.

Q: Six weeks in, is there any specific work you've started on improving or are working with people on?

A: The biggest is the engagement process. I've already probably met several hundred people across the institution and leadership at all levels. I have already met the student union, and have started departmental visits. I'm hoping to visit all our departments, meeting not just departmental management teams, but early career researchers, and bespoke sessions with students. I've just completed the residential with my own team and it was fantastic to get to know them as people and hear their ambitions and dreams for Imperial, as well as what's worrying them for the year ahead.

Q: Were there any issues raised at the residential that you previously hadn't been aware of?

A: No, the way I approached that is say "look, I want to hear you as a team", and asked: What do you think Imperial will look like in 10 to 20 years? How will this be? Who are we looking to compete with? Who are we looking to partner with? And equally, what are you worried about? How we've got to work together to solve those issues.

For example, student identity. It's very much an engagement thing and then what we will do is then start to roll that out across the institution with a view to



I'VE INHERITED A BRILLIANT MANAGEMENT TEAM.

then developing a new strategic plan got Imperial that tries to get that balance right between the short term, medium term, and the long term now. The quality of conversation was fantastic. I've inherited a brilliant management team.

I was equally impressed by student leaders, by their ambition for the institution. So the last thing that I should do is come in and say on day one I want to change.

As the interview came to a close, President Brady also mentioned that he "enjoyed our chat", and would like to "do it through the year".

If there is something that you wish to know more about concerning this interview, do email felix@imperial.ac.uk

... continued from page 1

to working with Professor Brady and the rest of the College in making sure that the right policies and procedures are implemented effectively."

On Monday, President Brady sent an email to all staff and students, titled "Starting the new term", in which he reminded staff and students that "support is available ... and that it is a sign of strength, not weakness, to ask for help", reassuring them. They also expressed concern about potential repercussions, joking that they might not be around at the College next week. They have been employed at the College for 25 years.

In the open letter, the staff member quoted a *Felix* article from 8th October 2021 (c. 1778) in which *Felix* summarised then-President-elect Hugh Brady's remarks on a Technical Healing podcast about the unusually high suicide rate at University of Bristol in the years 2016-18, while he was Vice-Chancellor.

The QC Investigation Report was the

subject of an FOI request, and a redacted version was published in February 2022 after the ICO commission ruled that it was in the public interest to do so. This ruled that then-President Alice Gast had bullied one person, and with then-CFO Muir Sanderson, had contributed to creating a hostile working environment. Muir Sanderson resigned shortly after the publishing of the report, and Alice Gast continued until the end of her tenure in July 2022.

The open letter alleges that "the Imperial Community were rightly concerned, upset and angered by what had happened", adding that the "report showed that procedures were not followed", citing the comments of sexual and racist nature quoted in the report.

According to the staff member, this report was the "consequence of not adhering to College policies, procedures and processes", and they expressed concern over the mental and physical impact on the victims. They then went on to describe that Mr Brar personally assured the Imperial community that

"the College's policies, procedures and processes were 'absolutely' followed in relation to the investigation conducted and also their disciplinaries.", citing that the College's full Harassment, Bullying, and Victimisation and Disciplinary Policy "was followed in the investigation".

The member of staff reminded the President, Provost, and Director of Human Resources that the College has a legal Duty of Care to protect staff and students, and laws, policies, procedures and processes exist to ensure that the people are treated fairly, consistently, and equitably. Finally, they asked that President Brady support the Imperial community by assuring a safe working environment that protects mental health and wellbeing.

As of the time of writing, President Hugh Brady has not yet confirmed the above. On 1st August, President Brady sent an email to all staff and students, titled "Joining Imperial", in which he stated that he would "want to hear how we can build an even more inclusive, diverse

and supportive College community." In the same email, he thanked Alice Gast for "steering the College through difficult times". An Imperial College London spokesperson said: "Bullying and harassment are unacceptable and must not be tolerated anywhere within our community. We have strong systems in place to enable this for both our student and staff communities. We will never be complacent and we will continue to listen to our community on this important issue."

If you have experienced bullying at the College, scan the QR code to report it to us. Your comments will be held anonymously by Felix.



Imperial's Jameel Institute announces new pandemic preparedness initiative

Jamie John Deputy Editor-in-Chief

The Jameel Institute-Kenneth C. Griffin Initiative for the Economics of Pandemic Preparedness, was announced on 30th September, at the Philanthropy Asia Summit in Singapore. Co-funded by a £3 million gift from billionaire Citadel founder and CEO Kenneth C. Griffin, and a separate gift from Community Jameel, the initiative will provide data and analysis to inform public health decisions related to pandemic preparedness and disease outbreaks around the world.

Epidemiologists, economists and data modellers from Imperial will work together with researchers from the WHO, Umeå University in Sweden, and partners at the National Centre for Infectious Diseases in Singapore.

“Throughout the COVID-19 pandemic, we saw the vital importance of accurate projections and modelling to

prevent deaths. Unfortunately, they had much less reliable evidence on the enormous social and economic impacts of pandemic mitigation. Our mission is to establish a robust and trusted methodology to forecast the potential human impact of future pandemics, across health and the economy”, said Professor Katharina Hauck, leader of the new initiative and Deputy Director of the Jameel Institute.

The group will produce a publicly available digital scenario-based dashboard to model preparedness levels of over 150 countries. In addition, they will conduct more in-depth analyses on key topics of concern in five countries, working with research organizations and government partners in Singapore, Indonesia, Thailand and Vietnam, and potentially the Philippines and/or Mexico.

The initiative also aims to provide evidence to governments, international health organisations and businesses, on

About the Jameel Institute

The Abdul Latif Jameel Institute for Disease and Emergency Analytics is based in the College's School of Public Health and aims to combat disease threats worldwide. It was co-founded by Imperial in October 2019 together with Community Jameel, an organisation launched by Saudi billionaire Mohamed Abdul Latif Jameel. Throughout the pandemic, the institute's mathematical modelling has played a critical role in shaping government policies across the globe, most notably in the UK, where its March 2020 report on the impact of different COVID-19 strategies drove the British Government to adopt a more stringent measures to suppress the virus. The director of the institute, Neil Ferguson, will be played by actor Anthony Howell in the new Sky TV drama, *This England*. The show features Sir Kenneth Branagh as Boris Johnson and tells the story of the UK's early response to COVID-19.

the impact of alternative policy strategies. “Using an integrated economic-epidemiological model of hypothetical pathogens, we will measure impact on deaths, economic costs due to business impacts, and social costs due to school closures,” said Professor Hauck, speaking to *Felix*.

The team's work will build on the

DAEDULUS model, developed during the pandemic to calculate the outcomes of a range of COVID-19 control strategies. “Part of our research will be to further develop this model and improve on the science behind it in a substantial way”, said Hauck.

In Pictures... ALERT statue inauguration

Credit: Imperial College London, Thomas Angus

Imperial's newest member unveiled

This Monday, the ALERT statue was unveiled by the College at a celebration event to formally thank the donors, Brahmal Vasudevan and his wife Shanthi Kandiah. Creator Sir Antony Gormley OBE RA was present, along with senior figures from within the College

Provost Ian Walmsley

President Hugh Brady



President Hugh Brady (right, foreground) at the celebration event. Standing on the far left is Provost Ian Walmsley



Left to right: Gormley, Kandiah and Vasudevan pose in front of ALERT



Gormley addresses a group at the celebration event in the Sir Alexander Fleming Building



Gormley, the donors and others posing in front of the statue

COMMENT

The College lets us down by shunning the humanities

Sam Lovatt Managing Editor

“The function of a University is essentially to produce good citizens, to give a complete and well-rounded-off education to its members and to encourage the pursuit of learning and research.” - Adam Sedgwick, Professor of Zoology at Imperial College (1909-1913), paraphrasing Henry VIII on the opening of Trinity College Cambridge, in a letter to Imperial College’s Governing Body in 1910.

Sedgwick goes on to differentiate Imperial College from other universities, stating that the purpose of the college, according to its Charter, is “to give the highest specialised instruction and to

provide the fullest equipment for the most advanced training and research... especially in relation to industry.” This was the founding principle of Imperial College, and in 1910 this applied fully - the idea behind the College’s conception was to produce individuals sufficiently trained to operate mines elsewhere in the empire. This is why we are called Imperial College, and not Imperial University.

This vision is very far from the Imperial College we know today. Last year we were ranked 6th best university in the world by the QS rankings, in the same field as Oxford, Cambridge and every other institution that teaches humanities. Study at Imperial College is not a specialisation that allows one to go

on to use the skills acquired to efficiently run a diamond mine, and indeed, a small minority of graduates directly use the knowledge and skills they learned in their first job out of university. We are in every way a normal university today: just one that teaches no humanities at all.

The idea of the “gentleman student” (for they were almost always men) that was expected at the time of the college’s conception, when a tiny minority of people attended university, is long dead. Such learned men of the past typically came from wealth and had spent their upbringing reading and learning a plethora of different subjects. It wasn’t uncommon for a student to understand our Latin motto in the early 20th century.

Again, today is wildly different - I don’t know of any surveys that attempt to answer this question, but from my experience in talking to Imperial students, most simply do not even read books.

Focussing only on science and not at all on any other field makes one highly specialised and likely extremely proficient at the discipline they are trained in, but with nothing more than their natural capabilities to do anything else. It makes one a well-sized and well-oiled cog in the machine. And I, as neither a Communist nor an ant, do not want to be a cog in the machine. The scientific method lays out the blueprint to discover exactly how things happen, not why. I want to know why.

That being said, I do not suggest that the College starts up a humanities faculty. Though to my knowledge a similar move hasn’t happened at another elite university, the process would probably be akin to starting a new institution altogether. Pairing some of the country’s best STEM students with what would, at least initially, be some of the country’s least promising humanities students, is not much of a viable path.

A merger with UCL, that would have created a “super-university” that would “eclipse Oxford and Cambridge”, was briefly mooted by the leaders of both institutions in 2002 before being shelved. Besides the myriad pros and cons associated with such a move, this would have been a near perfect solution to the problem at hand. However, not only did the UCL merger not go ahead, but in 2007 Imperial College seceded from the University of London (UoL), further isolating itself from the other world leading institutions in the same city.

And this is where we find ourselves today - an ivory tower of STEM with only optional horizons courses as in outlet for any broader thinking. I don’t think there are any one move solutions, but rejoining the UoL would be a start.





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THROWBACK

Edited by: NEGA FELIX

Bar faced cheek



Pascal Carr was shocked last Saturday when a lady accosted him in the Union Bar and proceeded to remove her clothes. The strip-o-gram was a present from his friends.

Some regular customers in the Union Bar have observed that if women are going to indulge in this sort of behaviour, it might be better if they were not allowed in the bar at all.

R.C.S. Women rejected.

The last R.C.S. Union Meeting held on Tuesday 20th March in Chemistry Theatre B attracted a total attendance of about 160. The members dealt quickly with proposed changes in the Union Rules, the proposals being passed by a majority of 90, and listened patiently with only mild cheer and boos as John MacManus presented the I.C. Council Report.

The major item on the Agenda was the Staff-Student Debate, the motion before the House being: "This House believes that the woman's place is in the home and not in R.C.S."

Dr. Hills, the Senior Treasurer, was the first speaker for the motion, and, speaking with skill and precision, held his audience from the beginning. He began in good debating style by defining the terms of the motion, concentrating on the word "woman". He said no clear definition was possible, since women so often look like men, but listed 6 properties:

1. Women usually have small feet.
2. Have a low power-to-weight ratio.
3. Seldom wear beards.
4. Generally do not have dirty fingernails.
5. Tend to have high voices.
6. Usually have a high chest-to-waist ratio.

Anyone who has 4 out of these 6 properties can be fairly safely taken to be a woman.

Dr. Wilson, opposing the motion, relied most effectively on subtleties, hints, and double meanings. He asked why, if women have equal desire, opportunity, and ability,

they should not come to R.C.S. A scientific training would help them in their married lives a great deal in saving fuel bills, for example.

