





From the Editor

Following the successful launch of The Bridge last year, we are delighted to share with you Issue 2. Although the release of this year's issue comes amid uncertain times, we hope that reading articles from our Hertford community on a range of topics will provide an enjoyable respite.

As ever, we are keen to hear your thoughts and feedback on our publications, as well as any ideas for future articles should you have them. Similarly, please connect with us on social media, and keep up to date with college news and events on our website and in our monthly e-news.

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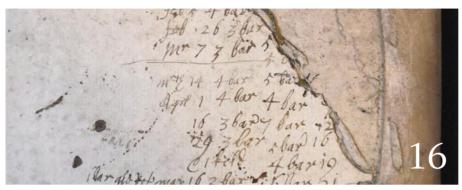
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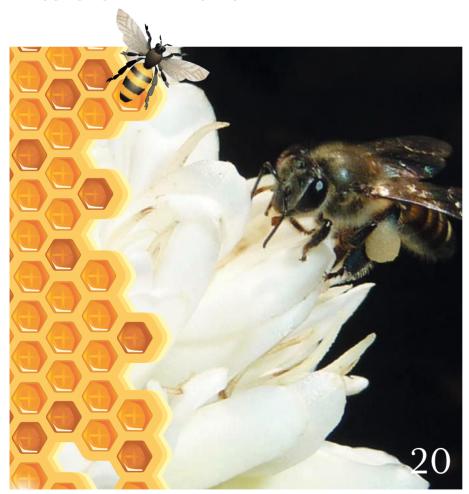
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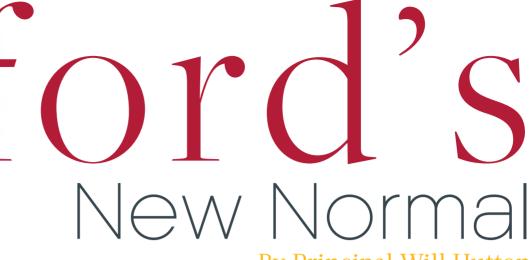
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By Principal Will Hutton

t has been nine years since my first morning at Hertford -September 1st 2011. It was an odd first two hours. I arrived at the lodge and was then left undisturbed in the Principal's study, unable to get my legs under the tiny desk which although ornate had plainly seen better days and notwithstanding the office's fabulous view of the Radcliffe Camera seemed to lack the state of the art office kit we aspirationally modern folk in 2011 thought vital. Had I come to the right place? Perhaps I had got the start date wrong - or had the fellowship had a last-minute change of mind?

Nine happy years on, I laugh at those first few hours (the bursar finally rescued me), and have now become reliant on Zoom. Microsoft Teams and my all-purpose iPhone (I was an early devotee back then). Over this Easter vacation we were compelled to hold a socially distanced Governing Body meeting on Zoom. For all its strangeness the success of even holding a meeting in such

circumstances would have seemed barely conceivable nine years ago but then so would a pandemic and lockdown.

The college has been remarkably resilient through the crisis - one of the leaders in Oxford - which I don't think would have been the case nine years ago. A large part is because today's culture is more digitally savvy so that fellows, staff and students alike are readier to take to cyberspace. The college has also invested significantly in its IT infrastructure under consistent pressure from fellows and staff alike and although it's been an uneven journey we have finally got a (more or less) robust system that can bear the simultaneous demand of hundreds of laptops, iPhones and PCs. Hertford has successfully migrated from the analogue to the digital world.

The lockdown with, as I write, no certain compass for exit has brought home the importance of resilience and the foolhardiness of so much of



the wider thinking over the last decade about how best to organise economy and society. What the pandemic has exposed is how so many of the institutions and processes that we knew were faulty - from the student loan scheme to the swingeing cuts imposed on so many public services and of course the collective obsession with property – have suddenly been revealed as such. It was crazy to organise our public health system with so little spare capacity, so little concern for its resilience, so much emphasis on maximising throughput, and with so little thought given to how to organise a resilient supply chain making key medical equipment. Then loading half the population at 21 with debts approaching £50k and expecting them to be paid back - or not, constituting a psychological burden - was a difficult enough proposition when times were good. But in the context of the depressed economy of the future, reeling from the twin impact of Brexit and the pandemic, it is impossible. And it's been mad for decades that British banks lend so much on property and so little to fast growing businesses who are thus so vulnerable to the unexpected. The whole system has been overly geared

The contrast with steering a college is profound. Hertford will be around a century from now, committed to teaching, research, and academic excellence.

to quick wins, to financial engineering, to corner cutting, to avoiding taxes and collective responsibility – it is not. as we are learning, sufficiently resilient or built for the long term.

The contrast with steering a college is profound. Hertford will be around a century from now, committed to teaching, research, and academic excellence. It knows and loves what it does and intends to carry on doing it for the long term. There are certainly decisions to be made about what to prioritise, but resilience is built into our DNA. There cannot be shortcuts over tutorial teaching. The college owes it to itself and its students only to recruit the best we can, whether fellows who are the academically best of their cohort or students from as wide as possible social backgrounds. We have to maintain and improve our infrastructure. We have to invest the monies we inherit as soundly and sustainably as we can. We cannot take short cuts, financially engineer, or cut corners. Nor can we indulge in jingoism or nativism. Academic knowledge knows no boundaries.

It is those values that need to inform the wider economy instead of being locked into the confines of our Oxford quads - haven though they may be from the bewilderingly self-defeating policies and approaches of what I think will become known as a lost decade. Britain could have chosen to learn the lessons from the financial crisis of 2008/9. Instead it chose to double down on catastrophically mistaken thinking, informed by Prime Minister Cameron's gut belief, as he later declared it, that taxation in essence is an amoral

infringement of personal liberty and that government can only be a force for bad and the private sector a force for good – so that almost the entire burden of reducing the deficit ended up being born by swingeing public spending cuts . Resilience in a properly resourced NHS? Proper attention and funding devoted to caring for the elderly? Sustaining local autonomy and local delivery of public services? Reforming how our flyblown capitalism actually worked in practice? All were martyred to keep tax rates from rising and the state small. When COVID-19 broke, our defences were sorely weakened not least by Conservative politicians refusal to accept that part of the job of government is to act purposefully in ensuring the public interest, and accompanying institutions, help economy and society flourish.

We will emerge from the pandemic with the institutions which the populist right have done so much to enfeeble showing their worth. The view of experts is no longer disparaged, and vaccination is not seen as an infringement of personal autonomy. The NHS and BBC have emerged stronger. Government is seen as an imperative, and taxes vital to deliver the public services and public health we need. Consultation with workforces is not an irksome regulatory burden: workers will not work in workplaces that they don't trust to be organised for their safety. Companies accept they need to offer fair returns to shareholders, stakeholders and government in return for the aid, soft loans and support they have received. There will have to be internationally

accepted COVID "passports" to allow people to travel freely so that destination countries can be sure they are not inadvertently importing this or future viruses. In future globalisation will have to involve less plunder and more acceptance of international governance.

All this is wholly congruent with what we teach and study at Hertford. What lies ahead is a reassertion of Enlightenment values, and Oxford University and Hertford College are quintessential Enlightenment institutions. We can do none other. So, the next decade will not be easy. but I think instead of headwinds we will have following winds. Hertford has always been confident in our values. Now, writing at the beginning of the 21st century's third decade, We can be more confident than ever. The world promises to move back in our direction.



Will Hutton has been Principal at Hertford College since 2011. Prior to his appointment, he was editor-in-chief for The Observer. and then chief executive of the Work Foundation. He is currently co-chair of the Purposeful Company, lead on an enquiry into the gender pay gap on behalf of the BBC and writes a regular column for the Observer.

IT'S ALL FAKE

JAMES COOK AND THE MAKINGS OF 18TH CENTURY WORLD

By Dr. Vanessa Collingridge

his year marks the 250th anniversary of Captain James Cook's first landing in Australia as part of his epic voyage around the world. But amidst news of his 'discoveries', how could the British public distinguish fact from 'fake news'?

