



Combating fake news

Lie detector

VILNIUS

Lithuanians, besieged by disinformation from Russia, are fighting back

“PATIENT ZERO” is a medical term that started as a misunderstanding. An early North American victim of AIDS was anonymised in some documents as “Patient O”. The individual in question, Gaëtan Dugas, a Canadian flight attendant, was thought at the time to have been the point of origin of the North American AIDS epidemic. The misreading of O (for “Outside of California”) as o (ie, zero), though accidental to begin with, thus seemed propitious. In fact, Dugas was not the sole point of that epidemic’s origin. But the term stuck, and has spread. It has, indeed, spread beyond medicine to embrace another sort of plague—disinformation.

Demaskuok, which means “debunk” in Lithuanian, is a piece of software that searches for the patient zeros of fake news. It was developed by Delfi, a media group headquartered in Lithuania’s capital, Vilnius, in conjunction with Google, a large American information-technology company. It works by sifting through reams of online verbiage in Lithuanian, Russian and

English, scoring items for the likelihood that they are disinformation. Then, by tracking back through the online history of reports that look suspicious, it attempts to pin down a disinformation campaign’s point of origin—its patient zero.

Playing ping-pong with the Kremlin

Demaskuok identifies its suspects in many ways. One is to search for wording redolent of themes propagandists commonly exploit. These include poverty, rape, environmental degradation, military shortcomings, war games, societal rifts, viruses and other health scares, political blunders, poor governance, and, ironically, the un-

covering of deceit. And because effective disinformation stirs the emotions, the software gauges a text’s ability to do that, too. Items with terms like “current-account deficit” are less likely to be bogus than those that mention children, immigrants, sex, ethnicities, animals, national heroes and injustice. Gossip and scandal are additional tip-offs. Verbiage about sports and the weather is less likely to fire up outrage, so the software scores items about those subjects as less suspicious.

Another clue is that disinformation is crafted to be shared. Demaskuok therefore measures “virality”—the number of times readers share or write about an item. The reputations of websites that host an item or provide a link to it provide additional information. The software even considers the timing of a story’s appearance. Fake news is disproportionately posted on Friday evenings when many people, debunkers included, are out for drinks.

Disinformers can be careless, too. Demaskuok therefore remembers the names of people quoted in fake news, as they sometimes crop up again. It also runs image searches to find other places a picture has been posted. Some, it turns out, first appeared before the events they supposedly document. Others also appear on websites with a reputation for disinformation, such as RT and Sputnik—both news outlets backed by Russia’s government.

Russian-sponsored disinformation of ▶▶

→ Also in this section

76 Genes and migration

77 Monkeys and oil palms

77 A treatment for Alzheimer’s?

78 Sex bias in museum collections

▶ this sort is a bane everywhere, but it is particularly rife in Estonia, Latvia and Lithuania—the three countries that, in 1990, were the first to declare independence from the Soviet Union, catalysing that union's disintegration. The Baltic states, as they are often known collectively, then exacerbated their offence by joining NATO and the European Union. Russia, the Soviet Union's puppetmaster, has neither forgiven nor forgotten. One consequence is that the Baltic states are particular targets for falsehoods intended to confuse and destabilise.

Demaskuok is part of the fightback. It has improved since Delfi's journalists began using it a year ago. It can now flag up not just total fabrications, but also more cunning trickery that works by exaggeration or omission. Viktoras Dauksas, who runs Debunk EU, a charity in Vilnius that was created in June to develop the technology further, says it can now even sometimes spot "broken mirrors". This is his term for disinformation in which facts are technically accurate but presented selectively to mislead. Russian disinformation, he says, has become increasingly treacherous, with truthful elements savvily "twisted in a way to undermine democracy".

Demaskuok is pretty good. About half the items it flags prove, under human scrutiny, to be disinformation. That scrutiny, though, is an important part of the process.

Some of it comes from Demaskuok's users. Besides Delfi, these include Lithuania's foreign ministry and a score of news outlets, think-tanks, universities and other organisations. After studying an item that the software considers disinformation, people in these organisations tell the system if it was on or off the mark. That improves future performance.

Demaskuok is also supported by more than 4,000 volunteers known as "elves". About 50 of them scroll through Demaskuok's feed of suspected disinformation, selecting items to be verified. These are sent to the other elves for fact checking. Reports on the findings are then written up by the software's users and emailed to newsrooms and other organisations, including Lithuania's defence ministry, that produce written or video "debunks" for the public.

The whole system typically moves so fast that an elf in Vilnius who goes by the alias "Vanagas" jokes it is like playing "Kremlin ping-pong". This speed makes all the difference, says Vaidas Saldziunas, one of Delfi's journalists. Wait too long and it may not matter if you "kill the patient zero, the original virus", he says. If the resulting false narrative survives long enough, it may take on a life of its own.

Officials say that abundant debunking has cultivated healthy scepticism in most Balts. But Eitvydas Bajarunas of Lithuania's foreign ministry frets about disinformation's effects on countries farther west,

where fewer people fear Russian aggression. He points to a bogus report on September 25th that falsely claimed 22 German soldiers had desecrated a Jewish cemetery in Kaunas, a city 100km west of Vilnius. Neglect to nip such rot in the bud, he says, and political support in Germany for keeping troops in Lithuania could falter.

