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OSRG ARTS SOCIETY

British Museum, 'Feminine Power'

At the start of term, members of the OSRG Arts Society visited the British Museum to see the exhibition 'Feminine power: the divine to the demonic'.

Using items from the extensive British Museum collections as well as several borrowed from other national museums, the exhibition set out to explore all aspects of the female character found in religions, societies and mythologies from ancient times to the present day. On arrival, visitors encountered a wall of dozens of single words describing 'the feminine'. The words set the context for the upcoming experience. The first section of the exhibition looked at ways in which the female form had been interpreted in prehistoric times when its purpose was to convey creativity and procreation. Abstract forms from Ireland, the Cycladic islands and from the eastern Mediterranean were celebrated here.



Beyond these small-scale items rose the famed sculpture of Aphrodite, standing naked, at an impressive 7 feet tall. Embodying the ideals of an ancient Greek female beauty, the goddess is depicted covering her pubic area and breasts with her hands. The very act of concealing these areas brings them to prominence in the mind of the viewer. As the goddess of beauty and love, she is both bringing attention to the female form as well as protecting its sanctity. Botticelli's The Birth of Venus provides a similar interpretation.

Passing more cases displaying powerful goddesses from American and Indian cultures denoting passion and desire, the visitor encounters, high up, set at right angles into the wall, a grotesque sculpture, the central object in the exhibition. The artwork introduces a section about magic and malice and depicts the naked Lilith, the first wife of Adam. Lilith refused to lie beneath Adam, and fled Eden rather than be his subordinate. For many centuries, she has been villainised, but more recently she is gaining a reputation as an icon of female independence. The figure is made of blackened bronze with staring glass eyes; the body is misshapen, crouched in a position that suggests mischief and evil. At first it is grim to glance upon and, indeed, shocking, but at closer inspection it is clear that she represents, in perhaps a sardonic way, the attitudes many have to women. Her genitalia are hidden within the crouched stance, which is reflective of the way that people look at women: when they are believed to have done wrong, they are seen as no more than a lesser form, much like Lilith herself. The sculptor, Kiki Smith, who created the piece in 1994, said 'Lilith is an early figure of defiance, a spirit that wreaks havoc and refuses to be subjugated. Here she is transcending gravity'.

The exhibition continued with themes of justice and defence, compassion and salvation. It was a visual treat and delivered many surprises as well as providing real food for thought. The exhibition helped us to engage with many different cultures and beliefs. Those beliefs can help us to reflect upon our own ideas and preconceptions of what feminine power means today.

PIGOU SOCIETY

'The Impact and the Aftermath of the Mini-Budget: Where did Truss and Kwarteng go wrong?'

The Growth Plan, or what most media outlets dubbed the "minibudget", was introduced to the House of Commons by Kwasi Kwarteng, former Chancellor of the Exchequer, in an attempt to reduce the impact of the cost of living crisis caused by the war in Ukraine. As inflation continued to rise sharply along with energy costs, Kwarteng and Liz Truss, our former PM, felt that something had to be done. However, as we've seen, their plan quickly backfired and the UK economy swiftly descended into turmoil, with global financial markets enraged at their plan, which ultimately led to a sacking followed by a resignation.

Well then, you may ask, what was in the mini-budget? The mini-budget dictated that the basic rate of income tax was to be cut from 20% to 19%, which the Government said would save 31 million people £170 a year. The higher rate of income tax, which was 45% for taxpayers in the UK earning more than £150,000 annually, was abolished. Instead, one higher rate of 40% was to be put in place in April next year. Furthermore, the planned increase in UK corporation tax from 19% to 25% was scrapped but then reinstated quickly. Finally, the Government said that average households using electricity and gas in the UK would pay no more than £2,500 annually for two years. Overall, the main aspect of the mini-budget was a series of tax cuts to combat inflation. However, this was a huge gamble that did not pay off in any way.

The initial damage done by the mini-budget was the depreciation of the pound, which lost 3% to the US dollar. The pound reached an all-time low in comparison with USD, with £1 being equivalent to \$1.0327 at the time. As a result of this, the Bank of England had to increase fixed interest rates above 6%. For comparison, interest rates were around 2.4% earlier in the year. Another negative reaction from the mini-budget had to do with the bond market. Increased government borrowing and spending caused a sharp rise in yields in the bond market, and this volatility forced the Bank of England to begin to buy UK government bonds in an attempt to calm down the bond market, which in turn put pension funds at a point of collapse.

There was also the issue of unequal money distribution in the mini-budget. The abolition of the 45% higher rate of income tax would mean that the rich would only get richer, and there would be further inequality in money distribution. The Resolution Foundation stated that because of this tax cut the richest 5% of households would be able to save £3500 while the poorest 5% of households would only be able to save £90.