In 1768, His Majesty's Bark Endeavour sailed from the River Thames round to Plymouth on what was to become one of the most famous voyages in British Maritime history. The ship had been loaded with eighteen months' worth of provisions, for this was to be the first statesponsored scientific voyage of discovery – a mission that would take her to the little-explored Pacific Ocean and then onwards around the whole world.

The journey's purpose was two-fold: to sail to Tahiti – the South Sea island newly discovered by Captain Wallis – to observe a rare astronomical event called the Transit of Venus. This would enable astronomers to work out the distance between the earth and the sun and thus map the heavens more accurately – an essential part of navigation in the days before Harrison's chronometer.

The second task was to sail to 40°S in search of Terra Australis Incognita – the Great Southern Continent: a land rumoured to exist for over two thousand years. In maritime Europe, the race was on to find it, map it and claim it for the winning nation, along with all the riches it would surely contain. The geographical equivalent of the Holy Grail, many believed the fabled Continent would rival Asia in not only size but also in wealth and political power – and it was for this reason







he had learned the valuable new skills of surveying when fighting the French in

Nova Scotia, Canada. These were the early days of scientific cartography: maps would soon become pivotal in controlling an expanding British Empire. Together with his proven interest in astronomical observation, Cook had everything the Admiralty and Royal Society needed and he was promoted to the rank of lieutenant just before Endeavour sailed.

However, in the eyes of the contemporary press and public, he was quite literally anonymous. Newspapers were the 'new media' of the eighteenth century, arising from the lapsing of the Licensing Act of 1695 and fuelling and feeding the craze for news that soon became an essential badge of honour in polite society. Periodicals were consumed by the literate and the illiterate; they were studied, shared and discussed to gain social capital in the new culture of curiosity. Much like today's social media obsessives, news addicts or guidnuncs soon became the subject of public comment, articles and even theatrical plays. However, in 1768, newspapers barely give Cook a mention. Instead, the mission is typically referred to as "Mr. Banks's voyage" referring to the wealthy aristocrat Joseph Banks who had paid around £10,000 to join the project, bringing with him a retinue of "gentleman philosophers"

and artists, and a very real passion for natural history. Little wonder then that the press and public were enthralled by these "Gentlemen of Fortune" on their "Tour of Pleasure": along with Endeavour herself, they became the celebrities of exotic maritime exploration.

And just like today, celebrity gossip sold newspapers, even if sometimes it was 'fake news'. In Ianuary 1771. while Endeavour was on her way home, the London Evening Post reported that she had indeed "discovered a Southern Continent, in the latitude of the Dutch Spice Islands". Sadly for Britain, this was not the longed-for Terra Australis but Tahiti where the

crew had been observing the Transit of Venus. This time, the 'fake news' was not designed to deceive but merely underscored how little the British polite society knew of the Pacific. The public was only just beginning to develop a geographical imagination about the wider world, so Tahiti and the so-called Society Islands were just part of a largely undifferentiated smear of 'South Seas' – a fuzzy, generic, exotic conceptual space. It wasn't the Continent – but it would do: it would sell papers and get people talking.

Meanwhile, James Cook was about to take his first step towards eighteenth century fame. A month after Endeavour arrived home, he was finally named by the London Evening Post as "Lieut. Cook of the Navy, who sailed round the globe with Dr. Solander and Mr. Banks"! Admittedly, he is positioned as an also-ran to his more esteemed travelling companions but the key comes a little later in the article: the news story then reports how Cook was "introduced to his Majesty at St. James, and presented to his Majesty his journal of the voyage, with some curious maps and charts of different places...; he was presented with a Captain's Commission".

This, then, is how to be noticed in the eighteenth century: not by sailing around the world, charting lands previously unknown to the west, but by associating with someone

as high status as the King! This gives Cook the validation he needs to start being named in the press as a credible source of new information.

However, the Admiralty was not yet ready for a humble farm labourer's son to be the voice of their new knowledge. Instead, they reportedly paid journalist John Hawkesworth an incredible £6,000 to write the official account of the Endeavour voyage. Part of a collection of South Sea voyage accounts including those by Byron, Wallis and Carteret, the publishers advertised heavily in the leading newspapers of the day, boasting about the status of everyone involved from Doctor in Law Hawkesworth to the most eminent artists of the day, endorsed by King George III.

This puffery was deliberate and for very sound reasons: in the eighteenth century, the fledgling press was experimenting with new ways of 'doing' knowledge. The public - growing in confidence with this new way of making its voice heard - was asking the very same questions we ask today: with so many stories appearing and so much new information, how do you know who to trust and who is just peddling Fake News? The answer, the press found, was by tethering new information to older, already trusted and established sources. Hence the name-checks and references to high-status people, even the King himself.

However, such tethering can be a risky strategy: in 1773, Hawkesworth's official voyage account went head to head with a rival but unauthorised account drawn from firsthand sources. With each publication vying for popular attention, the ensuing battle for credibility, sales and even moral reputation was played out with pure venom and some 18th century 'trolling' in the courts and the press. Rival editors stoked the fire, placing advertisements for the rival accounts side by side. But as the old saying goes, there's no such thing as bad publicity: while he was sailing the Pacific, Cook's name and work were now the talk of the town, receiving more mentions than at any other time in his entire career. When he returned from his second voyage in 1775 and learned of the furore – and of the errors in both accounts, Cook used his association with the Admiralty, Royal Society and King to demand successfully that – in future – he would always be allowed to write his own, authentic voyage accounts.

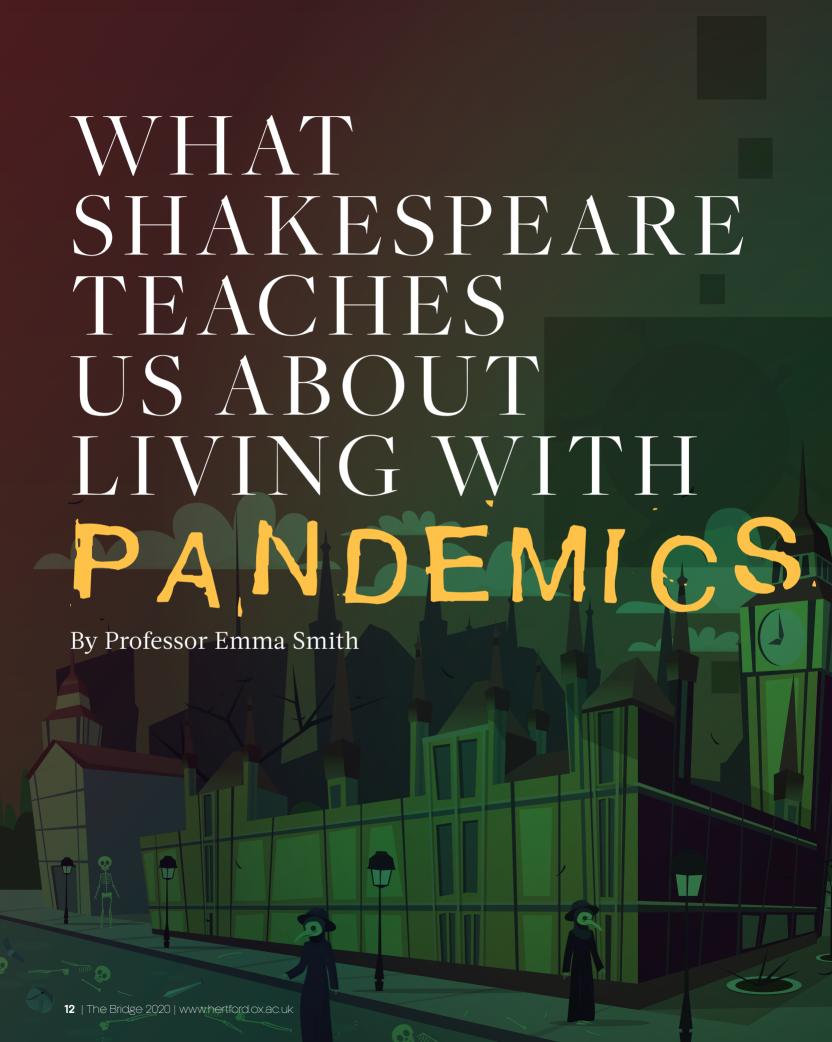
The fact that his second Pacific voyage finally proved that the fabled Great Southern Continent did not exist – and that all those rumoured sightings had been fake news and wishful thinking - barely mattered to the press. Instead of a new Continent, they had a new celebrity - Mai, the Polynesian brought home by Captain Furneaux of Cook's sister ship, Adventure. Mai was not only real, he took Britain by storm. Feted by the Establishment and press alike, this exotic embodiment of the Noble Savage 'sold' more papers than any far-off land.