Mike Harris, seconding the motion, was horrified at the effect R.C.S. had on women. Chemists smelt horrible, Physicists became cross-eyed, Zoologists had parasites in their hair, and Botanists had grass growing out of their ears. His speech was high-lighted by the way he nonchalantly caught an apple hurled at him. Unfortunately it turned out to be an egg of dubious age, which shattered violently.

Miss Carole Bedingfield also spoke for the opposition, but she had scarcely informed the Union (with some pride, one felt) that she had spent the previous night (or was it evening) with Finlay D.

McPherson when another ancient egg, thrown with fiendish accuracy, hit Robin Salmon on the ear with such devastating force that he was unable to take down any more of her speech. Miss Bedingfield appeared to be very popular with her audience and as the applause died down the vote was taken. The motion was passed by a large majority with further egg throwing and loud applause.

MOTIONS

MOTION ON PORNOGRAPHY.

Proposed by: Michael Newman (Life Sci.2)
Seconded by: Liberal Club.

I.C.U. Notes:

1. That R.S.M. Union organises and holds annually an event called 'Hon. Porn. Night' this has involved the showing of hard-core pornography and strippers performing lesbian acts on stage. This is completely paid for by R.S.M.U. funds and by an admission charge.
2. The pornographic business is a large multi-million pound industry relying for its profits on the corruption and sexual degradation of young children, teenagers, adults and animals.
3. Pornography is aimed primarily at a male audience and involves the portrayal of women and sexual organs to be used and abused. It portrays, perpetuates and derives from an attitude that women are inferior, are bodies to be leered at, to be laughed at, to be masturbated to and to be used and raped.
4. It is the right of individuals over the age of 18 to entertain themselves in whatever manner they choose so long as it does not hurt anyone else and is done in private.

SCIENCE

Can we revert ageing?

Wang Guo Staff Writer

Ageing is usually defined as the gradual deterioration of the body over time. However, a new definition of ageing, as the loss of functionality of the cell, the basic unit that forms our bodies, is gaining more widespread acceptance in the scientific community. Cells accumulate damage in their DNA, leading to a slow and gradual loss of function. There are certain external factors such as diet or exposure to mutagens that can accelerate this process, but cells will malfunction in the end regardless of our healthy habits, because the mechanisms that regulate DNA are imperfect. Ageing (and death) may seem the unavoidable fate of every living being on this planet. However, by using a technique called cellular reprogramming, we may be able to revert it.

Ageing is mainly caused by DNA damage, but DNA damage consists of more than just genetic mutations. Epigenetic factors are molecules that bind and interact with DNA to switch on/off particular genes, regulating DNA expression. These factors may be as important – or even more important than – mutations in the DNA itself. Each time an epigenetic factor works to activate or silence a gene, it is displaced

slightly from the original site of the DNA it was bound to, worsening its regulatory activity over time. All the cells of a baby will have all the epigenetic factors in the right place and working properly, whereas almost all the cells of an older person will be displaced and act over the wrong gene.

Cellular reprogramming is one possible solution to this problem. It works by returning normal cells into their earlier forms: stem cells. These cells are unique in that they do not “age” over time and are capable of specialising in different cells of the body from skin cells to neurons, which do age. The idea is to turn old cells into stem cells again, which would divide into young specialised cells, rejuvenating the body and restoring its functionality.

Surprisingly, a dramatic event like a somatic cell backing into a stem cell does not require complex genetic engineering or laborious techniques. In fact, we only need to inject into the specialised cell four molecules called Yamanaka factors: Oct4, Sox2, Klf4 and Myc. These are epigenetic factors that inhibit somatic cell genes while activating stem cell genes. Becoming a stem cell again means returning to the starting point, so all the epigenetic factors previously displaced

Tech Writers Needed!

Interested in writing about tech? Whether it's new releases, retro throwbacks or a piece on technology's impact today - contact science.felix@imperial.ac.uk to get your article in *Felix*.

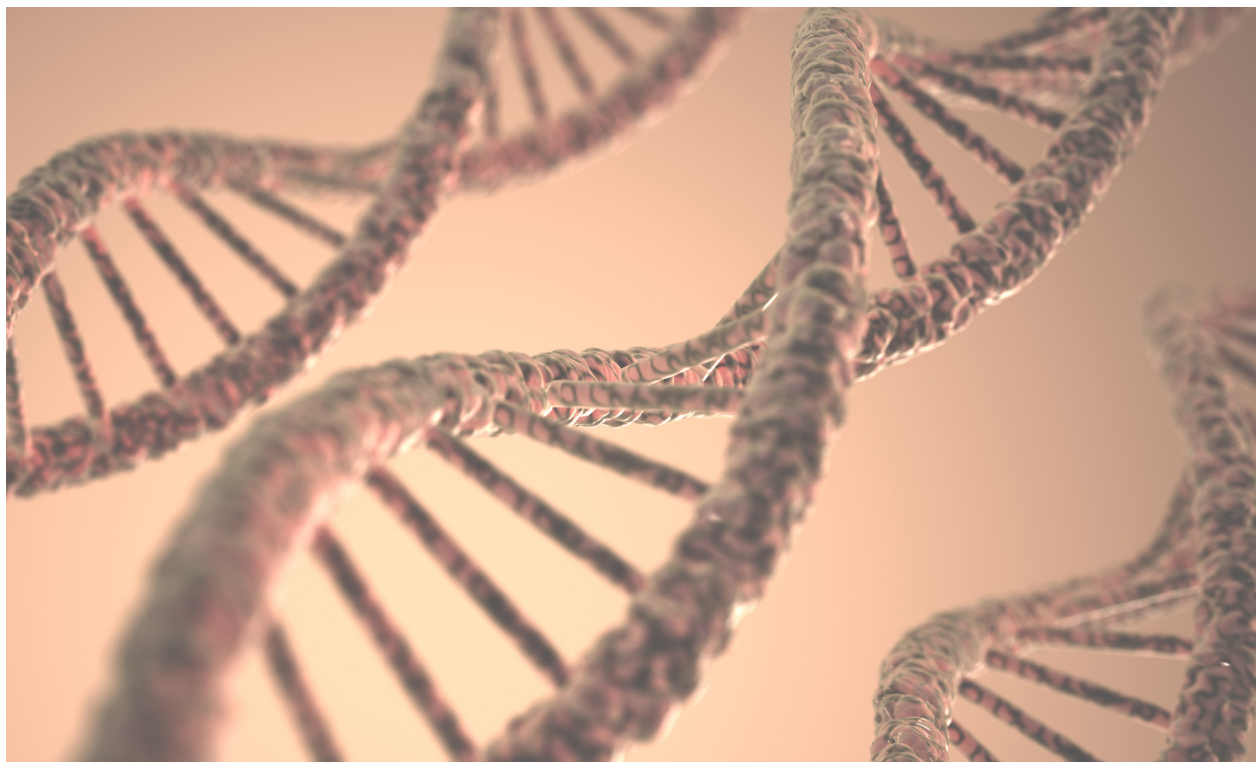
due to ageing can return to their original positions. However, in becoming stem cells, cells lose their functionality and hence, need to specialise again. This is one of the major challenges which has limited the therapeutic applications of cellular reprogramming: we still do not know how to convert these rendered stem cells into highly specialised cells such as cardiomyocytes or neurons.

In 2017, scientists succeeded in transforming skin cells into fully functional neurons. The scientists determined the success of the reprogramming technique by applying a voltage to the transformed skin cells, finding that they reacted exactly as neurons should. However, they were

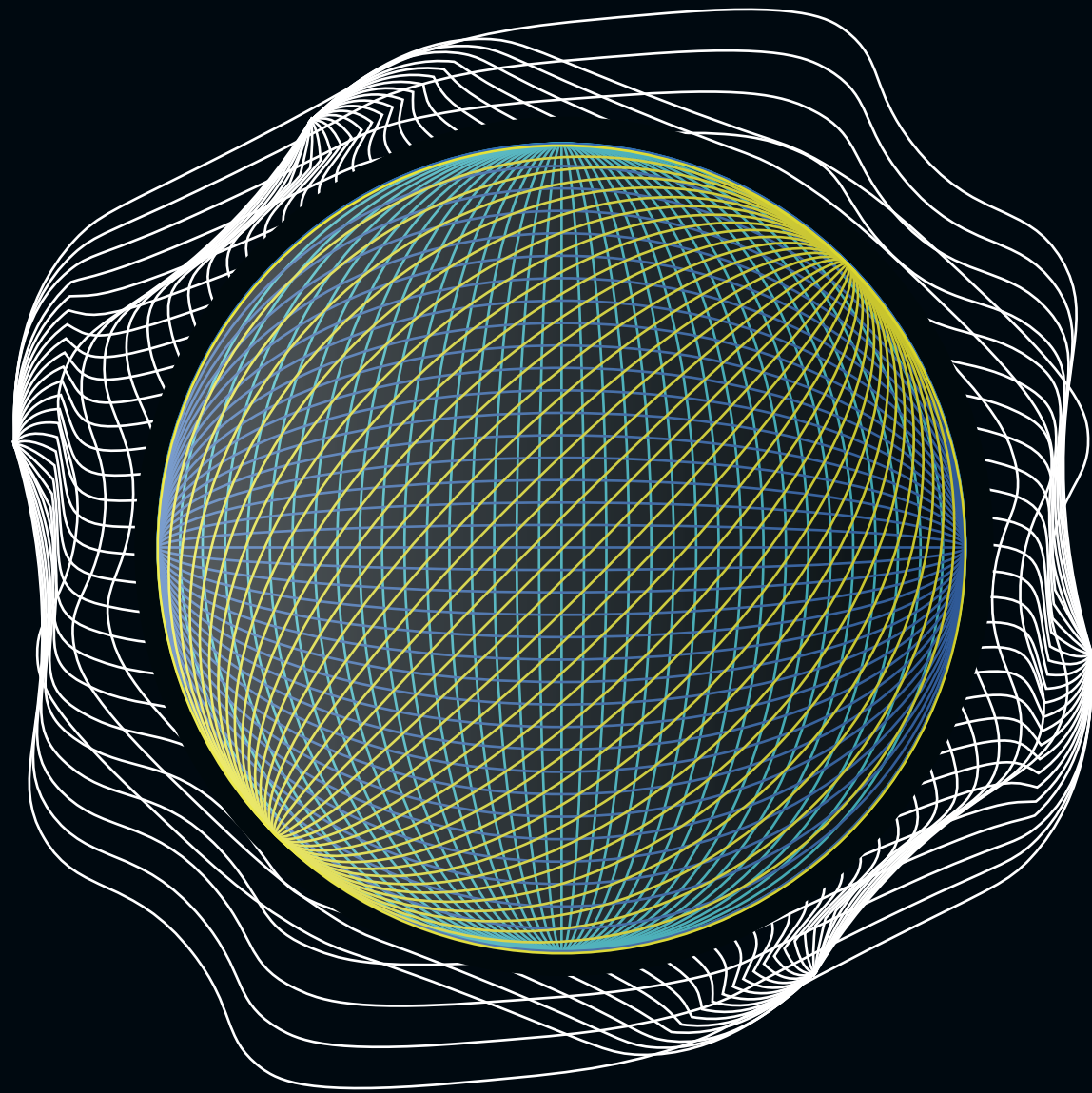
not able to tell if all the skin cells had transformed fully into neuron cells. During such a transformation, some skin cells will remain in intermediate states between neuron and skin cell, in limbo – without any functionality. Others will not differentiate at all. This happens because cells react differently to the same stimuli even if they are of

the same type – a major limitation of cellular reprogramming for therapeutic purposes. Take for example, the replacement of parts of a damaged brain with neurons reprogrammed from skin cells. If any skin cells remain in intermediate states or untransformed in this scenario, they could be lethal.