The reason for all these reactions was that the Government decided to spend more than they tax. The UK did not have the money to cover all these tax cuts. This meant that the Government would have to borrow money from other countries, putting the UK into debt. In other words, the Government would be putting the UK into debt in exchange for unsustainable growth. Sure, economic growth may be achieved in the short term, but if it weren't sustainable the snowball effect of borrowing from countries and big banks could lead to a financial crisis similar to that of 2008. So, from an economic standpoint, this was a massive risk that would potentially cause the UK financial disaster. This was the reason the Bank of England and the IMF had to use counter-measures such as raising interest rates and buying UK government bonds. The IMF, in particular, didn't welcome the Government's plans, saying at the time that the Government's fiscal plan that was to be published on 23 November was a chance to "re-evaluate" the tax cuts, "especially those that benefit high income earners".

As a result of the backlash, Kwarteng and Truss both left the Government, with Jeremy Hunt becoming the new Chancellor and Rishi Sunak, the old Chancellor under Boris Johnson, becoming the new prime minister. Together, they reversed all the tax cuts and the pound reached a high since the minibudget, soaring by 1.9%. Yet the initial issue that spurred the minibudget remains: the cost of living crisis. How does the Conservative government plan to reduce the effects of the cost of living crisis, such as soaring inflation and energy costs? Jeremy Hunt addressed some of these problems in his Autumn Statement on 17 November. However, only time will tell if his policies will benefit the economy or damage it instead.

MEDICAL SOCIETY Raulph Lubbe, The Grove, 'Applications of AI

technology in medicine'

Continuing on from the Medical Society's previous lecture on the applications of AI technology in medicine, Raulph Lubbe, *The Grove*, introduced robotics, VR and big data science in the context of modern and future medical care. Technological advancements have traditionally paved the path for medical development: mathematic algorithms improved drug development in the 1950s, CAD and artificial neural network chest radiograph processing sped up diagnosis in the late 20th century. Convolutional neural networks in the Da Vinci robot currently assist surgeons in minimally invasive procedures, and there is glimmering potential for independent robotic surgeries in the coming decades.

Basic local alignment search tool, or BLAST, is one example of the current application of big data in medicine. Individual patients can use next-generational sequencing to map their entire genome. BLASTx searches translated nucleotides from the genome against the resultant protein, while TBLASTn searches protein biomarkers against database nucleotides. As BLAST is available publicly on the US National Library of Medicine website, doctors and patients can "BLAST" patient genome sequences against the database. BLAST will then provide data on similar or identical genomes in the database, such as individual diagnoses and prognoses. The quick and easy access to thousands of patient data with similar symptoms/genomes helps doctors to make their diagnoses and treatment plans. The sheer computing power of modern technology also helps the pharmacological and radiological sectors. AI programmes learn training set tomographic scans of different body parts to analyse distinguishing patterns between normal and abnormal scans. AI technology has already shown higher correct diagnosis rates than radiologists and physicians in training and real-life circumstances. Programmes such as SYNTHIA retrosynthesis allow researchers to input hand-coded reaction rules and simulates all possible small molecule products. As 76% of newly approved drugs are small molecules, the simulation software saves time and funding from manual testing of reaction pathways. Doctors spend up to 60% of their day logging electronic health records (EHR). Some technology advocates argue that AI should take over tedious administrative tasks (such as the EHR), allowing doctors to spend more time with their patients.

AI and robotics have a well-established reputation in surgery. The most famous example is the Da Vinci machine, which has enabled surgeons to conduct minimally invasive procedures in a control room on the opposite side of the world. Engineers are developing robots that can complete simple surgeries without surgeon input. Indeed, Robocath, an independent surgical machine, conducted a successful self-controlled balloon angioplasty (inserting a balloon stent into the blood vessel). Robocath's success is only the first step towards robotic surgery in more complicated operations. More recently, physicians at Great Ormond Street used VR and scanning technology to recreate an exact virtual copy of a twin conjoined at the head and practised the surgical procedure while one doctor was in New York and the other in London. Thus, VR technology is helping both consultants and junior doctors train in surgical procedures in safe, low-risk environments.

Technology is also addressing patients' mental health issues. Diagnosis apps, such as chatbots and rehabilitative games, are currently used to help children with mental health issues. However, extensive research is required in this relatively new field.

Lubbe closed the lecture by addressing questions of concern from the audience regarding the growing autonomy of AI and potential privacy breaches. He argued that AI will help, not replace, doctors with surgical and administrative capabilities and that the risk of a data breach is equivalent to that of any modern digital data.

GORE SOCIETY

Ben Shailer, Rendalls, 'Kant's Transcendental Idealism: us, stuff and the things in between', 11 October

On 11 October, the Gore Society welcomed Ben Shailer, Rendalls, who talked about the influential German philosopher Immanuel Kant and his transcendental idealism. After giving us a brief introduction to Kant, Shailer explained the concepts of posteriori, priori, synthetic and analytic knowledge. He then proceeded to outline Kant's ideas about geometry and its relation to space, as well as how, if geometric knowledge were synthetic and a priori, the concept of space must also be synthetic a priori, and therefore space must be an intuition of our minds that we impose on objects and not an objective property of the object that we intuit. He demonstrated how Kant then suggests that if space is only a property that we subjectively impose, then the objects that we intuit must appear different to what they truly are: the distinction between which Kant calls the 'phenomenal' and the 'noumenal'. Kant then argues that a similar approach could be used for time as well, and time would thus necessarily also be an intuition of our minds.