Within months of Cook's return, two thousand years of discussion about what lay to the south stopped and the public gaze shifted to north with the dream of a shorter passage to Asia. Meanwhile, Cook's personal metamorphosis from anonymous captain to cultural icon would only be sealed a few years later by his 'heroic' death in Hawaii on his final, fatal voyage - a death that propelled him out of the newspapers and into the national mythology – for, as the contemporary coverage said - here was a man who had given his life for King and country and the dream that Britannia could rule the waves.

Cook's new status as a cultural icon helped to cohere a new physical and emotional world that was being stretched almost beyond the public's imagination. And in doing so, the press - that new media of the eighteenth century - helped to forge not only Cook's eternal fame but a new global British identity.



Dr. Vanessa Collingridge (Geography, 1986) is a broadcaster, writer and lecturer specialising in 18th Century exploration, the geographical imagination, and public engagement.





Twitter has been taunting us: when he was in quarantine from the plague, Shakespeare wrote King Lear. Shakespeare's life was, indeed, marked by plague. Just weeks after his baptism at Holy Trinity church in Stratford upon Avon, the register was marked, "Hic incepit pestis" (Here begins the plague). Mortality rates in the town in 1564 were four times that of the previous, plaguefree year. The son of the town's glover survived this and further plague outbreaks. Much of his work was composed, if not in lockdown, then in the shadow of a highly infectious disease without a known cure.

While the theatres were closed for an epidemic in 1592-3, the fledgling playwright produced his hugely successful narrative poems Venus and Adonis (a piece of beautiful erotica in which the goddess Venus throws herself at the unwilling Adonis) and Lucrece (a queasily voyeuristic poem about Lucrece's rape by Tarquin). Again in 1603-4, when plague prevented the coronation celebrations for the new king James I, and one in five Londoners succumbed to the disease, Shakespeare was probably writing his study of civic corruption, Measure for Measure.

In the plague outbreak of the summer of 1606, Shakespeare may well have been working on King Lear, given that the tragedy's first performance was at the Palace of Whitehall, the main London residence of Tudor and Stuart English monarchs, "on St Stephen's night in Christmas holidays" the same year.

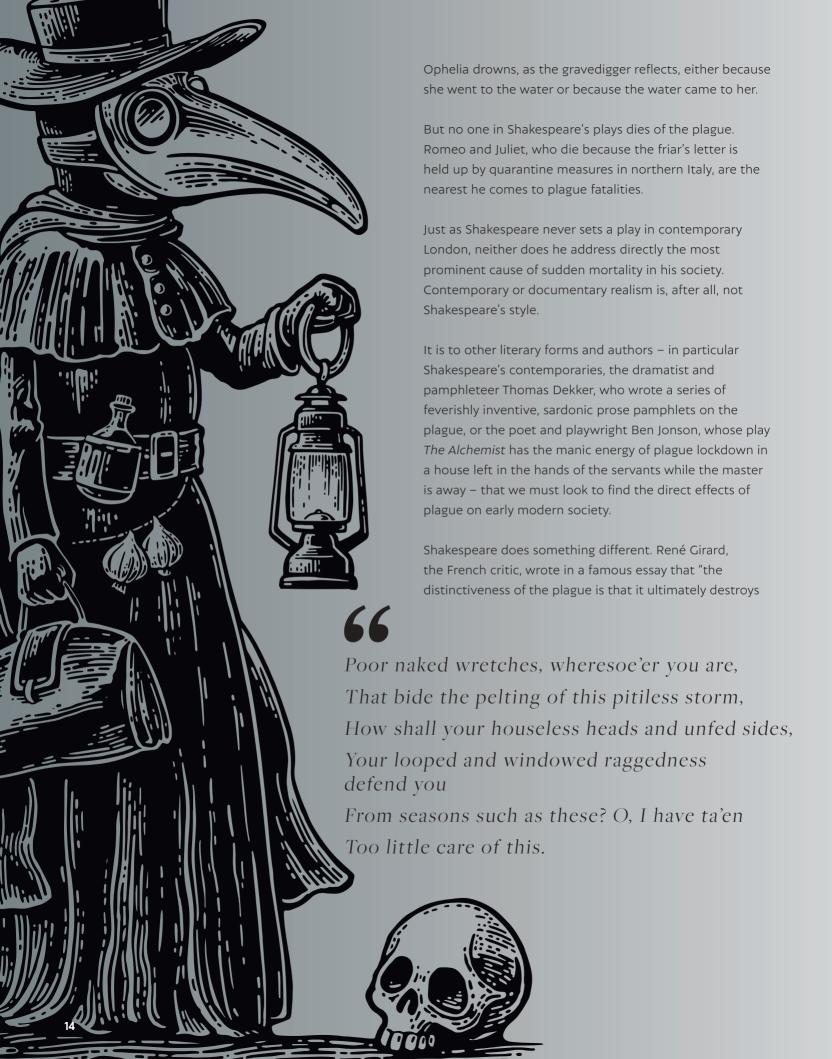
The impact of the disease on King Lear, though, is oblique. There are verbal references to plague which have lost their specificity over time, but which must then have caused a shiver.

Lear curses his daughter Regan and her husband Cornwall with "Vengeance, plague, death, confusion", and berates her as "a plague-sore or embossed carbuncle/ In my corrupted blood."

The reference is to the inflamed lymph glands or buboes that were such a feared symptom of the disease. It is not something any parent should wish on their child. Perhaps the play's particular violence on the younger generation allegorises plague epidemiology, which was most rampant among those in their twenties and thirties.

Shakespeare seems to have been able largely to shut out his immediate context. The plague is everywhere and nowhere in his works. It is rhetorically ubiquitous in the language of King Lear and other plays, but literally almost entirely absent.

There is, to be sure, a deadly epidemic at work in Shakespearean drama, and men and women do die in any number of inventive ways. In Othello Desdemona is smothered in her bed; in Titus Andronicus the rapist Goths Chiron and Demetrius have their throats cut and are baked in pastry; John of Gaunt dies of old age exacerbated by the absence of his exiled son in *Richard II*; in *Hamlet*



all forms of distinctiveness." Mass burial pits for plague victims were one visible symbol of the way the disease erased social, gender and personal difference.

Dekker noted that in the communal grave, "There friend foe, the young and old, / The freezing coward and the bold,/ Servant and master, foul and fair/ One livery wear, and fellows are." Plague was indifferent to the boundaries erected by society, and its appetite was ravenous. Dekker also recalled "what dead marches were made of three thousand together: husbands, wives and children being led as ordinarily to the grave as if they had gone to one bed."

The imagery common in late medieval culture and known as the danse macabre, or dance of death, depicted Death, personified as a skeleton, moving obscenely among the living of all kinds and conditions. He is with them, unseen, in the bedroom, at table, in the street, in the counting house.

While this is grimly terrifying it also domesticates death: this version of Death cares about our particularity enough to stalk us as we go about our daily business. It is something Shakespeare's tragedies amplify. Their response to plague is not to deny mortality, but rather to emphasize, through characterization and through dramaturgy, people's unique and inerasable difference.

The paradox of tragedy is that it underscores the significance and distinctiveness of the individual even as it moves inexorably towards his death. It challenges the narrative hold on the plague not by defying mortality but by reendowing it with meaning and specificity.

Elaborate plots, motives, interactions and obscurities focus our attention on human agents. No one in Shakespeare's plays dies quickly, obscurely and is thrown into a communal grave. Rather, last words are given full hearing, epitaphs are soberly delivered, bodies taken off-stage respectfully.

Shakespeare is not interested in the bills of mortality, those early modern statistics about how many deaths the plague has claimed. His fictions reimagine the macro-narrative of epidemic as the micro-narrative of tragedy.