At present, reprogramming all of the body's cells to rejuvenate them is challenging, given that current approaches to deliver epigenetic factors are not suitably advanced yet. Approaches today use engineered viruses such as adenoviruses or retroviruses, but creating viral vectors is expensive and time-consuming, limiting chances to go into the public market. Besides, viruses are foreign bodies and could cause excessive immune responses from patients, putting their lives at stake. This has already happened in the past and scientists are therefore still sceptical of using viral vectors in clinics. In summary, we face two major challenges in therapeutic cellular reprogramming: 1) the development of a method to successfully reprogramme all targeted cells and 2) the development of an effective method to deliver epigenetic factors to the body. Any progress towards overcoming these challenges would represent a huge step towards preventing the deterioration of the body.



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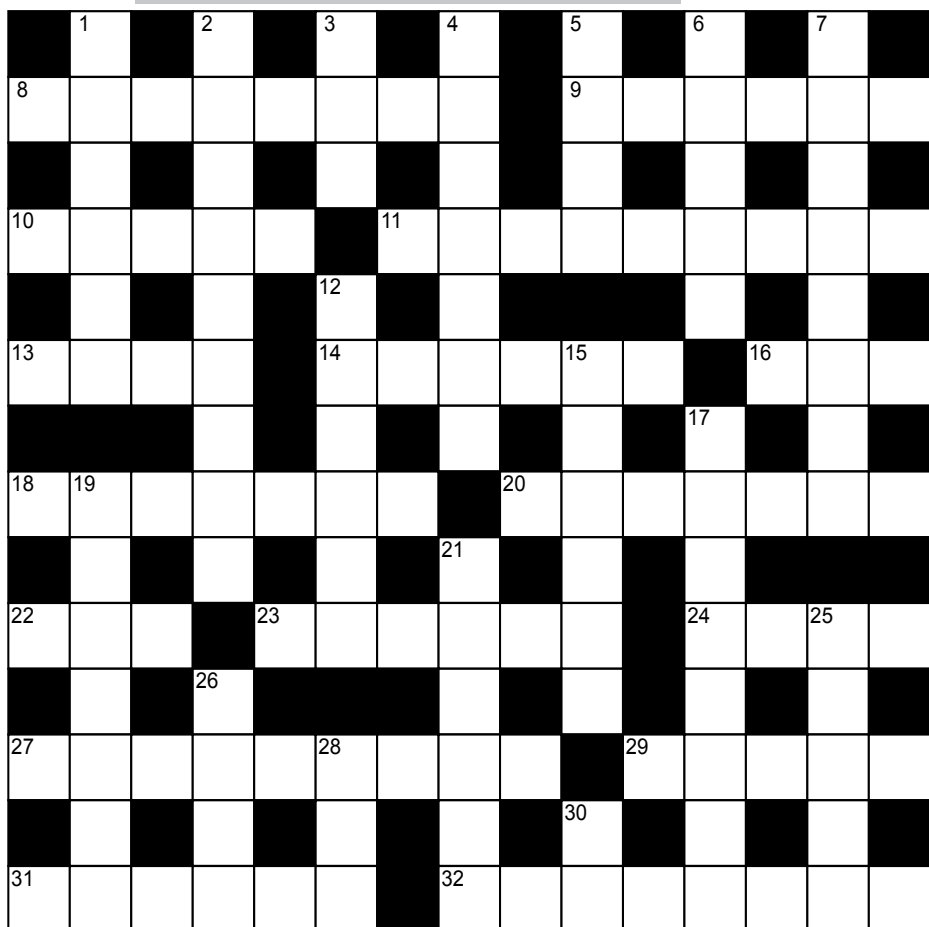
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PUZZLES

CRYPTIC Crossword Grid



REGULAR Crossword Clues

Across

- 8) Eaten cephalopods. [8]
- 9) Character alongside Antonio and Shylock. [6]
- 10) Subject of Henry VIII's wrath. [5]
- 11) Colossal bivalve. [5 4]
- 13) Many a Wikipedia article. [4]
- 14) Raid, sacking. [6]
- 16) You might get it when smoking. [3]
- 18) They wear a star. [7]
- 20) Obsidian, e.g. [7]
- 22) Antiquated unit of length. [3]
- 23) Act like a peacock. [6]
- 24) Little shard. [4]
- 27) Classic breakfast cereal piece. [9]
- 29) It can be found in the Old Testament. [5]
- 31) It's often salted at a bar. [6]
- 32) Unrecognised African nation. [8]

Down

- 1) Sacrificial chess move. [6]
- 2) Soft French cheese. [9]
- 3) Something played for laughs. [3]
- 4) Evolved falsehood. [7]
- 5) Electronic property partially responsible for atomic orbital structure. [4]
- 6) Negotiated ceasefire. [5]
- 7) Boozy, foamy dessert. [8]
- 12) Against divine law. [6]
- 15) Worries. [6]
- 17) Eponym for famous red cheese. [9]
- 19) Consecrated. [8]
- 21) Pacifist Christians. [7]
- 25) Set, as a jewel. [6]
- 26) Lacking substance and sense. [5]
- 28) Old stringed instrument. [4]
- 30) That found in a watchmaker's cabinet, e.g. [3]

Points

Cryptic, regular crosswords
Reverse Cryptic

5, 3 pts
3 pts

CRYPTIC Crossword Clues

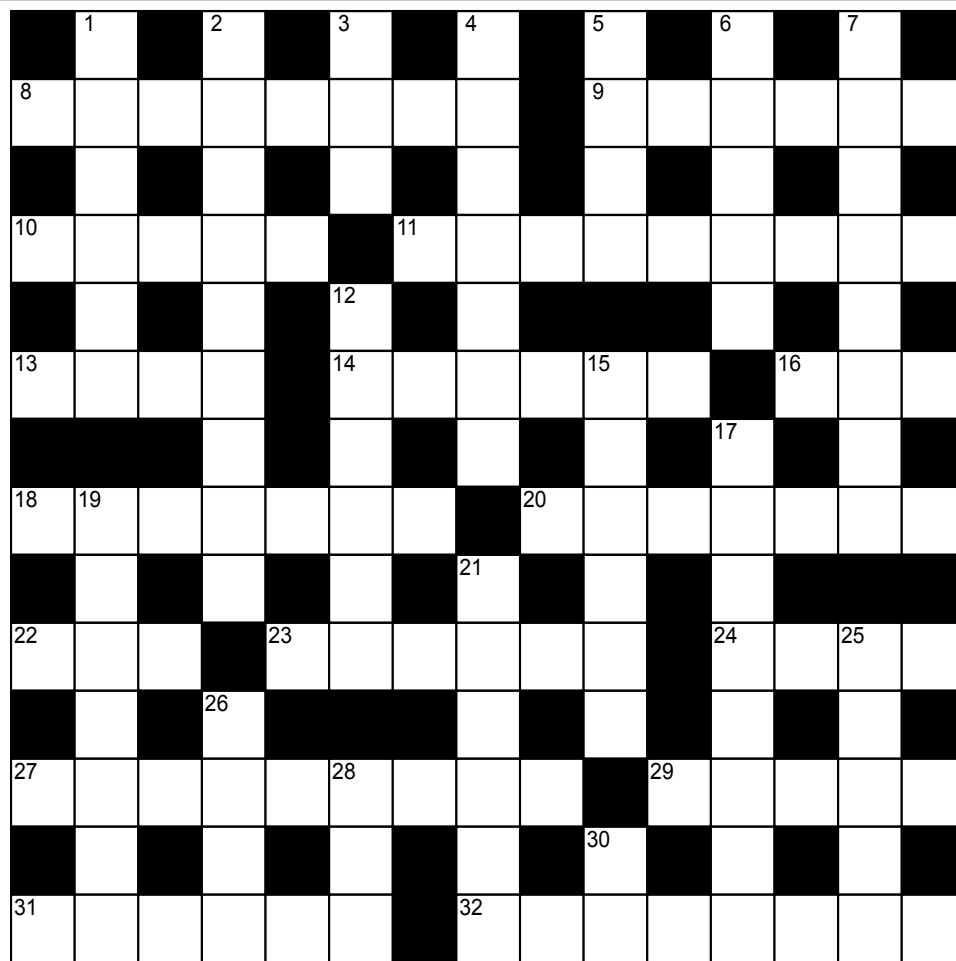
Across

- 8) Lost artefacts in parts of the French sea while I repeat back. [8]
- 9) I hear it's as good as the second one! [6]
- 10) Thorns in the direction of the horses. [5]
- 11) It connected the girl to her first boyfriend in Newark (Evan Roland). [9]
- 13) 150 keys represented by this musical symbol. [4]
- 14) Lots of crumble found in this pie? [6]
- 16) Cardi B hit in the back foot. [3]
- 18) Torn apart when caught below. [7]
- 20) Dangerous chemical makes me gaunt. [7]
- 22) It's backwards and pointless! Nuts to him! [3]
- 23) Tender horror writer? [6]
- 24) Support that buckled for potassium's former name. [4]
- 27) The outh American girl's back wearing lingerie for him. [9]
- 29) Griddled death's-head abundantly sprinkled. [5]
- 31) Time-saver makes one fast. [6]
- 32) With that gown, I could have been leng before, damn! [8]

Down

- 1) Jewel mostly set into bones? [6]
- 2) Wealthy topiarists? [5 4]
- 3) The King, for example, found inside. [3]
- 4) In that hat, mum resembles a religious leader. [7]
- 5) A single island atoll first found in this geographical region. [4]
- 6) Is it disappointing to dampen it? [5]
- 7) Almost demote the ambassador. [8]
- 12) The rat dashed from the danger. [6]
- 15) The story about Ray in the museum. [6]
- 17) Meat substitute that's just alright? [9]
- 19) You're one with bad taste in fat. [8]
- 21) A republic sounds like rule under another country. [7]
- 25) In Spanish, the even number. [6]
- 26) Tincture applied zealously under right elbow's surface. [5]
- 28) The vegetable made me keel over. [4]
- 30) Flagon found earlier? [3]

REGULAR Crossword Grid



Reverse Cryptic

Last week's reasons:
- Play on "my way or the HIGHWAY"
- BOLD = brave and a kind of type(face).
- Play on "come down like a ton of bricks", "bricks ton" sounds like BRIX-TON

You are given a cryptic Clue (C), an Answer (A), and have to give a Reason (R) as to why the correct answer is A. Practicing this will help you solve the cryptic crossword above.

C: Her previous achievement was a light one.

A: FEATHER

R: _____

C: Many surrounded by a canopy of this plant.

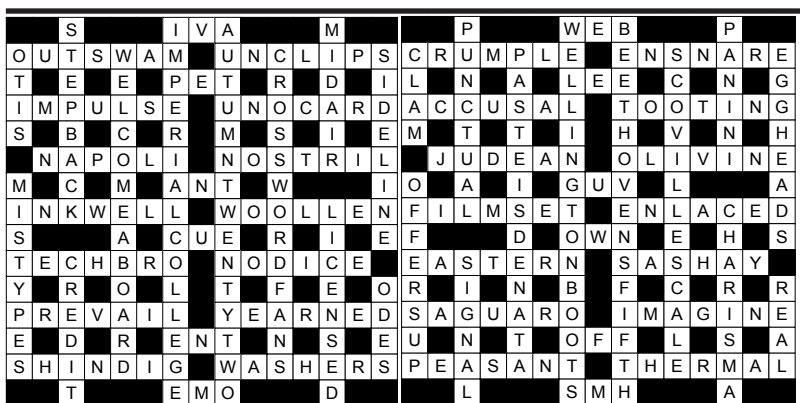
A: CLOVER

R: _____

C: A generic sort of hall

A: CARNEGIE

R: _____





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CATNIP

Union council passes motion supporting the suppression of protests in Iran

Feb Senton

Catnip Reporter

Union council members have reacted in shock to the news that they passed a motion this week calling for 'violent measures' to be used against female anti morality police protestors in Iran with one Faculty rep telling NegaFelix "This isn't what I got into student politics for".