Shailer then introduced the two antimonies of Kant, which deal with the nature of space and time by using set theory and the concepts of infinity respectively, highlighting Kant's argument that time can neither be finite nor infinite and that this indefiniteness is resolved by transcendental idealism. If time is only a product of our intuition (from which we cannot escape), it is justifiable to suggest that it is indefinite. Kant takes a similar approach with space, arguing that space cannot be made of a finite number of smallest things, and thus finite, and it also cannot be made of an infinite number of infinitesimally small things, and thus infinite. Transcendental idealism solves this in a similar way to time by suggesting that if space is just an intuition it can be indefinite in nature.

At this point, Shailer found himself facing a long round of questions, and once he had answered them all, with clarity, he moved onto the necessary conclusion that transcendental idealism suggests. He pointed out that causality is merely co-existing states of an object without time, and therefore we might be intuiting multiple versions of universes to perceive successive events. Kant also argues that our intuitions of ourselves are what he calls 'the soul', to which we can apply moral accountability.

Finally, Shailer answered another round of questions before concluding this engaging and innovative talk at the phenomenal ending-time of 10.20pm. It was an amazingly delivered and well-composed talk and certainly gives some insight into perhaps one of the most influential philosophers to have lived.

VIDEO GAME SOCIETY

Dario Holland and William Martin-Jenkins, both The Park, 'How did FIFA become the de facto football game? A look back on the evolution of FIFA' 11 November

On Monday 11 November, Dario Holland and William Martin-Jenkins, both *The Park*, entertained the Video Game Society with an informative talk regarding FIFA and how it became the de facto football game. They began with look back at the evolution of FIFA, going over the rights between FIFA and EA and how their collaboration is coming to an end. They briefly discussed the early FIFA games from 1994–96 and showed some clips of how old and simple they were back then, yet so revolutionary for their time.



Why did FIFA become the de facto football game? There are many reasons why it was so successful but none as important as how progressive and forward-thinking EA was in its ability to evolve its graphics, game design and gameplay. Its adaptations to the game made it easy for people to like. EA was one of the first to have players on the cover of its games, as well as managing to get the rights for having real names and clubs.

They went on to talk about how in-depth FIFA and EA went into making FIFA 11 and how successful it was, potentially being the most revolutionary and advanced game of its time. This was because of all the new features EA added in FIFA 11. The addition of Ultimate team and Career mode made the game popular and it is widely known today as the most popular games mode. It was also the first year FIFA was voted game of the year. The changes on dribbling, shooting, passing and more were important advances for the gameplay, which changed and revolutionised how football games were played. The game received so much praise and approval from the public that EA continued adding to and improving it over the following years so that became widely considered the greatest football game ever made. They briefly covered FIFA 18, talking about how big an impact it had and how some might say it was the best FIFA because of the updates on Ultimate team and Career mode. The game also had Ronaldo as its cover photo, which increased the hype.

They went on to talk about FIFA 22 with its significant improvement in graphics and game development, with the new technology of Hypermotion 2 that enabled a boost in graphics.

At the end of the talk, they explored why FIFA was much better than competitors like PES. They explained that it was beacuse its characteristics had more depth, with the best graphics and easiest and simplest game functions.

METROPOLITAN

BLACK HISTORY MONTH

'Why are there historically so few Black scientists in the chemical sciences?, by Jaden Odofin, The Grove

Throughout history, there have been many great scientists: Amedeo Avogadro, Robert Bunsen and Dmitri Mendeleev, just a few of the renowned among many. But even in the less prestigous parts of the scientific community, exclusivity is still the prevailing attitude, with a surprisingly low number of scientists being from a minority ethnicity. The figures today are shocking. Black people make up around 12% of the population of the United States, and so it should follow that a similar percentage of African-Americans would participate in the chemical sciences. This is far from the case, with just 4.5% of PhD recipients in the US being Black. In the past, these figures were even worse, with outright and blatant racism being much more prominent. Odofin's talk provided insights both into how this directly affected the prospects of becoming a chemist and what other obstacles Black people face along the path to becoming established in the field of chemical sciences today.

Odofin argued the primary issue was the fact that Black people - particularly in the UK - have a much more limited access to education, something which is vital to a career in the chemical sciences. In order to become a scientist, it is almost imperative to go university, a path that can be closed by barriers affecting Black people. The predominant issue, it was argued, was that racism in the past still continues to have an effect on Black people today. This is because, generally speaking, Black immigrants to the UK in the 1960s, mainly from West Africa and the Caribbean, were subject to widespread racism, which generally resulted in them getting worse housing and jobs in more deprived areas. Data shows that this has had a direct affect on educational opportunities, with schools in the most deprived areas tending to be much worse, on the whole, than those in affluent ones. These schools are 15 times less likely to be classed as 'outstanding', instead being eight times more likely to either be 'inadequate' or 'require improvement'. Growing up in more deprived areas puts you at an instant disadvantage in academia, given that a lower standard of education has an impact on GCSE and A-level results, which in turn limits opportunities to go to university and one's chances of being prosperous in the future. The cycle of poverty and lack of access to education has generally not been helped by successive governments' lack of desire to change things, which is why scholarships and initiatives are important for giving opportunities to gifted Black students.