Shakespeare's response to the plague, then, is to target humane uniqueness against the disease's obliterating ravages. It is a cultural prophylactic against understanding disease solely in quantitative terms, a narrative vaccine.

And when Lear realizes, in the storm on the heath, that he has ignored the plight of his people, this is less the discovery of an ancient British noblesse oblige, and more the articulation that indiscriminate plague should remind us of our shared humanity:

Poor naked wretches, wheresoe'er you are, That bide the pelting of this pitiless storm, How shall your houseless heads and unfed sides. Your looped and windowed raggedness defend you From seasons such as these? O, I have ta'en Too little care of this.

If King Lear has a message, it is this: that the king's own misery makes him see, for the first time, that other people's lives have meaning too.

So King Lear responds to the experience of plague by deliberately setting aside numbers and scale and by resolutely focusing on individuals. The cast of a Shakespearean tragedy is typically about twenty-five characters. It's a good start for a circle of empathy. Maybe this misery, like Lear's, will help us to see the meaning in the lives of others; maybe, like Shakespeare, we should fix not on statistics but on the wonderfully, weirdly, cussedly, irredeemably individual.



Emma Smith is Professor of Shakespeare Studies at the University of Oxford, a Fellow of Hertford College and the author, most recently, of "This is Shakespeare."

WHAT CAN BE Learnt from our By Dr Lucy Rutherford

significant amount of activity this year has been focused on the Magdalen Hall Buttery Books. The Buttery Books (sometimes called Battel Books in other colleges) are the most significant series in the Magdalen Hall archives. These are the domestic account books for the Hall, kept by the Butler. They record the names of the members of the Hall – the Principal, fellows, tutors, students and servants along with their meals taken and sometimes services such as washing and shaving. These were then used to make up an individual's bill at the end of each term. In addition the volumes are often used to record the names and dates of students being admitted to the Hall. As so few of Magdalen Hall's records have survived apart from these volumes, they are a unique and invaluable source for the history of the Hall from the 1660s to the transition to Hertford College in 1874. There are 166 volumes in the

College's archive collection. The earliest volume was started in 1661 and so the series dates from long before the Hall moved from its original location next to Magdalen College to the present Hertford College site. 17th century Buttery Books are rare amongst Oxford collections, so it is significant that nine volumes from this period survive. Until recently all of the volumes were stored in OB1. in cramped conditions which made it difficult to retrieve and handle the books. Over the summer of 2019 new storage was prepared in OB5 and the volumes were expertly cleaned and repackaged by the Bodleian's PADs service. All of the volumes are now individually boxed and easily accessed in the new storeroom, meaning that for the first time they can be properly catalogued and made available for researchers.

The books are large, tall volumes, usually made of poorer quality paper with vellum backed board covers. As they were working account books

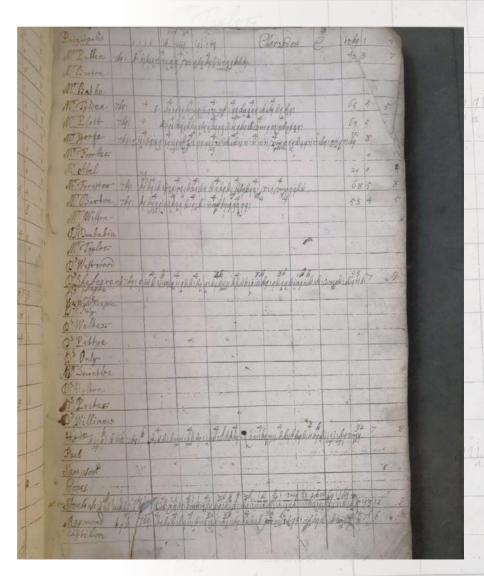
which were used on a daily basis, their physical condition can be very poor; some are in good enough condition to allow them to be handled carefully, others are extremely fragile and need to be handled as infrequently as possible. Some are so deteriorated that they should not be opened at all without the help of a professional conservator. All of this means that ensuring the long term preservation of the books, whilst making them as accessible as possible to researchers, will be a challenge. Three of the early 19th century volumes, covering the years 1816 to 1819, have been conserved during the course of the vear by our accredited conservator. Victoria Stevens. The aim of the work was to stabilise the volumes, preventing further deterioration and make them safe to handle. It took over 80 hours of skilled work to clean the volumes, treat areas of former mould damage, repair the covers, restitch the spine and to strengthen the edges of individual pages. They are now housed in custom-made boxes and with care are able to be opened and handled. It

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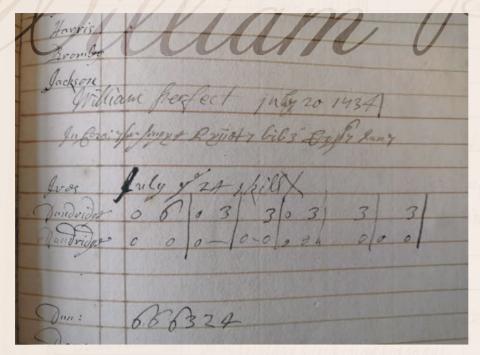
would not be feasible to carry out this amount of conservation work on every volume in the series, so the next will be to identify those volumes with the most research potential and to assess whether these should be conserved to a point where they can be safely handled or simply stabilised with a view to making digital copies.

The Buttery Books can be hard to decipher but it is worth persevering as they are a significant record of the Hall's day to day activity. Each volume covers the whole year, and is divided into four terms of 13 weeks. As the top edges tend to be deteriorated the dates are often not visible and so it can be difficult to work out the date of an individual entry.

The volumes are most useful for checking information about the members of Magdalen Hall. There are no existing registers apart from two Admission Registers which cover the years 1849 to 1874, so the books are the only means of checking whether a particular person studied at the Hall.



A page from the 1668 Buttery Book, recording the meals taken by the Principal & the Senior Fellows



Detail from the 1734 Buttery Book, recording the matriculation of William Perfect, who became Vicar of East Malling and whose great grandson also matriculated at Magdalen Hall in 1822.

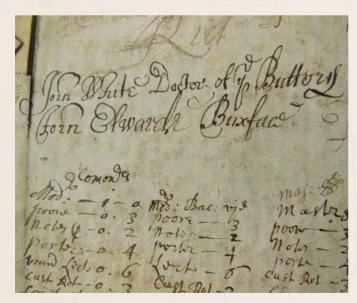
The volumes occasionally contain termly lists of students entering the Hall, but more usually record the name and date of matriculation individually within the body of the book. Thereafter it is possible to track whether an individual was

living in the Hall, by the number of meals they are taking, or whether they are merely being 'kept on the books' and living elsewhere.

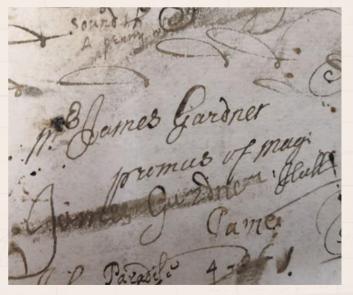
Information about College servants is more limited, as, unlike the

fellows and students, they are listed by their role rather than by their own name. Generally, a full complement of staff appears to have been an Obsonator (the person responsible for ordering provisions), Promus (the Butler), Bibliotecharius (Librarian), Coquus (Cook), Janitor (Gatekeeper) & Tonsor (Barber). It is clear that not all of these were taking meals in the Hall at all times, so it might be possible to deduce something about the fortunes of the Hall, by the number of servants employed at a particular time. Some servants signed their names in the front or inside covers.