The motion, that passed in the first Council meeting of the term with only two abstentions, encouraged Supreme Leader Ayatollah Khamenei to use 'all means at his disposal' to suppress the protests that broke out following the killing in custody of Nika Shakrami, allegedly for not wearing "appropriate clothing".

Reports of from the Council meeting suggest that the passing of the motion

was likely the result of Council members simply voting to pass whatever was put in front of them. Alarm bells were only raised when staff members were googling how to evade Western sanctions on Iran.

Recently graduated former Council member Zisabelle Hang told NegaFelix that meetings were so boring "I would have voted for the Holocaust if it meant I didn't have to sit there for longer".

This analysis was supported by reports that it was not morality that stayed the hand of the two abstaining Council members but the fact that they had fallen asleep.

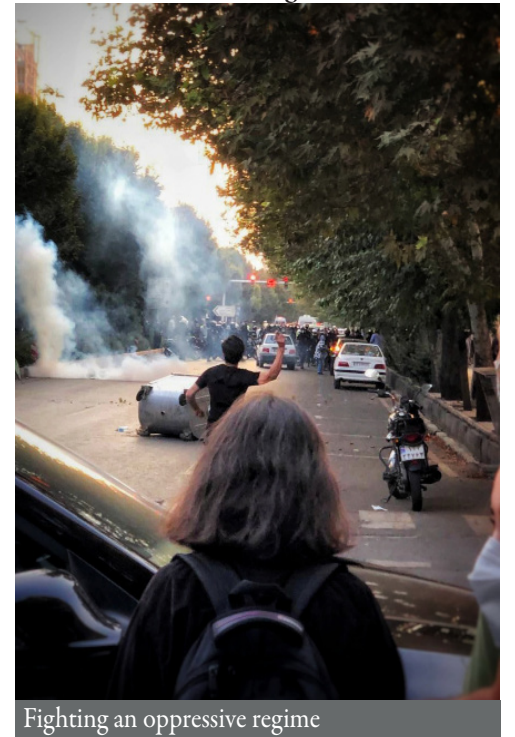
Viewed through this lens many of Council's strange historic decisions such as the mandating the use of Saudi Ara-

bian oil in heating the building, calling on the College to encourage more engineers to work for Glencore and throwing a Bain Consulting group funded state capture workshop.

When pressed on the Council's actions, new Council Chair Yueqi Xuan told NegaFelix that all Council's actions were carried out for the benefit of students. She has also asked the student that put forward the motion, Oliver 'Olly' B. Ist, to come forward to explain themselves and promised root and branch reform.

NegaFelix have submitted a motion to replace all voting members with wobble head nodding dog mascots with rubber stamps in their mouths. We will report back on the result.

Image credit: Wikimedia

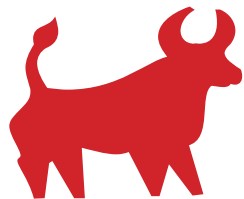


Horoscopes



ARIES

This week you are a skinny white guy. You join Rock Climbing Soc



TAURUS

This week you tell yourself that this year is going to be different



GEMINI

This week you are delighted that Felix is back in print. Buying loo paper was getting expensive



CANCER

This week will be number 149 since you last had sex. The ALERT statue is starting to look pretty fit



LEO

This week the Welcome Fair slogan "where you belong" is a pidgin English advert for a surgical shin-lengthening clinic



VIRGO

This week you tell people you shorted the pound but actually your card just got declined at Nando's



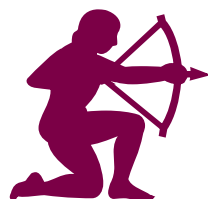
LIBRA

This week your weekly phone call home goes really well



SCORPIO

This week you sell your Carbon Monoxide alarm because the price of gas means you don't need it anymore



SAGITTARIUS

This week you offer up your cupboard as a sublet. 38 people say they are interested



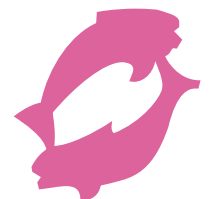
CAPRICORN

This week you go to the corporate recruitment event 'ironically'



AQUARIUS

This week your morning affirmation was 'fish are friends not food'



PISCES

This week your school boyfriend tells you that he thinks the relationship 'is going really well'

MUSIC

Edited by: TARA PAL CHAUDHURI
JOE RIORDAN

DON'T MISS THE GIG! ARCTIC MONKEYS AT EMIRATES STADIUM

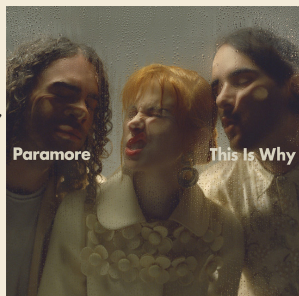
IF YOU MANAGED TO GET TICKETS, WELL DONE, EVEN THOUGH IT MEANS YOU HAVE TO SEE THEM DOWN SOUTH (YES, I WISH I'D GOT SHEFFIELD OR BORO BUT THIS'LL DO). FINGERS CROSSED IT DOESN'T CLASH WITH ANYONE'S EXAMS AND GET TOUTING IF YOU MISSED OUT!



Single of the Week

'This Is Why' by Paramore

Paramore! Are! Back! 5 years after *After Laughter*, your favourite (they'd better be) American pop-punk band are back with a new single and a new album coming in February. The latest track harkens back to the crunchy guitars and driving bass of *Paramore* and *Riot!* while still experimenting with new ideas as in *After Laughter*. It's a catchy triumphant return to the fold from the band and it makes me so excited for the album next winter. Give it a listen and let us know what you think!



TODAY IN MUSIC HISTORY

A BIG DAY FOR TV APPEARANCES, OCTOBER 7TH SAW: *THE FRANK SINTRA SHOW* DEBUT IN 1950; THE BEATLES APPEAR ON *SHINDIG!* IN 1964; THE ROLLING STONES APPEAR ON *SATURDAY NIGHT LIVE* IN 1978! AS WELL AS THESE SMALL SCREEN DEBUTS, THE MUSICAL *CATS* OPENED ON BROADWAY IN 1982.



Gig Reviews

At the Top of the Bleachers (By Mistake)

I accidentally bought seated tickets for my favourite band

Written by Joe Riordan Music Editor

I fucked up. It turned out alright in the end, but I thought I was in for a depressing night at first. I'll start from the beginning, way back in March. I was on the night bus (already not a good start to a story – sidenote for the freshers reading, download City-Mapper, it will save your life). I was heading home after hockey club night at Corsica. I lived near Putney Bridge in second year, so this was about an hour and a bit journey, and I was bored, and I wanted to sleep. As I waited for the sweet sound of “the next stop is Fulham High Street/New Kings Road”, I scrolled Twitter and saw Bleachers just announced a London show for the first time in at least 5 years. Immediately, I scrambled to secure tickets to see Jack Antonoff's solo band when they came across the pond. It was 2am, not many people were up, I got tickets.

Fast forward to the rescheduled date of the gig and I head to Shepherd's Bush Empire. There are two queues, one for standing and one for seating. I have never in my life purposefully (key word) booked seated tickets, so we head to the standing queue. It is here I realise I fucked up. My tickets are not standing. They are Level 3 Seated/ Standing. I saw the word “standing” in a daze on the bus and rushed to book it. At this point, I am expecting the worst, having to sit all through my favourite band. I was wrong. I had a good night.

Excitement bubbled during the longest wait between support and headline I've ever endured and then exploded as Antonoff took to the stage to '91' and sat in front of an old CRT TV flashing in black, white, and green – as the lyrics to the song literally state. As the opener of new album *Take The Sadness Out Of Saturday Night*, it contains gallons of references to previous album *Gone Now* (I'll spare you the in depth analysis of all the motifs scattered through both albums). This laidback version of '91' with only Antonoff singing and a soothing string accompaniment led perfectly into the staggered entrance for 'Dream Of Mickey Mantle' that introduced each part of the band in turn. I'm rewatching my videos of the night now and they're not providing much help because you can only hear me screaming along behind the camera. After the openers of *Gone Now* and *Take The Sadness Out Of Saturday Night*, the band settled into their London home for the next two nights and

delivered one of the best performances I've ever seen.

The set design had everyone on different levels, all lit by a small lamppost in the centre above Antonoff's TV. This let the main performers (Antonoff, his guitarist, and two saxophonists) run wild. In the chaotic breakdowns where they all showed off their musical aptitude, the others cut random paths around the mountainous stage, almost crashing into each other more than once. This all added to the infectious energy that had erupted as soon as Antonoff took the stage. Although there are only around 8 members of the band (including 2 drummers), they manage to sound orchestral and gigantic when they want to. Most noticeably in the euphoric choruses of 'Let's Get Married' and 'I Wanna Get Better', the band captured the room's buzz and thrived on it.

Usually behind the mixing deck producing pop star's megahits, Antonoff is just as comfortable being the star and commanding the night. Throughout the night he melts into different personas while always staying genuine, visibly enjoying the gig as much as everyone watching. During 'Big Life' he's a rock and roll star, think Little Richard or Buddy Holly, then in 'Rollercoaster' you see him as the producing mastermind who helps Lorde and Taylor Swift as he explains how the song came



My view (Credits: Joe Riordan)

together from a single synth note. It's incredible to have this glimpse into his process and how he builds up ideas and melodies. Finally, for 'Don't Take The Money', he's a rock star again, shaking his knees like Elvis and jumping up and down – an 80s movie would freeze-frame at this point with him air bound.

As well as the Bleachers hits, Antonoff added in a New Jersey classic as a homage to his home state, Tom Waits' 'Jersey Girl', and also The Waterboys' timeless 'The Whole Of The Moon'. I didn't know these tracks before the gig but now I'm sure they'll be in my Spotify Wrapped.

One day I will go into laborious, oppressive, tedious detail about *Gone Now*: it's my favourite album and I can't express how much I love it. I've definitely crossed something off my bucket list seeing it performed live.



View online here!

MUSIC

Felix Recommends

Mysticism, Melody and Monophony

An Introduction to the Spirituality and Musicality of Hildegard von Bingen

Written by **Gilbert Jackson** Music Writer

"And as the sun, the moon, and the stars appear in water, so writings, sermons, virtues, and certain human actions take form for me and gleam." – Hildegard von Bingen

In the modern age we are spoilt for choice for which music we listen to and we always have a piece of music which fits our every mood, our every movement and our every moment. You often find that such music was written with these aspects in mind: Mahler writing his music in great sadness, Shostakovich writing in anger and protest of an oppressive regime, Dvorak writing in awe at the great beauty of the American landscape.

These grand concepts and emotions thus create even grander and more emotional music and we find ourselves lost into a world of symphonies and fantasies. Thus, it can seem that listening to the plainchants and monophony (single melodic passages) of the mediaeval era seems like a waste of time due to its simplicity when compared with the music of the titans of the 19th and 20th centuries. Yet, we forget that for someone like Hildegard von Bingen, Plainchant and monophony offered a way to express what would've been the grandest concept of all, the nature of God.

Hildegard was born in c.1098 and from a young age had experienced visions of God and the Virgin Mary as written in her Vita (autobiography). These visions would lead to Hildegard becoming an Abbess, a mystic and an author of a large musical output. Her music often accompanied larger mystical works such as her book *'Scivias'* which features the musical segment *'The Symphony of Heaven'*.

It is clear to see, therefore, that the music which Hildegard was attempting to create not only offered a way to describe and expose people to the words and meanings of God, but also was itself a manifestation of God and that universe itself is the *'Symphony of Heaven'*; a powerful allegory and this idea of the universe being the music of God has often been used as a thematic device in the literature of C.S Lewis and J.R.R Tolkien.