The effect of events in the 1960s may appear tangential to the lack of Black academics in the chemical sciences, but this is not the case. The lack of educational opportunties has been undoubtedly one of the main reasons for the lack of Black chemists throughout history.

Not all Black people had restraints upon them in the past, but that did not mean that they were on a level playing field with people of other races. This is because of unconscious bias, something that has a significant effect today and was more prominent in the past. It is defined as the 'term that describes the associations that we hold, outside our conscious awareness and control' triggered automatically by 'background, personal experiences, social stereotypes and cultural context'. The reason why this creates such an impact is because in almost every instance it takes a great deal of self-awareness for someone to realise that they have an unconscious bias, with most simply not willing to go to those lengths. Unconscious bias leads to some people thinking that Black people simply cannot be at the same academic level as a White person solely by virtue of the fact that they are Black. It is this type of behaviour that can prohibit Black people from getting into university to study the chemical sciences, or getting a job in the chemical sciences. This, coupled with selective memory, which is the 'tendency to remember only what one wants to remember', is the reason why it seems there have been so few Black chemists in the past. Lack of appreciation of Black scientific achievements has led to their under-representation in the history books.

A Black person going to university and attaining a degree is still not a guarantee that they will become established in the chemical sciences. At each qualification following a degree and before becoming a chemistry professor, the number of Black people drops: 7.9% of those who achieve a bachelor's degree in the chemical sciences are Black, followed by only 4.5% at PhD level, then 3.2% at a postdoctoral research position, and finally, only one Black chemistry professor out of 575 in the UK. A major reason why Black representation drops so much is because the credibility of Black chemists' work has either been misattibuted or extensively questioned, with unconscious bias or, in the past, blatant racism, making it harder for them to gain recognition. Examples include the likes of Alice Ball, whose discovery of how to fractionise active oil was credited to another male chemist, or James Andrew Harris's lack of recognition as one of the discoverers of the elements rutherfordium and dubnium. Fortunately, the problem is starting to be resolved, with changes promoting equality taking place at every level within chemistry, hopefully leading to a substantial change in the future.

To conclude, historically, barriers such as limited access to education, unconscious bias, selective memory, and work being discredited have made it seem that Black people have not participated in the chemical sciences. However, in reality, Black chemists such as Alice Ball, James Andrew Harris and Percy Lavon Julian were pioneers in the realm of chemistry and often came up with the important ideas and research, contrary to what history would suggest. It is not the case that there was a lack of Black chemists in the past: many of them have been forgotten, something which will it is hoped will be rectified in the future.

CONTINENTAL BREAKFAST A short horror story

When I viewed the SCH breakfast menu this morning I was immediately struck with horror. There were two words that gripped me with terror: Continental Breakfast. The continental breakfast is irritating at best and unconducive to study at the worst. They say that breakfast is the most important meal of the day! Why then do I find myself eating continental breakfast at least twice a week? There is little nutritional value in this croissant and Babybell. I eat, but remain weak and malnourished. Do I starve to death, or eat a handful of buttery pastries to eke out enough energy to stay ahead of a busy day? If I had fancied continental breakfast, I would have chosen to live on the Continent. Are we not firmly within the British Isles? When I asked another boy, "Would you not rather eat bacon and eggs, the breakfast of champions, which was what surely won us two world wars and one World Cup, over this measly croissant and some smoked salmon that looks like it was fished out of Park Lake?" The response, to my horror, was a firm "No." And so I asked myself what Admiral Nelson would have said, or Lord Wellington, if they found out that a French breakfast was being served in one of Britain's finest institutions. They would allow no place for it.

"DONNY" WALKER

Founder of the Harrow Wanderers



The Walkers of Southgate were known in the county As players of cricket and purveyors of bounty, A Victorian family, they had sporting ability In addition to exceptionally robust fertility. Including four sisters, they numbered eleven. Just right for a team; our hero at seven.

Isaac Donnithorne to give him his full names, Displayed a precocious talent for ball games. For four years running he won his school flannels Two years as captain – as carved on the panels Add football for three years, champion racket And you just about have it: a gold-plated packet

The wealth of the Walkers was gathered from brewing Their plenteous income made no need for pursuing Gainful employment, indeed working at all And ID spent his summers with bat and with ball. Such was their skill that four were invited To play for their country, All England (United) Given the freedom of unending leisure, When Middlesex failed to call on his pleasure, ID turned to Harrow, the scene of his young days And spend afternoons striving for some ways Of imparting his skills, and maybe the joys Of cricket into a new age of boys.

He also provided the start of our story, One-fifty years of continuous glory, Touring the north with teams of invited Players on whom his keen eye had lighted. He was the skipper all tried impressing Nothing could happen without Donny's blessing.