Occasionally it is possible to flesh out the lives of these servants, who can otherwise be rather elusive. The early 19th century volumes which have just been conserved were selected as they are a good example of how the Buttery Books can be



Detail from the inside front cover of the 1667 Buttery Book

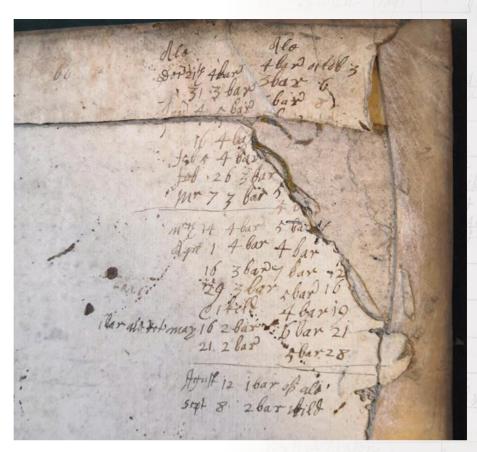


Detail from the inside cover of the 1684 Buttery Book

66

On the inside covers of the Buttery books can be found numerous notes recording the prices of household staples such as beer, cheese, bread:

used for research, not just about the College's history, but also for wider family and social history research. We know from the signature on the front covers that these particular volumes were kept by John Musgrove, who came from a family and was the Butler of Magdalen Hall probably from 1816 until his death in 1855. Musgrove came from a modest family with a tradition of working as college servants, but by the time of his death was a significant local figure and owned a number of leasehold properties in Oxford and one in Brighton. By chance a researcher who is also a descendent of John Musgrove visited the College archives last year, and has been able to discover more information about Musgrove and his career from other records in the College archives and elsewhere. Records in the College archives show that in the later part of the 19th century his daughters were leasing these properties to Hertford College; and it seems that there is an interesting story to be told about the way in which servants used family and college networks to strengthen their social and financial positions.

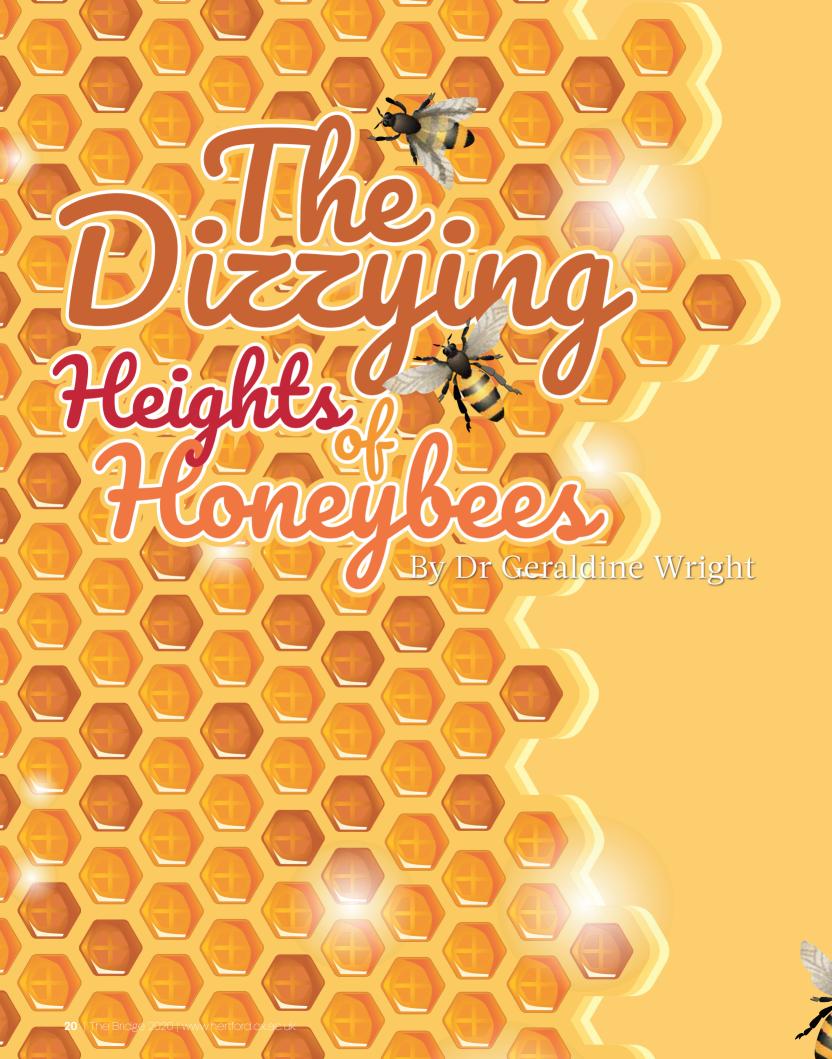


Inside back cover of the 1667 Buttery Book, recording orders for barrels of ale

On the inside covers of the Buttery books can be found numerous notes recording the prices of household staples such as beer, cheese, bread; and the amounts of these that the college has ordered. Sometimes the weight that a penny loaf should be is written down (a weight which was set nationally, according to current wheat prices). There are lists of people who have not paid their bills by the required date, and who clearly need chasing up; not to mention the occasional absentminded doodle. These details, together with the information about past members of staff, students and servants, make the Buttery Books a fascinating set of records, which will greatly benefit from further conservation and research.



Dr Lucy Rutherford read Theology and Church History at the University of St Andrew's before completing her PhD in Medieval Church History at the University of Edinburgh. She was archivist at Bath Abbey for 14 years before arriving at Hertford College in 2015 where she now curates and manages the college's extensive archival collections.



oneybees occupy the dizzying heights of the most advanced societies on earth.

A honeybee colony is a complex eusocial society, with one queen, thousands of her sterile, female progeny, and a few hundred of her sons (drones). As predicted by the models of Bill Hamilton developed in the 1960s Department of Zoology at the University of Oxford, the eusocial organization persists because of the haplodiploid organization of genetic inheritance of the insect order, the Hymenoptera. The sterile workers create the wax comb, rear the brood (larvae), feed the queen, guard and clean the nest, and collect all the food. Honeybees visit flowers to collect floral nectar and pollen which they use as their sole sources of food. Nectar is their source of carbohydrates and pollen is their main source of protein, fat, and micronutrients. This mutualism between plants and bee pollinators originated over 100 million years ago and is one of the key causes of the diversification of the Angiosperms.

Humans have benefited from and depended on the work of honeybees for millennia. Many ancient civilizations revered bees for their valuable production of honey and wax; bees were often associated with royalty and used as motifs of rulers or deities. Domestication of honeybee began as early as the ancient Egyptians who used clay tubes to keep bee colonies and harvest honey.

Honey is a key food source for human societies as early as hunter-gatherers who tracked honeybees to their nests to plunder them for honey and bee grubs. The global annual value of honey production is estimated to be ~£5.6 billion, and many products that originate from honeybee colonies, including royal jelly and propolis, are sold throughout the world for use in beauty and health industries.

Bees also contribute to food production in modern agroecosystems. Many of the fruit and nut crops we consume in our daily lives depend on domesticated honeybees for pollination. Agricultural economists estimate that ~35% of the crops we either require or eat are enhanced by the visits of pollinating insects. Almonds are an example of a crop that requires pollinators to set fruit. California is the world's largest almond producer, with a crop that is worth ~\$7 billion p.a.. Each year, millions of honeybee colonies from all over the United States are taken to California to pollinate almond trees while they are in flower in February. Many other fruit, nut, and vegetable crops are enhanced by the visits of bees. Soft fruits like strawberries and blueberries can double their yield of fruit when pollinators are introduced during flowering. The demand for pollination is growing alongside ever increasing markets for fruits and vegetables as part of human diet.



the Department of Zoology to set up a research laboratory devoted to studying how bees learn about, select, and consume the appropriate nutrients they require. In conjunction with collaborators in Israel and at the Royal Botanic Gardens (Kew), the lab has developed methods for measuring how whole bee colonies regulate their intake of essential nutrients including protein, fats, and carbohydrates. These methods include the use of standardized rearing cages in controlled conditions in incubators, semifield conditions where bees are limited to flying within an enclosed space, and field conditions as in a professional apiary. Through over 10 years of BBSRC funding, my collaborators and I have identified the nutritional optima of adult worker honeybees. Using the information gleaned from these experiments, we have successfully created a livestock feed for bees (i.e. a pollen substitute) that will be marketed to beekeepers worldwide through a new University spin out company. Future research will include investigations into the honeybee 'lipidome' to understand how lipids in diet are converted into fats used for energy storage, membranes, fecundity and immune function in bees.