No other work exemplifies Hildegard's beliefs of music being the manifestation of God than her great work, *'Ordo Virtutum'*, a large-scale monophonic work written as a morality play. Hildegard herself received no musical training at all but was described as a clairaudient and thus many believed that her music - as well as her written works - was inspired directly by God.

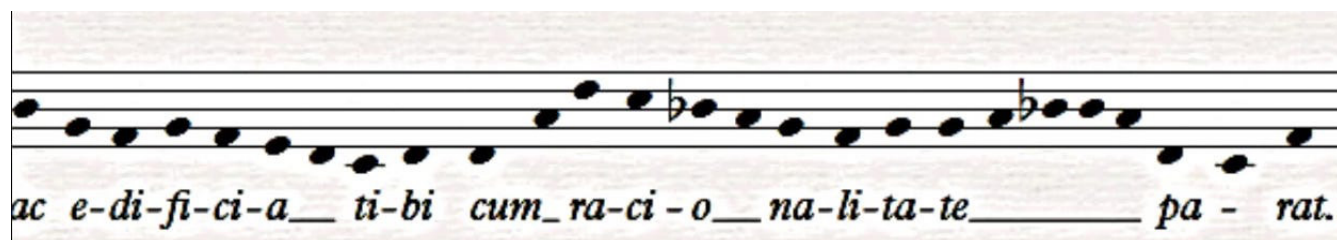
The play itself is a tale of how a soul yearning for heaven abandons its patience and is swayed by the



Devil in the first act, but learns over the course of several acts how the Heavenly Virtues are a means to ascend into heaven and to not be swayed by the Devil. It is most likely that the work was to be performed by the nuns in her convent as the significant majority of parts are for women, with a few male parts taking the roles of patriarchs and the Devil.

It is in this work that we see the extent of her musical talent. Most Gregorian Plainchant is very simple indeed and only requires a narrow range of the voice to successfully sing. Equally, since most prayers are quite verbose words, often many syllables would be incorporated onto one or two notes. An example would be this famous chant, *'Ubi Caritas'*. It can be seen that the range of the chant only extends to a perfect 4th and syllables occupy no more than two notes at a time.

Hildegard's chants by comparison break this norm by having many of the melodic lines be far reaching and wide in tonality, very melismatic and possessing



both angular and scalic passages which give her music diversity and character. This passage is taken from *'O Ignee spiritus'* and possesses a vocal range of a major 9th.

Often Hildegard uses melody as a method of character building in how she specifically caters each line to fit the voice singing; this is seen in *'Ordo Virtutum'*.

The personifications of Humility and Charity are quite reserved in their melodies and sung with grace and tranquillity whereas the personification of Heavenly Victory is bold, loud and quick paced. The Soul, the main protagonist of the moral, is light and jubilant with long skipping passages and angular melodies and the Devil does not sing but merely grunts and shouts; the Devil of course cannot participate or hope to join in the singing as Hildegard states, "...he cannot produce divine harmony". Thus, Hildegard has created a tale that is shaped and made more real because of the music she has made; if her gift of divine clairaudience is to be believed, it is also shaped and made real by God.

Hildegard von Bingen's legacy is still celebrated today; her mysticism and writings have been widely appreciated by the Catholic Church and in 2012 she was made a Saint and Doctor of the Church. Not only that, musicians continue to hold her in high regard for the work she did in advancing western music as a whole. An invaluable lesson that she taught us is that music offers us a way to express our emotions and our spirituality. Regardless of whether you are someone who holds spiritual beliefs, one cannot deny that music possesses an inexplicable power which allows us to move others and also to move ourselves.

I urge you all to listen to the album of *'Ordo Virtutum'* as interpreted by the choral society Ars Choralis Coeln. As well as faithfully interpreting the original monophonic works, some movements have overlapped monophonic chants to create a polyphonic texture and also use authentic instrumentation to add flavour to the music. It is a bold but strikingly beautiful interpretation of Hildegard's music.



Album Reviews

Fossora? I Hardly Know Her!

Björk's latest is a moving tribute to Iceland, her late mother and her children

Written by **Benjamin Bateman** Music Writer

It has been interesting only discovering Björk's music over the past few years. With every subsequent release, being able to rediscover the Icelandic songwriter's music all over again in her brand new reincarnation has been magnificent. With the release of *Fossora* I've finally gotten my chance to experience that rebirth in real time, instead of the usual album-to-album picking and inclining towards familiar material. *Fossora* is indeed something new, even if the familiarities of Björk's songwriting can still be heard among the tooting of bass clarinets and sampled excerpts of herself, her son and her daughter singing. The "weirdness" that has become a staple of her music and persona since day one has been dialled up to eleven, as she sings about her homeland, her late mother, and her *being* a mother in that famous all-over-the-place way that she has so distinctly mastered.

The first track and single of the album, 'Atopos' is decidedly discordant with itself, with the only real constant being the thumping rhythm underlying it as Björk confronts the perfectionists in her life: "Are these not just excuses to not connect?" The song builds gradually towards Björk's mantra: "Hope is a muscle that allows us to connect." You have to exercise it, you see, otherwise those you might have found a "resonance" with will be pushed away. In times of lockdowns and COVID, we needed these connections more than ever, and while the pandemic struck the world, Björk was also slowly losing her mother to a failing heart. "You

did well," She reassures her mother in 'Sorrowful Soil' accompanied by a chorus of other voices; this track was written before Hildur's passing. She contemplates what it means to be a mother, both to her and to Hildur, while acknowledging her mother's "self-sacrificial" ability to resist "nihilism" when raising Björk.

Following this is my favourite single, 'Ancestress'. Björk and her son sing together, the former about her own mother, and the latter about Björk herself. It weaves around long form (like the funeral procession in the music video, and another of my favourite Björk tracks, 'Black Lake') as she comes to terms with her mother's passing, and the last years of her life. She describes the fierce resistance her mother showed, even to the doctors she "despised" as they put a pacemaker inside her, and in her last years, how "The machine of her breathed all night." It's a beautiful musical obituary (Björk calls it a matrimort) to her own late ancestress; it's moving, sad, but also shows how much Björk appreciated and was inspired by Hildur's life of activism and selflessness. This is in stark contrast to the next main track of the album, that succeeds a brief Icelandic interlude. Björk sings about her journey leaving a state of mind of victimhood with a demonic, dangerous and almost evil timbre, which juxtaposes the saintly image she describes that comes with playing the victim: "Victimhood/Has a saintly glow/Holier than thou". The bass synths and clarinets sound like they've been ripped right out of a movie soundtrack for a villain's exposi-

tion scene. Björk's voice reverberates on high, cutting through the chaos of the drums, clarinets and vocal samples that increase throughout the second half of the track. Musically, it's quickly become one of my all-time favourite Björk songs.

At this point we're only halfway through the album — there's so much more to unpack: the spritely, Utopia-like flutes of 'Allow', and the almost giddy feeling 'Fungal City' (one of the many Björk songs that are pretty obviously about sex) which goes between tip-toeing and raving in matters of moments. *Fossora* has a fitting end, I think, in 'Her Mother's House'. Björk's daughter sings along with her: Ísadóra is her "hope-keeper", much like Björk was for her own mother in 'Ancestress'. It's a song about the empty nest Björk is left with now that her children whom she has fiercely protected are now all grown up. Björk now only wishes to remind them that her heart will always be with them: "When a mother's house/Has a room for each child/It's only describing/The interior of her heart".



Felix Recommends

13 Songs to Listen to While Appearing Mysterious on Campus

POV: It's Autumn in Stars Hollow and you're on your way to Luke's

Written by **Ambika Bhardwaj** Music Writer

There's inherently something dreamy about October, and something very gay (emo pride month if you will). So, I have curated a playlist with "Imperial coordinates" - so if you find yourself in a very niche situation at Imperial, you know what song to play. Also, I'm a shameless pumpkin-spice latte bitch so the songs have a Gilmore Girls vibe to it, I didn't want to create a playlist based on a specific character from the show (because fuck Rory) so think of it as y/n in Stars Hollow - you walk through the cobbled streets of the town, have a cup of coffee, and get to call Lorelai "mommy" (maybe it's just MY thing).

1. 'Then She Appeared' - XTC

Much like the month of October, this song is crisp, misty, and golden - with a sweet and heavy melody. Influenced by the Dukes of Stratosphear, Andy Partridge, XTC's songwriter and lead vocalist, penned this whim-

sical song which is praiseful of women. As October is an inherently gay month, it only made sense to start this playlist with a song for my fellow sapphics, and anyone else who "worships at the church of women".

Imperial coordinates: When you step into Central Library Café in all black clothes and colourful socks and work up the nerve to ask the girl in front of you if she listens to Girl in Red.

2. 'They're in Love, Where am I?' - The Weepies, Deb Talan, Steve Tannen

From an album with a solid collection of songs that dance around the joys and mysteries of dating and living with another person, 'They're in Love, Where am I?' leaps out as a brilliant slow song - mixing the unhappy lyrics with little acoustic touches like squeaky nylon guitar strings and an occasional glockenspiel riff to brighten it up.

Imperial coordinates: When your roommate falls in love with the boy-next door and you wistfully look at them holding hands in the kitchen.

3. 'We're going to be Friends' - The White Stripes

I think we have talked much about the pain of losing a friend, but let's also talk about the joy of having one, which this song captures perfectly - the heartfelt lyrics evoking the simplicity and nostalgia of childhood friendships.

Imperial coordinates: when you meet a lovely girl with bright purple hair who spells her name with two e's and uses dance to distract her opponent in beer pong.

4. 'Funny Little Frog' - Belle & Sebastian

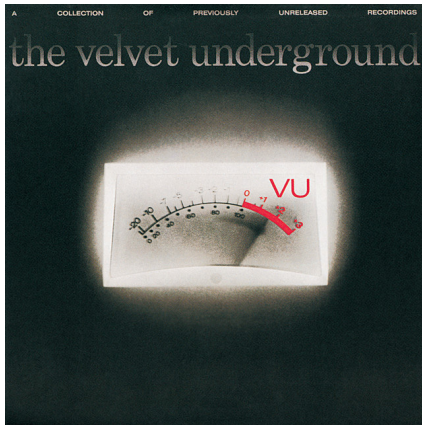


MUSIC

Like the Kinks' *Lola* (transvestism), Roxy Music's *In Every Dream Home A Heartache* (rubber love) and Helen Reddy's *Angie Baby* (killing for company), *Funny Little Frog* is a genuinely enthralling dark parcel wrapped in the most cotton candy pop confection. Belle and Sebastian have never sounded so perverse and so irresistible.

Imperial coordinates: when you catch feelings for someone you call "horse boy" because you played chess with them for 4 hours.

5. 'Stephanie Says' - The Velvet Underground



'Stephanie Says' was one of the Velvet Underground's greatest songs, arguably their most affecting ballad. "Stephanie says, that she wants to know, why she's given half

her life to people she hates now?" are just some of the words that narrate a tale of clinical depression bathed with an almost baroque beauty.

Imperial coordinates: for when you're having your agonies

6. 'Let's Get Out of This Country' - Camera Obscura

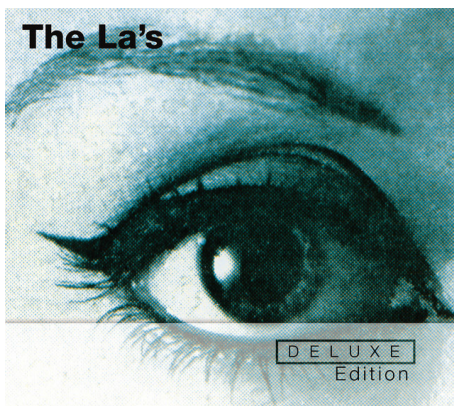
There's hardly a dud to be found in any of their albums and their similarly styled songs distinguish themselves the old-fashioned way - with memorable melodies and unique lyrics. With confessional lyrics and the fabulously schmaltzy Vegas-wedding organs that flash all over the son like blindingly white grins - *Lets Get Out of This Country* is the epitome of zazziness.