Alas, he died young, just fifty-eight years A giant of old, revered by his peers. With him the genes the Walkers all carried For none of the brothers chose to get married; But he gave us our club, so let not the night pass Without to our founder raising a glass.

WINTER TIMETABLE

Did the rain descend when clouds came in And I looked at the sky and sighed; Did the air crush me with winds gushing And I walked against the rushing tide Of wind rain, and bad weather of all sorts Which rumbles and mumbles and occasionally snorts.

The sun smirks and says farewell, The rain lurks just before the bell, The wind breathes, in but not out, All waiting for the final shout Of quarter past four on Friday night. As the first strike of the bell draws nigh.

St Mary's rings, the heavens dim, The Hill goes dark from rim to rim. All the weathers release their might So we can suffer quite a blight. But, of course, no weather could Stop Harrovians do whatever they should.

Double physics on Newtonian dynamics, Latin and Greek and even more classics, Theology and philosophy, causality and time, Harrovians learning to act and to mime, Working out sums, typing in codes, Modulating chords, or just sketching toads.

Walking and treading, fighting for life, To find some space in the colossal strife Into the Shepherd Churchill Dining Hall, Designed to feed a thousand young minds. Perhaps the meagre doors don't fit all Eight hundred boys in fratricidal grinds.

For winter does not only brings bad weather and rain, But also the excruciating timetabling pain, Sitting in lessons, with brains that ache, Or simply trying to stay awake. I think, it is the wish of every sane soul, To exterminate winter timetable once and for all.

REVISING EFFECTIVELY

Avoiding mental burnout and fatigue

With the Autumn Trials fast approaching, our priority is to stay focused and be as effective as possible when revising. The biggest obstacle in our way is, as the title suggests, mental burnout: a state of complete mental exhaustion. This can occur, for example, when we spend extended periods of time (often with little to no rest) on cramming chapter summaries or doing a past-paper marathon. It is not a good idea to come even close to reaching this state of fatigue, so let us explore the some of the ways to avoid this.

Firstly, you may think that the more revision you get done, the better your grades will be. Maybe to some degree this may hold true, but in the long run the more important part is how efficient you are at revisiting material and how well this revision is planned out; as such, creating a revision timetable is key. You may already have done so in your Tutor periods, so use it! You don't have to follow it minute by minute, but having a rough idea of when you want to dedicate your time to revising specific parts of a subject can be very helpful. It is also important to know which parts of the syllabus are going to be examined under what contexts so that you can adequately prepare for the papers ahead. Spend the most time on going over parts of the course that you are the least familiar or comfortable with, and spend least time on the stuff you already know - there's no point patting yourself on the back when there is more difficult content to tackle! Having a rough schedule or plan is the first step in achieving more efficient revision sessions, which in turn will help to make you less stressed and avoid (or, at least, minimise) mental burnout.

Second, remember to take appropriate breaks between periods of revision. It is much better for your mental and physical health for you to do numerous smaller sessions rather than pulling a massive all-nighter. A good rule of thumb is to follow the 3:1 ratio – 45 minutes of revision, followed by a 15-minute break. Many people would choose to spend their break scrolling through their Instagram reels or even extending it to watch an episode of The Crown, but it is much more beneficial to be physically active. After sitting around for so long reading paragraph after paragraph in the textbook, it can be very refreshing to leave your room and walk around, giving your brain some time to recover from constant hyperactivity. Spending excessive time being sedentary is also very poor for your blood circulation and causes you to be more tired over time, making the benefits of taking a walk every once in a while much more apparent. Plan your breaks wisely by slotting them into your schedule when you need it most: for example a shorter break after an easy Geography session can mean that you can rest for longer after a much more taxing Physics session. Knowing when to take a rest is crucial for maintaining a clear mental state.

It can also be helpful to take full advantage of the resources at your disposal. Actively seeking help from others can be particularly useful: email your beak sooner rather than later for help on a specific topic and ask friends in your division how they managed to wrap their heads around a tricky concept. There are also many online resources that can help you revise effectively and tackle the parts of each of subject you find the most difficult: years and years worth of past paper questions, step-by-step YouTube videos on every syllabus point... the list goes on. All of this is readily accessible at your fingertips and can help ease the stress in planning and revision – always keep in mind that a targeted, no-nonsense revision plan is the best way to go forward, reducing the overall time sitting at your desk poring over pages of notes, helping to alleviate mental fatigue and burnout in the long run.

Overall, it is important to consider a holistic approach to avoid mental burnout from a health and wellbeing perspective – after all, it would be nigh on impossible to list all the ways of avoiding fatigue. Every person is different, and each will have their own ways of coping with stress: talking with your friends or family, getting some fresh air, having a nice meal... the list goes on. Above all, during this exceptionally busy time of year, it should be your highest priority to treat yourself kindly: be supportive and understanding with ourselves, rather than being harshly judgemental or critical – for example, instead of giving up at the smallest mistake, step back and reassess the situation from a different angle while taking appropriate actions to try again. 'Rome wasn't built in a day, but they were laying bricks every hour': take your time in building up your mental dexterity with all the tips above and you will soon become even more mindful and efficient in everything you do.