Moreover, some worry that even Demaskuok's success may play into Russia's hands. Rob Procter, professor of social informatics at the University of Warwick, in Britain, offers a sobering thought. The Kremlin's goal, he suggests, is not so much to convince Westerners that certain falsehoods are the truth. Rather, it wants its adversaries to doubt that anything can be trusted as true. If this is the aim, software that increases the number of news reports which get debunked may, paradoxically, have the opposite effect to that intended. ■

Dysgenics

Will ye nae come back again?

Migrants from coalfields take more than just their talent with them

IT IS A common assumption that migrants have more pizzazz than stay-at-homes. That this is reflected in people's genes, though, may come as a shock. Yet this is the conclusion of a study based on almost half a million Britons who have volunteered to have their DNA, and much else about them too, recorded in the UK Biobank, a resource available to researchers who are trying to

understand the links between genetics, environment, disease and social outcomes.

The study in question, just published in *Nature Human Behaviour*, was carried out by a team led by Abdel Abdellaoui of the University of Amsterdam, in the Netherlands, and Peter Visscher of the University of Queensland, in Australia. Building on previous work done in the Netherlands, they were looking at how genetic patterns associated with certain biological, medical and behavioural traits cluster geographically and change as people move around.

To establish baselines for their work, Dr Abdellaoui, Dr Visscher and their colleagues turned first to 33 published studies that used a technique called genome-wide association study. This is intended to discern the contributions to a trait of large numbers of genetic differences that each have a small effect. It concentrates on so-called single-nucleotide polymorphisms (SNPs)—places in the DNA where an individual genetic "letter" routinely varies from person to person. There are, for example, about 100,000 SNPs that affect height. On average, each makes a contribution, either positive or negative, of 0.14mm to someone's adult stature. This is in contrast to Mendelian variations, where a single difference between individuals has a pronounced effect—such as the difference between brown and blue eyes.

Each of the 33 baseline studies identified large numbers of SNPs that had positive or negative effects on a particular trait: extroversion, heart disease, height, body fat, age at menopause, recreational drug use and so on. The researchers then applied these SNP patterns to the records of 450,000 UK Biobank participants, and asked various questions. One thing they ▶▶



Welcome to the past, lads

► looked for was geographical clustering of SNPs related to individual traits. This, they discovered in abundance. Of the 33 traits under consideration, 21 showed evidence of SNP-related geographical clustering.

The most strongly clustered of all, they found were SNPs for educational attainment (ie, how many years an individual had spent at school and college). SNPs lowering educational attainment were particularly clustered in former coal-mining areas. These are places that have seen a lot of internal migration, both inward, when the mines were developed during the late 18th and 19th centuries, and outward, after the second world war, as mining shrank from being one of Britain's biggest employers to its current state of near non-existence.

Dr Abdellaoui and Dr Visscher were able, from their studies of the biobank's records, to chart the effects of the more recent, outward migration. They divided participants into four groups: those born in mining areas who had subsequently left; those born in mining areas who had stayed; those born outside mining areas who had moved into one; and those who had never lived in a mining area. The results were stark. People in the first group, outward migrants from mining areas, had significantly more educational-attainment-promoting SNPs, and fewer damaging ones, than any of the other groups, while people in the second group, stay-at-homes in mining areas, had the opposite.

Though not quite so sharply as with

educational achievement, this pattern was also reflected in all but one of the other 20 SNP-related traits the researchers looked at. With the exception of bipolar disorder, the best outcomes were found in outward migrants from coalfields and the worst in stay-at-homes. The healthy, in other words, depart. The less healthy remain.

The upshot is a vicious spiral. That young, ambitious, healthy people tend to leave economically deprived areas is hardly news. But to see that written clearly in their DNA, which they take with them when they leave, while the converse is written in the DNA of those who stay behind, raises questions of nature and nurture that society is ill-equipped to answer, and possibly unwilling to confront. ■

Agriculture

Monkey business

Plantation owners profit by not persecuting primates

PALM OIL is a lucrative business, but not without its problems. Plantations of palms, the fruit of which are crushed to release the oil, are usually there at the expense of rainforest. This does not go down well with environmentalists. Nor does it go down well with the rainforest's inhabitants, some of whom, such as pig-tailed macaques, a species of monkey, raid the plantations to eat the palm fruit before it can be harvested.

Such raiding, naturally, invites retaliation by planters, who try to trap and relocate the animals, or scare them off with gunshots. But a study published in *Current Biology* this week, by Nadine Ruppert and Anna Holzner of the University of Sciences Malaysia, suggests such retaliation is a mistake. Far from driving monkeys away, plantation owners should welcome them, because monkeys help control a yet more important pest of oil palms—rats.

Dr Ruppert and Ms Holzner spent more than two and a half years tracking a pair of macaque troops around a large oil plantation in West Malaysia. As they expected, they found that the monkeys were eating oil-palm fruits—but not, actually, all that many. A troop of 44 animals (the average for this species) would, they reckoned, get through 12.4 tonnes of palm fruit a year. This is 0.56% of the fruit that would be produced in such a troop's home range. That same troop would, though, in the same time, get through more than 3,000 rats.