Imperial coordinates: when you're booking flight tickets to Trapani with your friend Steph instead of working in the library.

7. 'There She Goes' - The La's

It's an indie singalong love song anthem that never fails to bring a smile as it is warm and inviting, the tone



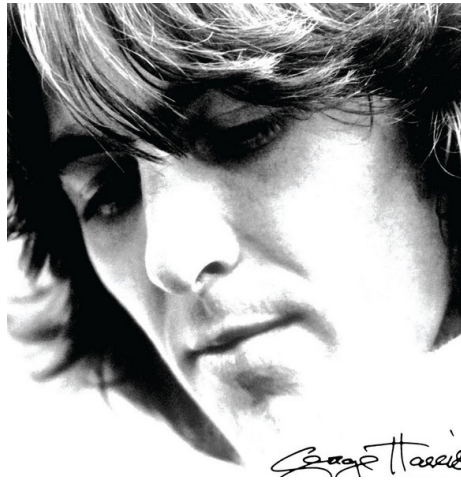
is optimistic and whimsical, the subject a love that just can't escape your mind. The short and sweet pop masterpiece invites you back home

with open arms at the steps of Lime Street.

Imperial coordinates: when your library crush sits next to you on the fourth floor.

8. 'Ballad of Sir Frankie Crisp' - George Harrison

In those halcyon days when the Beatles did not have destinies, only personalities, and every Beatle fan had a favourite Beatle, John once satirized his mates as "wideeyed Paul, cosy Ringo, and skeleton George." George, overshadowed as he was by two enormous egos, and lacking Ringo's openness, was the hardest to know. George's album, *All Things Must Pass*, is both an intensely personal statement and a grandiose gesture, a triumph over artistic modesty, and even frustration. And finally, defining the musical core of the album are George's brooding essays on living, loving, and dying. *Ballad of Sir Franky Crisp (Let It Roll)*, with lots of "Ye's" to remind us that it's a ballad, is both watery and oceanic. *All Things Must Pass* with its washed-out horns and cadence beat, is eloquently hopeful and resigned.



Imperial coordinates: when you're sitting at the steps of Gabor with your friend Cristina and talking about all things heavy.

9. 'Love Changes Everything' - Sam Phillips

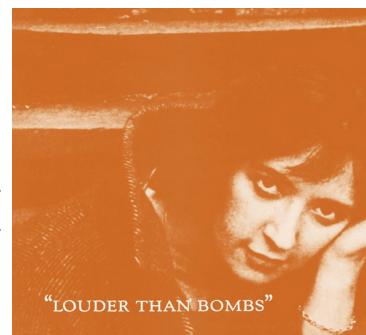
'Love Changes Everything' marks a departure from Sam Phillips' previous, generally more upbeat work. The song has a decidedly darker musical quality, even when the lyrics are more positive. The result is an intriguing song that can easily grow on one. Ms. Phillips is in excellent form, and the musical backing along with the production by her husband T Bone Burnett brings together some unexpected combinations

of sounds, sometimes simultaneously hinting at Beatles-era pop, old cabaret music from the 1930s, and film noir or the novels of Raymond Chandler.

Imperial coordinates: when you're filled with an inexplicable loneliness at the thought of someone.

10. 'Back to the Old House' - The Smiths

It's a melancholic song about the bittersweetness of pale distraught memories of youth. The old house represents childhood memories of a home where he grew up or people he knew within the vicinity. He starts by lamenting he does not want to go back to the old house because there are too many bad memories. But by the end of the song, he says he would "love" to go back to



the old house, but he won't ever return. It's like a depressive pleasure he seeks or is haunted by. A pleasure that comes in the basking of the rustic memories of his youth no matter how tragic or harrowing they are. Youth is youth and it is something that always feels bittersweet no matter the upbringing. As always Morrissey's poetic narrative is strong and subliminal.

Imperial coordinates: when you watch starry-eyed freshers roam the halls you used to roam before.

11. 'Harvest Moon' - Sunflower Beam

There is a blend of musical influences as the band flits between a classic alternative rock (reminiscent of Siouxsie and The Banshees, The Cure and late 70s Stones) to more grungy tracks that drew on the sound of early 90s bands such as Nirvana and Spiritualized. Their cover of Neil Young's *Harvest Moon* is undeniably sweet.

Imperial coordinates: when your friends send you postcards whenever they go out of town.

12. 'King of Carrot Flowers, Pt 1' - Neutral Milk Hotel

As the track progresses on, a few more instruments join in the mix and Jeff Magnum's vocals also take on a more up-front delivery which gives the song a very full sound in my opinion. Another thing I enjoyed about this track is while all these different instruments are coming in and adding their own parts, the acoustic guitar pattern which started off the track does a good job of holding a steady rhythm for the song and makes up for the lack of any percussion or bass in the song.

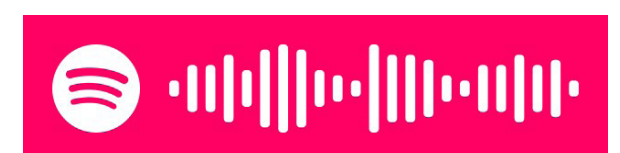


Imperial coordinates: when the imposter syndrome takes the wheel.

13. 'Save Tonight' - Eagle-Eye-Cherry

I don't know what it is about this song that I love so much. On the surface, it is a pretty basic and extremely radio-friendly acoustic pop rock song; it even has that chord structure that shows up in pretty much half of pop songs, and the lyrics aren't mind-blowing or anything. Still, there is something so bittersweet about this song and the cracking, dry vocal delivery over the upbeat rhythm - it makes the song extremely effective.

Imperial coordinates: when you keep on going despite, despite, despite...



FILM

Director Focus

Agnès Varda: A Life in Thirds

The life and work of the spirit of the French New Wave

Jonah Hewett Film Editor

For the entirety of her 65 year career, Agnès Varda embodied all that is good about cinema. Her feature debut, *La Pointe Courte* (1955), is widely considered to be the forerunner to the French New Wave movement, one of the most important eras in the development of modern cinema - and one that, despite its association with progressively feminist themes, is often attributed primarily to four male directors.

Varda often described three primary ideas as being central to her life and work; *inspiration, création, partage*. Inspiration - the reason why you make a film, the ideas and the context. Creation - the method, the structure, the creative choices and the people with whom you make it. And *partage* - sharing. As she says in her final film before her death in 2019, *Varda by Agnès*, "You don't make films to watch them alone, you make films to show them".

Here we present a criminally short synopsis of three landmark works from Varda's extensive oeuvre, though this list is not exhaustive.

Cléo de 5 à 7 (1962)

One of the most well known films of Varda's career, and for good reason. *Cléo de 5 à 7* follows a Parisian woman in real time, from 5pm to 7pm, as she waits to hear the results of a test that may confirm her cancer diagnosis. That's the premise, but in just 90 minutes of Cléo's life the film leads us through an entire arc of her life. Cléo is a young and beautiful singer at the

beginning of her career, and her life - whether by choice or circumstance - appears to be defined by the perspectives of others. She skillfully enacts the various roles that she is expected (or perhaps expects herself) to; pop star, lover, and lady à la mode, but it is obvious in her frequent consultation of mirrors that this is not making her happy - and the brooding threat of her own mortality, that she desperately tries to distract herself from, frequently consumes her.

Cléo de 5 à 7 showcases many of the filmmaking quirks that enshrine the New Wave - the scenes are shot on location, almost feeling as though Varda herself has just grabbed a camera and started filming the citizens of Paris, and none of the 50s Hollywood shine is to be found here. But even more so that other films of the movement, her training as a photographer is evident - every frame of this film is masterfully crafted.

Villages, Visages (2017)

Brilliantly translated as *Faces, Places*, this 2017 documentary follows Varda at 88 years old, as she travels through France with co-director JR, a French photographer and street artist. They travel in JR's photo-booth truck, taking portraits of the people that they meet, printing them as huge posters and pasting them on any walls or surfaces that take their fancy. It's an incredibly heartwarming and wholesome film that

Image credit: Criterion Collection



beautifully encompasses themes of community, friendship, and a life spent sharing art.

The film also focuses on Varda herself as she approaches her 9th decade, and the less celebrated aspects of a long life - loss and ageing. But with it comes a sense of wisdom, of imparting her experience onto others, and a gratitude for the life she has lived and the people

in it. As she says in the film, "In fact, JR is fulfilling my greatest desire. To meet new faces, and photograph them,

so they don't fall down the holes in my memory".

Villages, Visages is a wonderful celebration of the everyday. Agnès and JR photograph ex-miners, waitresses, children, and their enthusiasm for meeting each and every one of these people is obvious. It's honest, charming, and you should absolutely watch it.

Black Panthers (1968)

As much a master of reality as she was fiction, Varda's documentaries are empathic *tours de force*. *Black Panthers*, a documentary made whilst Agnès was living in LA with her husband (himself an iconic filmmaker of the era), follows the famous black student movement of the same name. It's an open and honest portrayal of the people in the movement - achieved by the surprisingly novel technique of letting them actually talk, for extended periods, about who they were and what they stand for. Politically divisive at the time, the film never aired on French TV as it was supposed to - a fact that Varda suggests was due to the censorship boards not wanting to incite further student protest.

Write for Film!

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film.felix@imperial.ac.uk

BOOKS

Edited by: ZANNA BUCKLAND

Book Review

This Is How You Lose the Time War

Ivin Jose Books Writer

Take the sworn-enemies-to-lovers romance of *The Night Circus*, add generous dashes of fantastical time-travel, and finally, season with the heartbreakingly precious prose of *On Earth We're Briefly Gorgeous* and what's left is a deliciously intricate cocktail of a novella. *This Is How You Lose the Time War* is another fantastic addition to the criminally under-appreciated but – personally – much adored epistolary genre. Co-authored by Max Gladstone and Amal El-Mohtar, this queer love story is the deserved winner of both the Hugo and Nebula awards for 'Best Novella of 2020'.

At its centre, the plot of *This Is How You Lose the Time War* appears simple. Following rival agents, the reader is taken on a vivid time-travelling, multi-verse-treading adventure with every intricate detail exquisitely portrayed. Sights, sounds, tastes, and textures are all strongly evoked as we jump from historical fantasy settings to futuristic technological dystopias, flying through the full breadth of science fiction. Our protagonists, Red and Blue, are elite, powerful feminine figures within their respective agencies and have been born and bred to turn the tides of the titular war in their favour. Blue works for Garden, a faction that weaponises nature, sowing seeds of poison into the fields of history in the hope they will bear future fruit. Whilst Red represents the mechanised might of Agency – the opposing force to Garden – which uses amorphous inorganic robotics to fight for their future. And so, at polar ends of the war, Red and Blue, the best agents of their respective sides, are inevitably thrust into battles, hatred, and undying rivalry.

But life is never this simple.

The story starts with Red. We see her standing, triumphant, in the aftermath of a battle, but although successful in this particular skirmish, something feels different. She senses an unusual presence, a letter from the enemy, crafted for Red, written by Blue. Despite her better judgement, Red reads it and thus begins their secret correspondence. As years, decades

and centuries pass by, we follow Red and Blue, letter after letter, as their relationship evolves from tentative to fully-fledged romance. But how can they possibly overcome their differences? How can they find love in the midst of waging war? And ultimately, what are they prepared to sacrifice to find each other?