The lab also studies the bee's sense of taste and its ability to learn and remember floral cues associated with food. We have found that bees cannot detect toxic pesticides (i.e. neonicotinoids) in the nectar

of plants such as oilseed rape that have been sprayed or treated with these compounds. Bees may not possess gustatory mechanisms that enable them to detect bitter/ toxic compounds. Instead, our lab's research indicates that bees appear to have enhanced abilities to detect sugars in foods. Some of my lab's notable research has shown that certain compounds found in nectar with pharmacological targets in the bee's brain, such as caffeine or nicotine, amplify the rewarding properties of nectar in the memories of bees. Plants like coffee and citrus have nectar laces with quantities of caffeine that are comparable to a cup of coffee (on a per unit basis). The lab found that bees that consume caffeine-laced nectar are more likely to learn and remember the floral traits (e.g. scents) associated with this nectar. The bees cannot taste the caffeine in nectar. Instead, they unwittingly consume the nectar but believe it has greater value than nectar from other plants. This leads them to be more likely to

visit other flowers of the caffeinated plant species, enhancing its fitness through outcrossing. In recent research, members of our lab have identified that if bees are exposed to compounds like caffeine or nicotine for several days, they begin to exhibit drug-seeking behaviour associated with withdrawal that are hallmarks of addiction.



Geraldine Wright is Professor of Comparative Physiology in the Department of Zoology and Fellow of Hertford College. Her work on is paving the way for innovations in beekeeping and preservation of

NEWRULES HE CORONA SA By Paul Batho

n 2004 the social anthropologist Kate Fox identified a congenital and incurable disorder endemic to the English, something she defined as 'a sub-clinical combination of autism and agoraphobia'. She named it 'Social Dis-ease', a condition which was responsible for a 'general

inability to engage in a normal and straightforward fashion with other human beings'. Symptoms included social awkwardness, emotional constipation and a fear of intimacy. These were blamed for a whole gamut of national behaviours, ranging from football hooliganism to an inveterate obsession with talking about the weather.





unwritten and unuttered rules of behaviour. Who can you speak to in the pub – and why must what you say vary according to whether you're at the bar or in the gents? What can you safely moan about, and in what circumstances? Why do we apologise for everything, regardless of blame? And so on....no one tells us the answers, we just know, it is as natural as breathing. It's only social anthropologists and foreign visitors who find the endemic behaviour of the English in the slightest bit peculiar.

But now, beset by COVID-19, social behaviour is subject for the first time ever to the very strictest of rules, imposed by none other than the government and enforced by the police. How does Social Dis-ease respond to social distancing?

There are encouraging signs that, as with any virus, Social Dis-ease can evolve with astonishing speed to adapt to its new conditions. Take just one example of something that's still permitted - a walk in the country. This is an activity that has always been governed by strict social rules. On encountering a stranger on a footpath, a brief 'good morning' is expected which must be followed by no more than two or three words about the weather, and then only if it is truly

exceptional. No slowing the pace, the slightest of smiles, eye contact limited to a millisecond or two. But beware! Utter nothing and you're silently damned as an inveterate townie.

Meeting someone you know is different. A minute or two of chat is expected, so long as it's not too serious and preferably on a subject involving pets. In the absence of pets, children can provide an acceptable substitute. Both parties are, however, inwardly straining for that 'Well, must get on' moment and a return to comforting introspection.

Under the Corona Clampdown, rural footpaths are dotted with people desperate to escape the confines of home for an hour or so. They will mostly be strangers to you yet in these new times, the Greeting Strangers Rule still applies, though with subtle variations. One of the less-reported symptoms of Social Dis-ease is the 'Importance of not being earnest' rule. It's all well and good being serious but there's something about the zealot that's frankly just not on. One simply must be seen to be taking the current crisis in one's stride; hiding behind a handkerchief face mask, head bowed, is just a bit too committed and yet on a narrow strip of path the magic two metres separation can be

impossible to achieve. Wracked with uncertainty and embarrassment, yet keen to avoid an untimely end, how to proceed?

Try this. Take a deep enough breath to last until you've safely passed the approaching stranger. With reddening face and bursting lungs, walk on and, as you pass and with your last gasp let out a 'good morning!' in a tone and with an expression that shows you're the sort of person who, while duly concerned about the current situation, is loath to take it too seriously (this may take a bit of prior practice at home in front of the mirror). Having passed walk onward, holding your breath until the threat of inhaling lingering germs is overcome by giddiness and crushing chest pain, then pause and gasp like a recently beached halibut as the stranger disappears from view.

Meeting an acquaintance, though, is different. You see someone approaching and must brace yourself to (a) greet them in the appropriate tone (see above), (b) make it quite clear that, even though more than half an hour from the house, you're a truly responsible member of society and not actually enjoying yourself, (c) revel in a bit of human company for a change and (d) make good your escape. But how?

Endless TV costume dramas, backed by the novels of Jane Austen, has taught us that the beaus and belles of the Regency ballroom hid their passions behind the formalities of the dance and a little of their skill can be transposed to 21st century Corona-bound England. Back on the footpath, like long lost lovers across a dance floor your eyes meet and you must begin to perform a gentle but purposeful sashay to the left. If you've been sufficiently purposeful your friend should do the same, thus avoiding that excruciating zig-zag as each tries over-politely to make way for the other. As you near your target, a breezy greeting will quash that unuttered 'what are you doing here in a period of grave national crisis?' question: "So lovely to be out, just for a few minutes!"

Next, the right-side pass: as you near each other, extend the left arm and twist the fractionally to the

right, as if inviting your friend through a door. As you pass, wheel half right and...halt, precisely two metres from your friend, regarding them kindly (but not over-familiarly) over the right shoulder. Now you're perfectly placed, the path in your direction of travel uncluttered by acquaintances, and poised in a position of semi-readiness, like a greyhound in the traps slightly distracted by a passing burger. Perfect for a moment's banter, your bearing clearly indicating this really isn't going on for too long and with your escape route clear. A few words (children, dogs, weather) and a carefully studied understatement on the subject of the current 'strangeness' (words like 'crisis', 'unprecedented' and 'disaster' should of course be strictly avoided - far too earnest) and then, with a fleeting farewell and a twist of the hips to port, you're away. The Corona Sashay social dis-ease and social distancing conquered in one elegant move!





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By Professor Michael Wooldridge

The Rise of Artificial Intelligence

Anyone with even the remotest interest in science and technology can hardly have failed to notice that Artificial Intelligence (AI) has become, well, quite a big thing over the past decade. A stream of apparently remarkable and rapid advances in AI have made headlines across the globe, and what used to be a relatively quiet backwater is now the most feted and rapidly growing area in the whole of science and technology. This is all the more remarkable when one considers that AI has, at various times. suffered from a rather poor reputation in the wider scientific community, somewhat akin to homeopathic medicine. The apparently rapid progress has led some commentators to believe that perhaps we are now about to achieve the grandest of all AI dreams: machines that are as fully capable intellectually as people. And this prospect has, naturally enough, alarmed many people. The world's most famous scientist, the late great Stephen Hawking (Univ. 1952) was so alarmed that he publicly stated AI represented an existential risk to humanity. Al, he feared, might lead to the end of the human race. Elon Musk, the brilliant but occasionally eccentric billionaire founder of PayPal and Tesla Motors was similarly concerned, and donated millions to research to understand and mitigate risks from Al. So, what is the reality here? What are the breakthroughs, and what do they mean? Is AI really an existential threat?

What is Al?

One of the perennial frustrations about working in Al is that despite the fact that AI has been the subject of continual research for seven decades, nobody really agrees on what it is. The early AI researchers were very ambitious in their views of where the field can and should go. They wanted nothing less than machines which enjoy the full range of intellectual capabilities that human beings enjoy. If they succeeded with this goal, then machines would be able to do anything a human being could do: conversing, telling a joke, inventing a joke, reading, reading and understanding a novel, critiquing a movie, cooking an omelette, riding a bike, creating a work of art, and so on. They would be able to do everything that we can do. In the early days of AI, progress seemed rapid, and this led to entirely serious predictions that this ambitious goal the ultimate dream of AI – would be achieved by the year 2000.

It didn't work out that way, of course. The rapid progress quickly petered out, and the grand predictions of the early researchers are used by doubters to ridicule progress in AI to the present day. There has in fact been rather little progress towards the ultimate dream, which is nowadays referred to as general AI. Indeed, for much of the last 50 years, general AI has been rather on the sidelines of mainstream AI.