I/O TRIUMPE

'Generative Design: Shaping the Future of the Manufacturing World', by Andrew Stratton, Newlands

Modelling and testing designs has been integral to the success of engineers over many generations, from the great pyramids of ancient Egypt to the first car ever created. This process has served humanity endlessly without fail, and while the process has remained consistent, the method by which this process is carried out is constantly evolving. Now, advancements in technology are facilitating this evolution, leading to the creation of unprecedented systems.

One of the most revolutionary innovations in manufacturing is computer-aided design (CAD) modelling. CAD allows designers to visualise their products digitally, making adjustments to dimensions and aesthetics without wasting any material. CAD is a very recent invention, but there is already a new system being developed on top of CAD that could shift how engineers think and drastically change their output, leading to a completely optimised reality. This new tool is called generative design.

Generative design solves many of the slight issues of CAD modelling that were initially hidden. I say "slight issues" because there is nothing actually wrong with CAD, but there are some aspects of it holding designers back from unlocking a product's full potential. The first of these is human bias. As humans, we tend to lean towards design options that have proved to work in the past, rather than the perfect design for the future. An example of this could be tables: how do we know that a structure with four legs and a base on top is the best way for something to be supported? We do not, but because it has worked in the past, we have automatically stuck to it. Moreover, it is not the case that other designs are not being produced; they are simply rejected quickly because they do not conform with society's image of what a table should be like. This concept is true not only for design but is also applicable to us in everyday life. For example, a cricketer who has used the same cricket bat for years will probably want to continue using the same bat despite there being more effective alternatives. This could be due to the high price of new bats, or the sentimental value of the old one. Either way, the batsman has stuck with the option that has proved to work, and despite a few bad days with it, he would not change his decision to use it.

The solution to this is the topology optimisation aspect of generative design: finding the ideal shape for a particular part to carry out a specific function. This software does not allow the endeavours of the past to influence its designing. It thoroughly analyses different shapes and structure with different materials under precise loads, eventually reaching a conclusion on the ideal practical design. While an engineer may be drawn to common, symmetrical shapes to carry out a function, assuming they are the right option, the use of generative design prevents this and picks the perfect profile for getting the job done. Another issue with CAD is how the digital product design can be machined and manufactured in real life. A lot of the time, ideas from designers and engineers seem ideal, but are incredibly difficult to construct. Generative design solves this problem by ensuring that every product it creates can be either machined, cast or moulded. Therefore, this makes the product easy to reproduce, saving money and resources for manufacturers.

This leads to another purpose of generative design: resource management. How many times have you heard of manufacturers going over budget? It happens so frequently, yet is easily preventable with this new system of technology. The process is called light-weighting: the system will scan a design and analyse it under stress, removing mass where there is less pressure and adding mass where there is more. This provides a product that is just as safe and functional as the original, but with minimal mass. All that is required from the user is to set up the requirements for the model, such as manufacturing processes, loads and constraints; the software then offers a design that meets those requirements, resulting in a lightweight, unbiased, optimal design.

In conclusion, while all these components of generative design are wonderful, they are individually doable by engineers and designers alike. So, what place does generative design actually have in the manufacturing industry? Time. Generative design saves time, and time is precious, not just in engineering but in all walks of life. That is why we are already seeing generative design being used to not only design new products, but also improve on older designs, especially in automotive and aerospace industries. Due to this key factor of time, generative design is really going to make an impact on society.

SPORT

FENCING Ist v Bradfield College, 10 November, Won

On Thursday, the fencing team had a fixture against Bradfield College. Sabre A won by 45-16, a powerful display of skill by Brian Chang, *Druries*, Aidan Lee and Luke Pain, both *The Head Master's*. Epee won by 45-5, with some great performances from Arthur Cullinane, *The Head Master's*, Julian Herschel, *The Grove*, and Cyrus Chang, *Druries*. Finally, Foil won by 45-20, a solid and steady performance from Nathan Goff, *Lyon's*, Sinan Basak, *Elmfield*, and Brian Chang, *Druries*, who stepped in to fence Foil as well as Sabre at the last minute. Overall, Harrow achieved a clean sweep: a great performance from all members.

RUGBY

The School away v Eton, 17 November

The XV away v Eton College, Won 33-10

The XV continued their undefeated run of performances with a 33-10 win away at so far undefeated Eton. The XV showed plenty of character to win, despite facing a delayed arrival and shortened warm up after their bus broke down on Garlands Lane.

Harrow's back line threatened every time the ball got into the wide channels. First-half tries from Edstrom, *Newlands*, and Cross, *Newlands*, gave Harrow a 12-5 lead at half-time despite playing into a strong gale. With the wind at their backs in the second half, the Harrow side opened up even more and converted tries from Miall, *Newlands*, and Thayil, *Rendalls*, put the game to bed with Harrow finishing 33-10 victors.