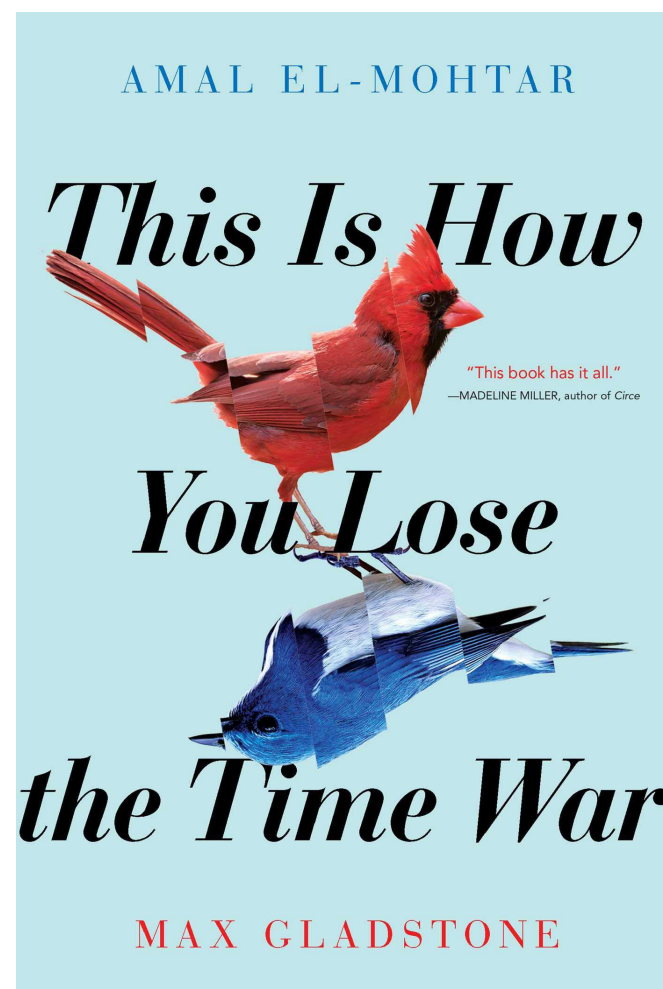
Now, despite how beautiful this sounds, there are two caveats that might be irksome for certain readers: the time travel and the prose.

The time-travel aspect is dealt with tastefully. Absent are the numerous, constrictive rules that govern time-travel in books such as *Before the Coffee Gets Cold* or the mind-bendingly confusing plots birthed by rampant time-travel movies such as Christopher Nolan's *Tenet*. Gladstone and El-Mohtar use time-travel in its

purest sense, as a mode of transport, facilitating Red and Blue to traverse the past, present, and future as a landscape. Journeying from one stunning location to the next, the reader is allowed to appreciate the impossible complexity of a time-war in all its glory. Additionally, by following Red and Blue as they chase each other across eons, leaving letters in their wake, the reader sees the growth of their relationship organically, witnessing how curiosity becomes friendship, how fundamental differences are overcome and how pride and enmity are swallowed by romance. Although time-travel does feature heavily within the story, sci-fi fans looking for a 'hard' time-travel narrative diving deep into the nitty-gritty of chrono kinetic mechanics might be disappointed.

A review of this novel would not be complete without mention of its prose. As purple as it is beautiful, the ornate, and at times poetic, writing style of Gladstone and El-Mohtar may not be to everyone's taste. Littered with inter-textual references, most book lovers will adore the Easter eggs woven into the book, spun with fun, intelligent originality. Gently led through whimsical settings, readers will be awestruck by the countless inventive ways the authors are able to describe two simple colours. *This Is How You Lose the Time War* is flowery prose at its finest.

So, if you're in the mood for a delightfully written sapphic love story, following two elite female agents on opposite sides of a time war, *This Is How You Lose the Time War* is the perfect read for you. Exploring themes of friendship, desire, and timeless love, this novella is one you will devour while savouring every single thread.



“
A DELICIOUSLY
INTRICATE
COCKTAIL OF A
NOVELLA

As Fresher's week is upon us. Books wants to say a quick hello! to all the incoming (and returning) Imperial student readers of Felix. We're constantly looking for Book reviews and articles to feature in this section. So whether you're an avid reader or just manage to get through one book a year, we encourage you to submit your pieces to books.felix@imperial.ac.uk; we're dying to hear what you've all been reading and your thoughts and opinions on it! Have an amazing start to the year, and get writing!!!

Books Article

Appeasing Hitler

Justin Macharia Books Writer

Over the long summer holiday, I had the opportunity to read many books, including Franz Fanon's *The Wretched of The Earth*, Snowden's *Permanent Record*, and Obama's monumental, 768-page-long *A Promised Land*. Most of the books I read were enjoyable and provided me with a new perspective on the world we live in. However, one book stood out from the rest: *Appeasing Hitler* by Tim Bouverie, a strong analysis of the British government's response to the rise of Hitlerism.

The book begins with the man himself. Dictating his opinions in his infamous manifesto, Hitler made clear to the world the character of Nazi ideology. Rumold, the British Ambassador to Germany, and his French counterpart, François-Poncet, both read *Mein Kampf* prior to Hitler's accession, however, they arrived at opposite conclusions. The former viewed *Mein Kampf* as a handbook for future Nazi policy, whereas the latter believed that Hitler's manifesto was incidental to his true ambitions, the mad rambling of a failed Austrian painter, discontent with his position in life.

This divide between acceptance and marginalisation is a running theme throughout Bouverie's book. It is understandable that many people initially underestimated Hitler's fanaticism. To articulate ideas in writing is one thing, to action those ideas is another. However, following his accession to power, Hitler did put the egregious principles of Nazism into action. The Jewish persecution, the suppression of political opponents, and the rapid rearmament should

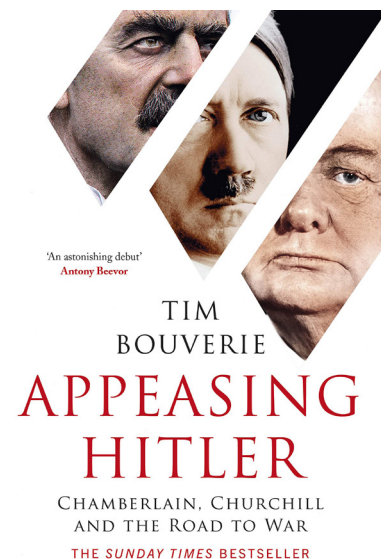
have alerted the allied powers to the dangers of Nazism, and the need to nip it in the bud by taking aggressive action. Unfortunately, they did not. The 'policy of appeasement' prevailed until it was too late.

This fatal weakness of the British and the French, Bouverie argues, derives from three factors. First, public opinion was overwhelmingly pacific. Recovering from the traumas of World War I, the British masses feared that military intervention would lead to another catastrophic war. Second, following the Great Depression and the crippling measures of the Treaty of Versailles, the plight of the German people drew the sympathy of the British public. Finally, the exaggeration of German aerial supremacy (at a time when aerial warfare was seen as we view nuclear warfare today) also dissuaded the British government from taking a militaristic approach to confronting the Nazi menace.

Although rearmament was the focal point of non-appeasers, there were pacific alternatives available, such as establishment of military alliances between Britain, France and Germany's eastern neighbours, as well as imposition of resource sanctions on Nazi Germany and its budding ally, Italy. During the Second Italo-Abyssinian war, British intelligence and the Mussolini administration recognised that oil sanctions would cripple Italy's war efforts. The failure of the British to impose these sanctions, out of fear that doing so would provoke a retaliation — which would be detrimental to the Italians who would have to fight a war simultaneously in Europe and Africa and who possessed a weaker military — sparked in Hitler the idea that he

could do as he pleased in Eastern Europe. In addition to the inability of Chamberlain to establish — and fulfil — military guarantees to Austria and Czechoslovakia, this gave Hitler full confidence to annex those territories in order to empower the German military.

Ultimately, the policy of appeasement was irrational. Despite being universally scoffed at by historians today, the notion that a war with Germany could be avoided by allowing it to strengthen its military saw wide appeal in the 1930s. The marginalisation of Hitler's excesses — the contravention of peace treaties, the widespread dissemination of Nazi propaganda, and the flagrant violation of human rights — is wholly responsible for the belief, held by the dominant elements in the British government, that agreeing to Hitler's demands would snuff out his imperialistic ambitions. If there is one thing *Appeasing Hitler* makes clear to the reader, it is the need for clear-headed leadership in times of global turmoil.



Author Review

Sally Rooney: On Humanity

Zanna Buckland Books Editor

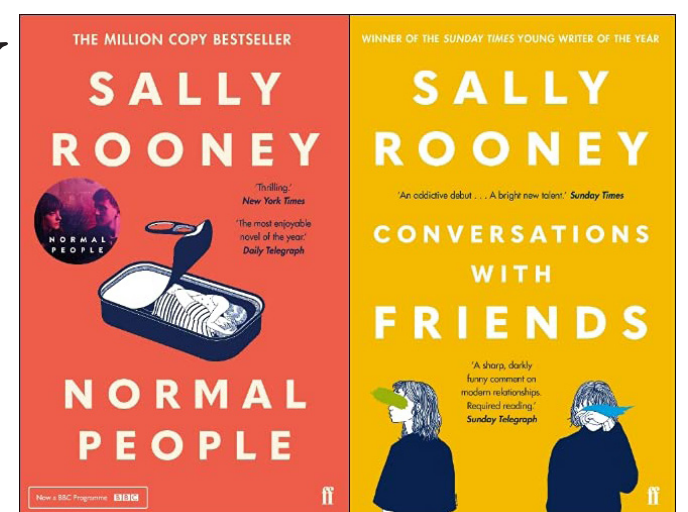
With the release of BBC Three and Hulu's TV adaptation of *Conversations With Friends*, I was finally driven to pick up Sally Rooney's first two bestselling novels as part of my summer reading. While 'bestseller' romance novels tend towards cliché and a little gimmicky, I couldn't help being intrigued by people's fascination with Rooney's work.

Set in Ireland, both *Conversations With Friends* and *Normal People* follow 'regular' teenagers as they navigate their daily lives and relationships. While this sounds like a fairly mundane concept, Rooney elevates it to classic status with her character-building. There is heavy focus on the main characters, highlighting

their thoughts and opinions, strengths and flaws, and exploring the nuances of their personalities in depth.

Rooney's unique writing style takes a little getting used to; dialogue is written as regular text without quotation marks, rendering it visually indistinguishable from the descriptive writing in her novels. Both books are relatively easy reads once acclimatising to this style. It has the effect of making one feel as though they are actually witnessing events in the novel happen in real life, as opposed to watching a performance.

In the interest of space, this review is short and sweet. In summary: Rooney's acclaim comes from the distinctive nature of her writing, but while I would recommend reading these at least once if you're a



fan of romance novels or anthropology, they're not the kind of books that call to be picked up and read over and over. Regardless, something about Rooney's work clearly speaks to people on a deeper level, as she picks apart the logic and madness behind human behaviour and the relationships we form with others.

BUSINESS

Biopharma: Past, Present and Future

Industry Spotlight

Zhifan (Ashley) Xu Business Editor

20 Years Retrospective

Over the past 20 years the biopharmaceutical industry has developed significantly. Since the human genome was first sequenced at the beginning of the 21st century, scientists have been able to build a stronger understanding of the human body, and disciplines such as gene therapy, stem cell research and nanomedicine have come forward leaps and bounds. Furthermore, approaches to drug manufacturing have change immensely, with single-use systems and continuous manufacturing becoming more viable each year.

New treatment classes and production methods

- **Gene therapy:** The treatment of disease by repairing or replacing defective genetic material, or otherwise genetically modifying a cell to produce a therapeutic effect. Therapy can be either somatic or germ line – somatic cell therapy can cure the ailment for the individual in question, whereas germline therapy can remove the likelihood of the individual's offspring also suffering from the disease. The field is still in its experimental and clinical stages but has grown greatly since the first clinical trial in 1990.

- **Stem cell therapy:** Stem cells are unspecialized cells that can mature into one of multiple different types of functional cell. In the medical industry, scientists can use stem cells to replace diseased tissue with new, healthy tissue. Specifically, researchers grow them in a lab, guide the cells toward the desired cell type by altering their environment, and then implant them into patients through surgery.