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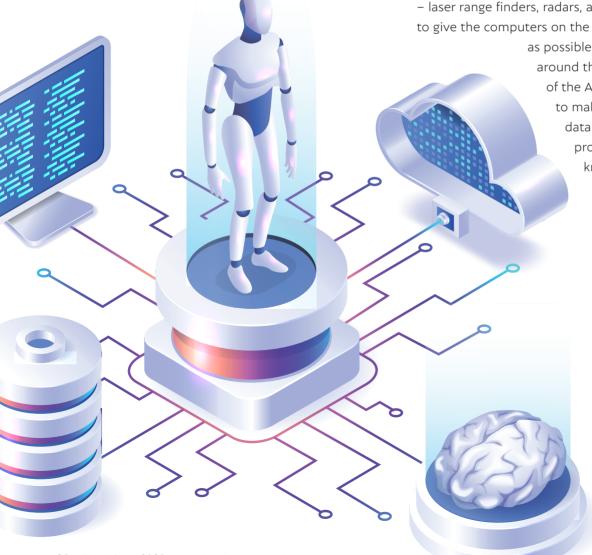
Instead, over time, attention in the AI community shifted to a less ambitious goal. Roughly, the aim of AI began to be understood as getting computers to do more and more of the tasks that currently possible only with animal brains and bodies. In particular, the aim of AI has been to focus on tasks that seem hard to get computers to do. Here are some examples of tasks that have attracted a lot of attention from AI researchers over the past decades:

- Driving a car
- Recognising faces in photographs
- Writing simple captions for pictures (e.g., "a man with a fishing rod in a rowing boat")

You might notice that these are not tasks that you would normally associate with intelligence, and indeed this often causes some confusion for those not familiar with AI. The reality is that it is very easy to get computers to do some things that people find tremendously hard (quickly and accurately processing large numbers of mathematical equations) but very hard to get computers to do some things that people find easy.

Amongst the biggest problems for AI historically has been tasks that involve perception – understanding what is around us in the world. This is, in fact, the biggest problem for building computers that can drive cars. The decision making in driving (whether to speed up, slow down, signal, turn, and so on) is relatively easy if you know what is around you. The difficulty is knowing what is around you, and this is why the prototype driverless cars you might see on the streets of our towns and cities are equipped with a barrage of sensors – laser range finders, radars, and so on. They are there to give the computers on the car as much information as possible about the environment

around the car. And the main task of the AI software in the car is to make sense of all the raw data that these sensors are providing – to be able to know that a certain signal from a sensor actually means that there is a pedestrian on the road ahead.





Neural Networks

For much of its history, AI struggled with tasks, like driving a car, which involve perception. This ruled out a huge range of things that might be useful for computers to do. Your robot butler will not be possible unless the robot can make sense of its environment: the fanciest camera in the world will not help unless you have AI software that can interpret the signal generated by the camera. And it is tasks involving perception where AI has seen the breakthroughs in the past decade, which have led to the current excitement.

In a sense, the current breakthroughs are surprising because they involve a very old idea - indeed, an idea that 20 years ago was quite widely dismissed as a dead end for AI. The breakthroughs involve a technique called neural networks. These are very simple computational structures, which take their inspiration from nerve cells called neurons that appear in animal brains and nervous systems. Your brain has unimaginably large numbers of neurons, and they are organised into extremely complex structures, through which individual neurons can communicate with other neurons according to certain patterns. Each individual neuron can only do a very simple computational task, but when they are organised

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into very large networks, they can do much more complex tasks - such as recognising faces in pictures. Neural networks were proposed as long ago as the 1940s – the time of the very earliest computers. And it was known back then that, if you could design them appropriately, then they would be able to solve many of the problems facing AI. But there was a problem: we didn't know how to design them. Specifically, the problem was we didn't know how to "wire" the neurons together so that they had the right pattern of connections. This task is called "training" a neural

network, because the way it is usually done is showing the network lots of examples of things that you want it to do: in the case of recognising faces in pictures, if you want a network to recognise Mike, then you show it lots of pictures of Mike. But until very recently, we simply didn't know how to train networks that were big enough to do anything useful.

The scientific breakthroughs that made the current advances in AI came around about 2004, in a technique called deep learning. The main developer of this technique is a British-Canadian researcher called Geoff Hinton, who in 2019 was a recipient of the Alan Turing Award for his work on deep learning: this is the "Nobel Prize for computing", the greatest honour that can be accorded a computer scientist. But Hinton's deep learning techniques were, in truth, only a part of the story. Two other ingredients were also crucial to making current AI techniques work. First, training neural networks requires lots and lots of computer power - and this is now very cheap and widely available. Second, as I already mentioned, when you train a neural network, you need lots of data to train it. And of course, we are now in the era of "big data". Every time you upload a picture of yourself and your family to Facebook, you are providing data that is used to train Facebook's neural networks.

Where is it going?

Deep learning is a very powerful technique. But just how powerful is it? Will it take us to the grand dream of AI – machines that have the full range of intellectual abilities that people have? Some people believe it will, and they are very concerned about this. What happens, they ask, when machines are as smart as people? Could they then apply their intelligence to making themselves even smarter? And if machines become vastly more intelligent than people, how can we control them? If their interests are not aligned with our own (and why should they be), then might they even represent an existential threat to humanity?

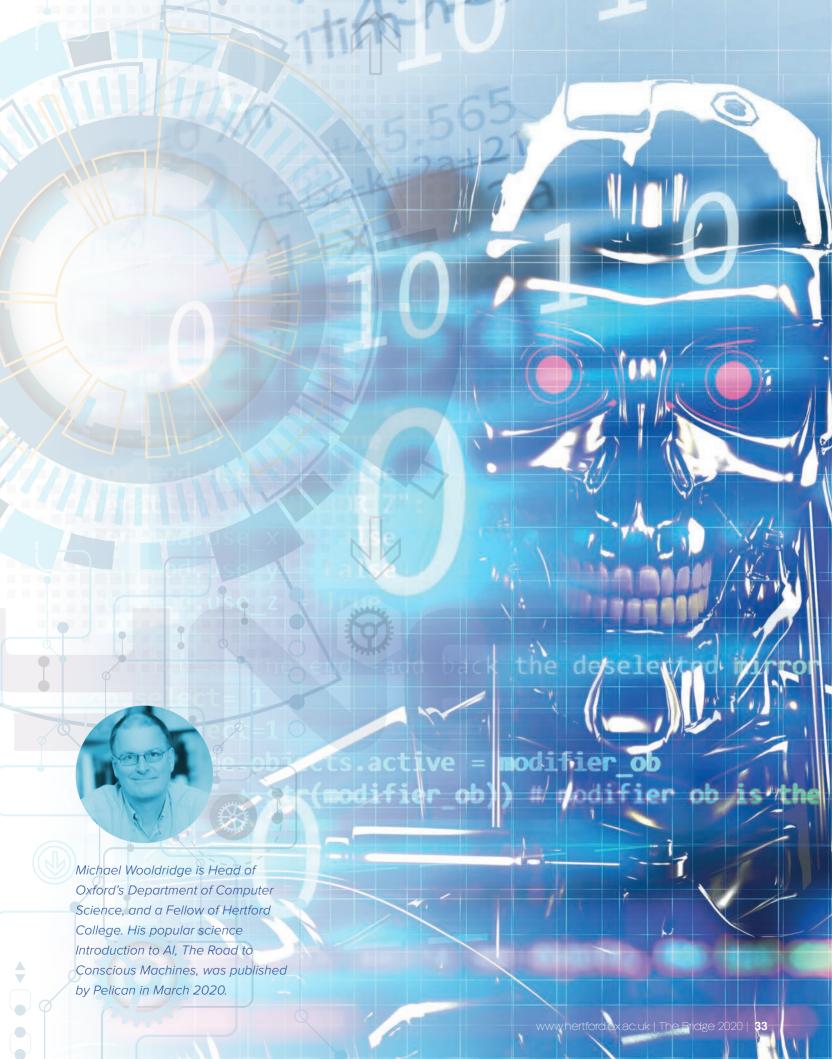
This is not an original idea, of course: it is a staple of science fiction, from movies and TV shows such as

Terminator and Battlestar Galactica. In the Terminator movie, a large computer called Skynet is given control of a nuclear weapon's arsenal. But the computer become self-aware, and decides to eliminate humanity.