The XV will be pleased to secure the win against the evercompetitive Eton opposition and will look to rest and recharge over the exeat weekend before Bedford next Saturday.

2nd XV away v Eton College, Lost 10-26

After a nervy start when the bus to Eton broke down on the Hill, the 2nds arrived late and were ushered through a quick warm up to kick off while it was still light. The early exchanges were scrappy and Eton scored first, taking advantage of handling errors to rumble over. Harrow came back into the game by building the phases, the forwards probing into the 22 with strong carries before JC and Keir combined calmly to put Kurran in. Eton managed a second score before half-time in bizarre conditions to take the score to 12-5.

The 2nd XV performance in the second half was much improved but Harrow struggled to get on top in a game that lacked flow, among other things. Baba Obatoyinbo, *The Knoll*, crashed over the line but the referee was unfortunately held up arriving to verify the try, by which time so was Obatoyinbo. As Harrow chased the game, Eton to their credit were clinical, notching two breakaway tries. Harrow rallied with a brilliant driving maul but the game was beyond chasing. Overall a frustrating performance, but another experience to learn from and move on from quickly.

3rd XV away v Eton College, Won 19-17

A hard-fought battle consisting of scrappy rugby from both sides. Harrow came away victors thanks to a brace from Zak Banton, *Newlands*, and Finlay Douglas', *Newlands*, trusty right boot.

4th XV away v Eton College, Lost 5-12

A strong game by a weakened team. Harrow were strong throughout.

A great performance by Archie Tait, *The Head Master's*, as captain with some really good play. Eton although not necessarily strong moved the ball around better than us. The game overall was tightly fought by a reduced squad.

Colts A v Eton College, Won 52-12

Colts B v Eton College, Won 26-14

The air was moist with anticpation about one of the biggest fixtures of the year – no, not the tiddlywinks spoon fifth place play-off, but the annual battle against the light blues from Slough. On the evening of battle, the captain convened a COBRA (COlts Bs Rugby Association) committee meeting to finalise the squad formation and attack plan. In the very same evening, there was much turbulence within the Colts hierarchy, with players moving up and down between the A/B/C teams like a proverbial yo-yo. Unfortunately, our captiain himself Harrison, Moretons, was among those snatched from the warming embrace of the Bs and thrust into the fragile limelight of the As. Thankfully, the Colts Cs team was positively overlfowing with talent, and after a friendly but firm request for a prop and a back, the Cs coach happily obliged and sent his best up to join us - indeed the author hereby doffs his cap to the Cs coach for his kindness and benevolence at the eleventh hour.

Harrow won the toss and chose to receive first. The whistle blew and they were off. Within the first ten seconds of the game, our pack won the first ruck, then floated a poorly-timed hospital pass westward towards our backs. Eton were watching it like a hawk and darted forward to make the intercaption then put the first try down. Disaster – Harrow were on the backfoot from the get-go. Dunne, *Elmfield*, had been seleted as stand-in captain for the day, and had to rally his troops to try and eliminate such careless mistakes. Some firm tutting and finger-waving under the posts seemed to work as Harrow then began to cut into the Eton defence more often, and began to push towards scoring their first try. Unlike the Tories, Eton were strong and stable, and kept turning us over. Thankfully Hu, *The Head Master's*, had enabled 'bulldozer mode' and frequently blasted gaping holes in the light blue defence. Unfortunately we let them through one time too many, and one of their attacks broke through our back line allowing them to score their second.

A glimmer of light was shining from the heart of our pack, and we did not give up. Our fellowship was strong, and we started to push through their strong forwards time after time. Riddick, *Druries*, made a great run along the wing to put down our first try of the afternoon, and this stoked the fire of battle in our hearts. Bruinette, *Newlands*, was hungry for contact, and also wanted some of the try action. Despite his slightly grazed knees, which he feared could leave him off-eccer, the prevous evening, he was fully bandaged and Savlon'd. After Hu gracefully body-checked the Eton front-row, he then laid off a lovely pass to Bruinette, who then hop-skip-jumped across the middle of the pitch to find our next try. Eton were now on the backfoot and scrambling for distance. We had to take advantage of this moment of weakness and strike while the try-scoring iron was hot.

Eton had identified our weak spots, and kept pressing through the central channel. We almost conceded several more tries, but some fantastic rucking and turnovers kept their attacks at bay. Deshpande, *Moretons*, made a stunning run down the wing and slipped through their rear defence line unnoticed to put our third own.

The game was in its final moments, indeed the ref had announced it was the final play. Doherty, *The Head Master's*, tried to kick for touch but couldn't quite get the distance, and Eton's winger picked up the ball and made a hasty dash down the wing. Lord, *Lyon's*, and Mercer-Wong, *The Park*, were on-site however, to lay him down safely but firmly and snatch posession. Lord then spotted the gap and charged in to score our fourth and final try of the game.

A huge battle, a carefully waged war and some fantastic teamwork this week from all involved. Well done boys.Onwards and upwards.