- **Nanomedicine:** This field involves the manipulation of nanoscale materials - such as biocompatible nanoparticles and nanorobots - for diagnosis, delivery or sensing purposes. Continuous manufacturing within the nanomedicine field could significantly lower operating costs and enhance drug quality.

- **Single-use systems:** Single use biopharmaceutical processing systems offer a potential solution to contamination issues and sterilisation costs. These manufacturing systems are designed for only one single batch of therapeutics and then discarded. They are manufactured in a cleanroom, double bagged and then sterilized by gamma, EtO, or x-ray sterilization methods. This approach ensures a sterile environment for every batch and has proven, despite waste concerns, to be highly efficient.



20 Years Ahead

“In the next 20 years, industry experts expect to see the convergence of pharmaceutical breakthroughs, computing power, and democratisation of healthcare products, which will ultimately deliver fundamental changes in the biopharma industry” (Deloitte, 2021)

- **Prevention and early detection:** The emergence of vaccines and improvements in wellness effectively have reduced the chance of contracting diseases globally. In the future, by developing powerful vaccines and whole genome sequencing, which identifies who may be genetically predisposed to some diseases, we may cure a disease before symptoms even surface. Similarly, early detection through blood testing or biomarker analysis has become possible. For example, liquid biopsy technology has the potential to identify cancer cells with one single blood test.

- **Customized treatments:** Driven by data-powered insights, medical personalization can now effectively match patients' physiological profiles with customized drug cocktails, or design therapies that would work for just a few people, or even a particular person.

- **Curative therapies:** This kind of therapy removes the symptoms of a disease permanently or semi-permanently. By contrast, with prescription

medicines, patients may need to take pills for the rest of their lives to manage symptoms. Types of curative therapies include:

- 1. Biology-modifying drugs, which target the disease-causing mechanism. For example, this may include interfering with virus replication.

- 2. Gene therapy, as previously detailed.

- 3. Genetically re-engineered cell therapy, such as CAR-T and stem-cell treatments. The most publicized form of its kind uses the patient's own immune system to destroy cancer cells.

- **Digital therapeutics.** The future product may provide actionable insights, personalized coaching, and real-time tracking which allow patients to actively manage their disease, and for doctors to intervene before symptoms escalate. Prominent examples include Sleepio, a digital sleep improvement program, and Livongo, a digital health management app for chronic diseases.

- **Precision intervention:** Technologies such as robotics, nanotechnology, and tissue engineering enable us to perform precise medical interventions. They could lead to dramatically improved outcomes in cancer, infectious disease, inflammatory conditions, and chronic pain.

Opportunities in Depth

Editor Ashley Xu has interviewed biotech startup Oralead Pharma to dive into the niche segment of oral delivery biologics. Oralead Pharma CEO Dr. Dou is a member of the Royal Pharmaceutical Society of Great Britain and the American Pharmacists Association. He obtained his PhD from UCL before joining Shenzhen Capital Group as an investment manager and later worked at Intract Pharma, specialising in the oral delivery of complex proteins, before establishing Oralead Pharma in 2022. The company has already received an angel investment of several million pounds and is currently working on pipelines of orally delivered biologics, or specifically, polypeptide drugs. The team is expected to submit an Investigational New Drug Application in 2023.

Before we dive into details, what are biologics?

Common drugs can be roughly categorised into two types: chemical drugs and biologics, or biopharmaceutical drugs. Chemical drugs have small particles and well-defined structures. They are typically manufactured through chemical synthesis by combining specific chemical ingredients in an ordered process, which allows for large volume production. In comparison, biologics are large, complex molecules manufactured in a living system such as humans, microorganisms, plants or animal cells. Therefore, the production process is significantly more sophisticated and is extremely sensitive to physical conditions, which bring difficulties to scaling up, ensuring purity and maintaining batch-to-batch equivalence.

Oral delivery is best

The oral route is the most common form of drug administration. Currently, oral formulations represent about 90% market share among all pharmaceuticals; 84% of the best-selling pharmaceutical products are orally administered; its market size is valued at \$98.3 billion, with a predicted 6% compound annual growth rate (2020-2027).

Specifically for biologics, Oralead chooses to focus on the oral route because, for many biologics, injection may cause an immune response. For other biologics, such as peptide drugs (the most typical drug of this kind is insulin), patients may need frequent and regular injections, which are painful and inconvenient.

What are the obstacles?

To reach their target tissue, drugs need to pass through the stomach and duodenum (a part of the intestine), whose enzymes and acidic environment will likely destroy the fragile biologics and reduce their absorption rate. Factors that govern oral drug absorption include drug solubility, mucosal permeability, and stability in the gastrointestinal tract environment. Overcoming these obstacles may result in higher bioavailability (the ability of a drug to be absorbed and used by the body). Pharmaceutical technologies that aim to enhance oral drug absorption include nanocarriers, micelles, cyclodextrins and lipid-based carriers.

The solutions: existing and prospective

The history of polypeptide drugs dates back to 1921 when the first product of its kind, insulin, was acquired from a non-human source. In 2016, Novo Nordisk dropped its needle-free oral insulin research line, which discouraged many. However, in 2019, the first

oral insulin, “semaglutide” was approved by the FDA, opening the door to a new age of oral biologics. Some problems persist: 1. high costs; oral insulin costs \$26 per day, twice the cost of injection. 2. Low bioavailability 3. Inconvenience; oral insulin needs to be taken every day. With these shortcomings, oral delivery of insulin may not be able to build significant demand when still in competition with the injection method.

While existing products have a bioavailability of around 1%, Oralead Pharma aims to use its patented technology to achieve a bioavailability of 26% - 26x higher than existing products - and reduce the frequency of dosing to once per week. The company uses an unreactive excipient substance to enhance permeability and uses oligopeptides to increase stability.

Overall, although the oral biologics delivery industry is in its early stage of development, and has many obstacles to overcome, it is a multi-billion dollar market with potential to revolutionise existing medicine.

Editor's note

Welcome, my dear readers! Felix has recently created a new column called ‘Business’, which will feature entrepreneurial stories, industry insights, and expert interviews. We aim to inspire students to explore innovation opportunities, learn about technological frontiers, think critically about real business problems, and ultimately make positive impacts to the world. In the near future, we will deliver content through podcasts, Twitter and LinkedIn, so stay tuned!

If you are particularly interested in any topics, have any suggestions, or if you simply want to chat with us, feel free to email me through zhifan.xu18@imperial.ac.uk. Looking forward to hearing from you.

Ashley



CLUBS & SPORTS

Edited by: SAM LOVATT

University of London Society of Change Ringers - who makes the Queen's Tower ring

Esther Gao Change ringer at ULSCR

If you've ever been on campus during graduation ceremonies, you will have heard the noisy bells that seem to ring forever while you were busy revising. You might know that high up in the Queen's Tower there are ten bells that are rung for special events, the heaviest of which is nearly two tonnes. But have you ever considered who actually makes the noise and how they do it?

Bells have been around in Britain for centuries since around 400 AD, but what we call change-ringing has its origins in the 16th century, when they began to be swung $\sim 360^\circ$ rather than $90-180^\circ$. With the addition of the stay and the slider (see diagram to the right), the bell could

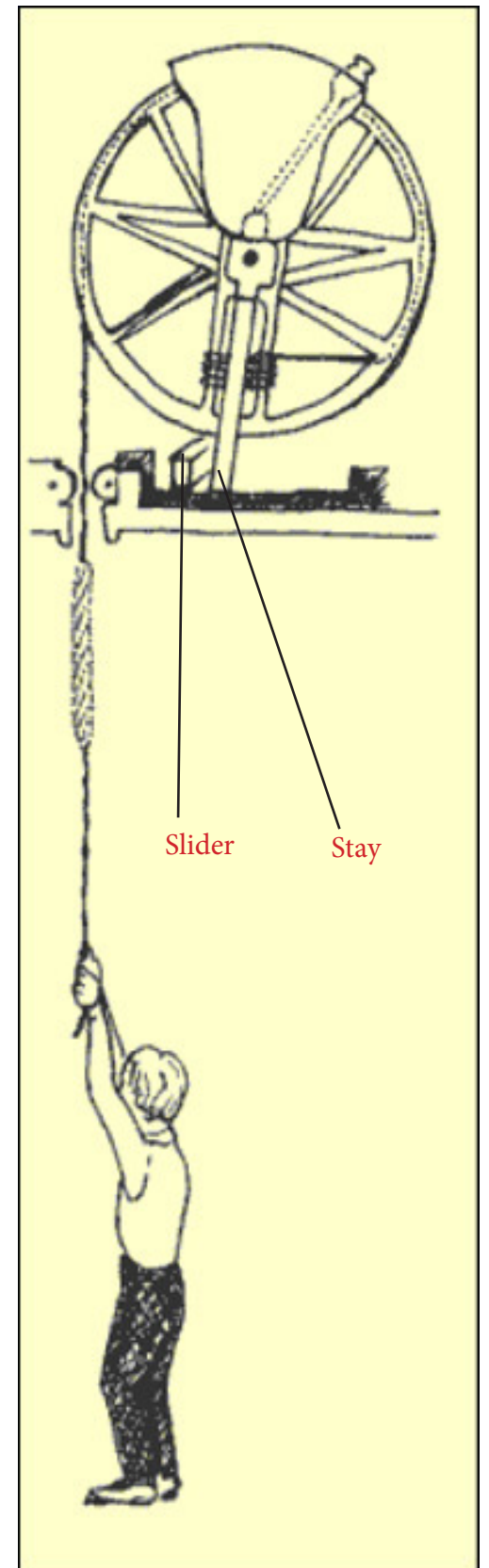
be balanced on its end in the up-right vertical position. This gave much greater control and allowed bell ringers to accurately change the order in which the bells sounded, as opposed to the random swinging found in continental Europe at the time. Such control of the bell allows increasingly complex sequences – otherwise known as ‘methods’ – to be rung by moving the bells in continuously-changing sequences. Today, bells are rung as both a fun hobby and to mark events, such as weddings and funerals, or the Queen's Jubilee.

You might be wondering what the relevance of all this is in 21st century London. Perhaps the most prominent reason is that change-ringing is an interesting and rewarding hobby that

is almost unique to the UK. Best compared to a very sociable orchestra, the high levels of skill, intricate timing and inexplicable delight at success being very similar, it can involve travelling all around the country and meeting plenty of new people in places which are off limits or costly for non-ringers to visit. It is incredibly exciting to visit the ‘hidden’ corners of a church or cathedral and be temporarily tucked away from the outside world, engaging in a centuries-old practice.

I myself only took it up through sheer coincidence, but it has proven to be one of my favourite hobbies. A few years ago, at Christmas, in the little Welsh church of St Tegai, I fell into conversation with a group, whom I later found out to be the local band of ringers. I was later taken to see the ringing chamber and belfry for myself. Beginning with my local tower of St Tegai, now with ULSCR (University of London Society of Change Ringers), I have travelled to multiple towers across stunning and historic parts of the country, and I have met many other bellringers who are very patient and friendly when it comes to ‘learning the ropes’. Every visit to the tower is a step forward in my knowledge of campanology (if you want to be overly posh about it) and although I occasionally struggle with new methods and concepts, the thrill of ‘levelling up’ always compensates for it! My home tower of St Tegai houses six bells, and since joining ULSCR, I have gone to towers with eight, 10, 12 and even 16 bells. Despite initial trepidation, having the opportunity to do something fairly mentally challenging, alongside being able to socialise, has encouraged me to keep progressing.

So, how can you get involved? Regardless of experience or religion (despite the location, ringing is largely a secular activity for most members) everyone is welcome to join our undergraduate practice on Thursdays from 1900 to 2030 at St Olave's Church, Hart Street. The nearest tube station



Ringling the Queen's Tower Bells in 1981

is Tower Hill (Circle and District Line). If you're not quite convinced yet, there's always the promise of a pub outing afterwards too, not to mention many socials throughout the year! Interested or have questions? Check out our website at www.ulscr.org.uk or our Instagram @ulscr.