Scenarios like this, based on the idea that there is a point at which machine intelligence eclipses that of humans, are called the singularity in Al. I have to say, while many commentators are concerned about the singularity, opinion is very sharply divided about whether it might occur. While some Al researchers believe it is possible, at least as many (and probably more) think it isn't going to happen - and it certainly isn't imminent.

The reason for this is simply that current AI techniques are all focussed around getting computers to do very narrow tasks, such as driving a car or playing a particular computer game. They are *not* directed at the general AI problem, and I believe we have in fact made very little progress to general AI, for all the successes we have had over the past decade. There is no simply route from where we are now to that grandest of AI dreams.

As to the Skynet idea, that we will wake up one morning to find super-intelligent machines, it isn't remotely plausible. To use an analogy by my colleague Rodney Brooks at MIT, think of an AI system that was generally intelligent as being a Boeing 747. When we developed Boeing 747, it didn't take us by surprise; it wasn't built by someone in a shed at the end of their garden; and it didn't magically fall into place overnight. It was the result of a long, expensive, and careful engineering process. General AI, if it is possible at all, will take a lot longer - and right now, we still don't know where to start.





and Politics

A lack of diversity in our student populations is a well-known and lamentable feature of the Higher Education sector (and among Russell Group universities in particular). Yet whilst universities continue to focus on diversifying their student populations, improving outreach initiatives, and supporting students who might be likely to drop out of their courses, there has not been a commensurate level of energy and attention given to improving all students' employability at the end of their degrees.

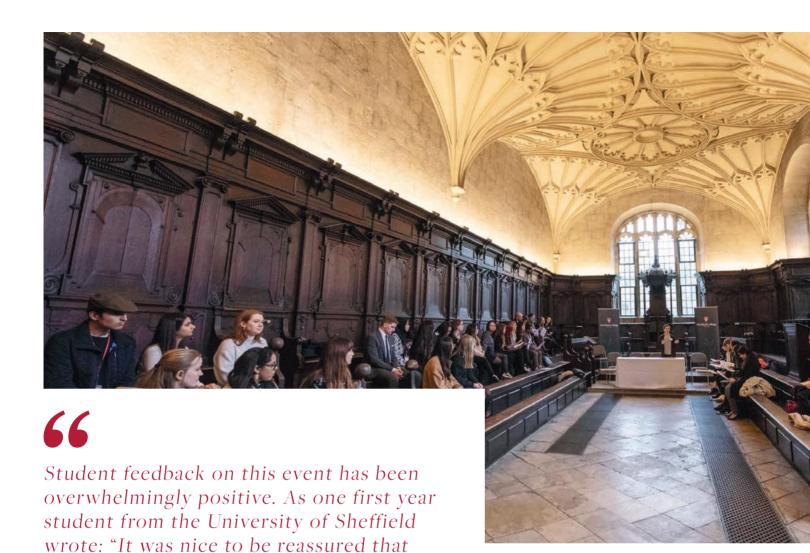
At the same time, it is obvious that structural barriers to equality in the workplace continue to prevail across the UK labour force generally and in political careers especially.

Only 10% of MPs, 4% of councillors,

and 12.7% of civil servants (including only 6% of senior civil servants) are from Black, Asian or Minority Ethnic (BAME) backgrounds (compared to 14% of the UK population at the time of the last census). Similarly, just 34% of MPs and 36% of councillors are women.

The percentage of women in the senior civil service ranges from 28.1% at the Ministry of Defence to 56.7% at the Department for Education (average of 45% across departments). The statistics for those with disabilities and of different religious beliefs are equally disheartening. The situation is not much better in UK academia itself, where women account for 67% of all part-time staff and only 26% of professors. Just 2% of all academics (0.7% of professors) are Black.

Whilst a burden of responsibility categorically lies with political institutions and employers to improve diversity in their workplaces and accessibility in their recruitment procedures, universities should also be doing more to level up the playing field. It is naïve to think that a degree will open the same doors for everyone. If universities are serious about getting a handle on equality and diversity (and leading that conversation per se), then they need to think as much about the career prospects of all students as they currently do about the financial returns of getting these students through their doors in the first place.



With this in mind, an idea was conceived by the two of us over a coffee at King's Cross station in a world pre-social distancing. In talking about how we could put our services (and contact books) to good use, we both saw there was a real gap in careers support for young people interested in professions associated with government whether that be the civil service. Think Tanks or academia. These areas are all vital in serving the British public, but often fail to represent it,

a Politics (and International Relations)

degree is as much of a 'door-opener'

and we wanted to begin to change that as best we could.

We approached Hertford with an idea that was slightly out there: why don't we bring young people from four different universities. and a range of under-represented backgrounds, together for a day at Hertford to encourage them to pursue a career in these disciplines? Much to our delight, Hertford were not only interested in the idea but were keen to offer their

enthusiastic support to the cause to host the day at no cost to students.

On 28th February Hertford welcomed a group of 60 bright, ambitious and curious students from the universities of Oxford. Reading, Oxford Brookes and Sheffield for a day of talks and workshops about what it's really like to have a job in politics and public policy. All the young people who attended were from



BAME, bursary eligible, and/or first generation (to go to university) backgrounds. The majority were women.

A range of speakers joined us to discuss the nature of their work in the government and politics sector as well as the challenges, the opportunities, and the entry requirements and routes in each case. Speakers included Jacqui Smith (former Labour Party MP and the first female Home Secretary),

Kumar Iyer (Chief economist at the Foreign and Commonwealth Office). Emma Norris (Director of Research at the Institute for Government). Professor Claire Dunlop (incoming Vice-Chair of the Political Studies Association). Tanva Abraham (Director of Political and Social Research at YouGov), and Beth Russell (Director General of Tax and Welfare at Her Majesty's Treasury).

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Alongside presentations and roundtable discussions from these speakers, the Treasury also ran an interactive situational teamwork exercise in which students from all four universities had to work together in groups to solve a hypothetical public policy challenge. This exercise was similar to those used by the Treasury in its own assessment centres. The University of Oxford careers service reflected on this exercise with the students before giving bespoke CV and application guidance.

Student feedback on this event has been overwhelmingly positive. As one first year student from the University of Sheffield wrote: "It was nice to be reassured that a Politics (and International Relations) degree is as much of a 'door-opener' as any other and that there are schemes in place to move from degree to both industry and academia."

In keeping with the aim and purpose of the event, another undergraduate commented: "I think today was really successful, and really important for people whose background doesn't give them a foot in the door. Today has definitely helped alleviate my anxiety about not being from a background which gives me automatic contacts in the industry."

Assuming that the marketisation of higher education is not disappearing any time soon, it is possible that academics may be able to harness that logic to employability schemes and events (funded by universities) that improve equality and diversity in political careers (and other careers as well!). We hope to reproduce this event in other locations around the country and welcome everyone and anyone to get involved or to join this wider conversation.

We are hugely thankful to Hertford, our speakers and our students for helping to deliver such a fun and interesting day. We hope that the experiences our attendees gained throughout the day will help them to achieve their manifest potential in the future.



Josh Platt is a Senior Policy Advisor at HM Treasury where he works on public spending. Prior to that, Josh advised on EU exit policy at the Treasury and as part of the Civil Service Fast Stream undertook placements at the Department for International Development, Ministry of Housing, Communities and Local Government and in the charity sector. Josh graduated with a BA in History from Hertford in 2015.



Dr James Weinberg is currently a Lecturer in Political Behaviour and Leverhulme Fellow at the University of Sheffield. His research on topics such as political ambition and citizenship education has been published in high profile peer-reviewed journals as well as a forthcoming book with Bristol University Press. James is also currently an elected trustee of the UK Political Studies Association, but he started his career as a qualified secondary school teacher in London. He completed his undergraduate degree at Hertford in 2012.