Colts C v Eton College, Lost 26-36

Junior Colts A away v Eton College, Lost 14-22

Junior Colts B away v Eton College, Lost 0-44

Junior Colts C away v Eton College, Lost 0-15

Yearlings A v Eton College, Won 35-0

Harrow dominated the collision and breakdown from the outset with a physicality that was simply unmatched. Consistent phase play in attack saw Eton pushed back time and again with frequent opportunities created in the wide channel and some exciting tries scored. An impressive team performance that had the opposition desperate for the game to be over.

Yearlings B v Eton College, Won 12-10

With no points on the board at half-time from either team, the Yearling Bs scored two brilliant tries from Rio Odofin, *The Knoll*, and Daniel Kim, *Moretons*, before showing resilience in defense to hold off the opposition and win by just two points.

Yearlings C v Eton College, Won 50-0

Yearlings C were easily the better side against Eton, amassing over 50 points, and Timi Aiyeola, *The Grove*, Tito Odunaike, *Elmfield*, and Niniola Olagundoye, *Bradbys*, all scored hat-tricks.

Yearlings D v Eton College, Won 44-0

A comprehensive win, defined by excellent defensive shape and power in the rucks. Another man-of-the-match performance from Danton Liu-Evans, *The Knoll*, a bastion in the breakdown. Stas Shatokhin, *The Knoll*, and Hiro McLinden, *The Park*, both scoring a brace.

Yearlings E v Eton College, Won 64-14

The Yearling E's put together their most complete game of the season to capture the win over Eton. Alex Kim, *Rendalls*, and James Ho, *The Knoll*, scored three tries apiece and Damon Chiu, *Newlands*, added six conversions.

CROSS-COUNTRY

Regional Qualifier for the XC Cup, 12 November

On Saturday, the cross-country squad made the trip to St Albans to compete in the regional round of the national cross-country cup. The boys had to step up on an extremely hilly and difficult 6.5km course. Tom Emery, *Moretons*, came third, an exceptional performance, very closely followed by Cameron Elliott, *West Acre*, in seventh, Tom Hobbs, *Newlands*, in 15th and Julian Abass, *Elmfield*, in 31st, with Freddie Emery, *Moretons*, Jaden Odofin and Jonathan Riddell-Webster, both *The Grove*, rounding out the team. This was an exceptionally strong performance given the quality of opposition. This result placed Harrow third, meaning Harrow have qualified for the nationals taking place in Leeds near the end of term. Well done to all the boys for a gritty and powerful performance.



Ten Schools' Match, 17 November

The cross-country team had a tough match last Thursday hosting the Ten Schools Match. The day started for Harrow in the Junior boys race (Shells) around the normal 2.5km Shell cross-country course. Otis Farrar-Brown, *Newlands*, came fourth for Harrow with a very impressive time of 9:09. Next was the Intermediate boys' race (Removes and Fifth Form) around the Senior 5km cross-country course. Henry Barker, *The Park*, came tenth for Harrow with a time of 18:43 and Jonathon Ford, *West Acre*, came 26th with a time of 20:16. Unfortunately, the Intermediate team came fifth overall. Then the Senior boys (The Sixth Form) ran a new 7km cross-country course including the golf course. With Cameron Elliott, *West Acre*, coming ninth with a time of 26:10, with a good performance from Julian Abass, *Elmfield*, who came 40th. Unfortunately, this led to Harrow coming in eight place. Overall, it was a decent performance from the cross-country team, hampered by injuries, against some very tough competition and a particularly muddy course.

WATER POLO

Last Tuesday, Harrow welcomed John Lyon School for a water polo match. The boys played in four quarters of six minutes, with a result of 9-6 to Harrow.

Eshaan Firake, *Newlands*, was man of the match. Firake was playing as goalkeeper for the first time in our team and saved some impressive shots from John Lyon.

The first quarter set the tone with two goals from Rahul Ponniah, *Newlands* – who showed us he is not only good in goals, and Gus Chukwuemeka, *Druries*, who granted us the privilege of his presence instead of being on the rugby pitch.

The second quarter raised the bar even higher, with Henry Emerson, *Newlands*, and Sias Bruinette, *Newlands*, being true to form. John Lyon quickly understood that these two boys needed to be tracked at all times. Captain Jake Phillips, *Newlands*, who had been injured in rugby, was finally back in the pool and imposed himself with two brilliant goals.

The third quarter was quiet for Harrow and John Lyon took the opportunity to equal the score.

The pressure went up for Harrow, as another loss was inconceivable. The last quarter finished with three scores from our best swimmer and vice-captain James Rates, *Newlands*, then Bruinette and Ponniah.

John Lyon was a strong opponent and shots were flying on both sides. Despite the occasional two-hands and drowning fouls, the team made Harrow proud by showing fellowship towards our neighbours.

Ways to contact The Harrovian

Articles, opinions and letters are always appreciated. Email the Master-in-Charge <u>smk@harrowschool.org.uk</u> Read the latest issues of The Harrovian online at harrowschool.org.uk/Harrovian



CELEBRATING OUR PAST REFOUNDING OUR FUTURE