Previous reports suggest rats living in palm plantations consume around 10% of the fruit produced, so it crossed the researchers' minds that, from a planter's



Pest control macaque style

point of view, leaving the monkeys alone to act as rat controllers might actually make economic sense. And so, after a bit more work, it proved.

By comparing plantations whose owners did and did not discourage monkeys from visiting, Dr Ruppert and Ms Holzner found rat abundance in the former to be five times that in the latter. Overall, they calculated, tolerating monkeys would lead to a crop loss of about 2.5%, compared with the 10% toll that rats impose unhindered. And this is before the costs of control measures against the two species are considered.

For planters, then, the message of this work, as far as monkeys are concerned, is "live and let live". Though macaques do charge a fee in fruit for their services, that fee is a small price to pay for the benefits they provide.

Alzheimer's disease

Fabulous or futile?

Claims of a treatment for Alzheimer's should be met with caution

A DRUG THAT slowed the progress of Alzheimer's disease would be both a boon to humanity and a cash cow for the firm that developed it. Hence the rollercoaster ride enjoyed by the shares of Biogen, a biotechnology company based in Cambridge, Massachusetts, which hopes to be the firm in question. The recent surge in its share price (see chart overleaf) followed its announcement, on October 22nd, that it would soon seek approval in America for aducanumab, a molecule it believes will fit the bill.

Aducanumab is a type of drug known as a monoclonal antibody. Antibodies are specialised protein molecules that form part of the immune system. They include so-called hypervariable regions, the exact chemistry of which differs from one type of antibody to another. The specifics of the hypervariable region cause it to bind with great fidelity to some other molecule, usually part of a pathogen, stopping that molecule working and marking it for destruction by other parts of the immune system.

Aducanumab is tailored to bind to a protein called beta-amyloid, which forms plaques in the brains of people with Alzheimer's disease. Most researchers agree that these plaques are at least part of the cause of Alzheimer's symptoms, rather than being a benign consequence of other, harmful processes. And aducanumab does, indeed, seem to reduce the amount of beta-amyloid around. The theory is that this should, in turn, slow progress of the illness's symptoms. And that is where things get complicated.

Having established aducanumab's safe- ►►



► ty in preliminary trials, Biogen organised a pair of larger trials to test its efficacy in slowing down the development of symptoms. Such trials are monitored as they go along, in order to check that a drug under test still looks safe, and also for futility—in other words, whether there is any sign that the substance is having the desired effect. In March, the firm announced that aducanumab had failed the futility test and both trials would therefore end.

That seemed to be that. But the latest announcement, based on extra data squeezed out of one of the trials, says there is an effect after all. And, according to statistical convention, there is. Just.

Statistically, there is little doubt that aducanumab was clearing beta-amyloid. A rule of thumb in statistics is that if the likelihood of an apparently significant result having actually been accidental is less than five in 100, then it can provisionally be accepted as real. Calculation suggests the plaque-clearing effect found would happen by chance only one time in 1,000. That, though, is merely to confirm what was already known about aducanumab's powers. Of the four results cited for various cognitive effects, only one is this good. Two others have "happened-by-chance" values of one in 100—which counts, but would benefit from confirmation. The fourth has a value of six in 100. Nor is Biogen's case assisted by the fact that only one of the two trials is being cited in this reinterpretation.

America's Food and Drug Administration, which will decide whether to give aducanumab the go-ahead, will of course be aware of the conventions concerning statistical power, and will make its decision in light of that awareness. There must, though, be a temptation, given the magnitude of the problem of Alzheimer's (in America alone there are almost 6m cases), and the absence of alternative treatments, to give a green light to something that might work, in the hope that it does work. Which will make heroes out of everyone involved if it turns out to be correct—and villains if it does not. ■

Museums

Sexual selection

Collections of animals favour male over female specimens

UNTIL RECENT years, science has been a male-dominated profession. And that bias, it turns out, is reflected not just in its practitioners. A team of researchers at the Natural History Museum in London have carried out a thorough review of the animal specimens in their own collection and in the collections of four of the world's other great museums of natural history. They have found, as they describe in the *Proceedings of the Royal Society*, that, among birds and mammals at least, there is a noticeable preference for cocks, stags and drakes over hens, hinds and ducks.

The team, led by Natalie Cooper, an evolutionary biologist at the museum, analysed records of almost 2½m specimens in London, Paris (Muséum National d'Histoire Naturelle), Chicago (Field Museum), New York (American Museum of Natural History) and Washington (Smithsonian Institution). The oldest dated from 1751. The newest were from 2018. They considered only species with 100 or more representatives, to reduce the effects of chance.

A surprising number of the records they looked at (49% of bird specimens and 15% of mammals) did not describe the sex of the animal they referred to. But of those that did, 60% of the birds and 52% of the mammals were male. Even taking into account known sex ratios in the wild, which do favour males in some species, these figures suggest collection bias.

There are two possible explanations. One is that if the sexes look different, it

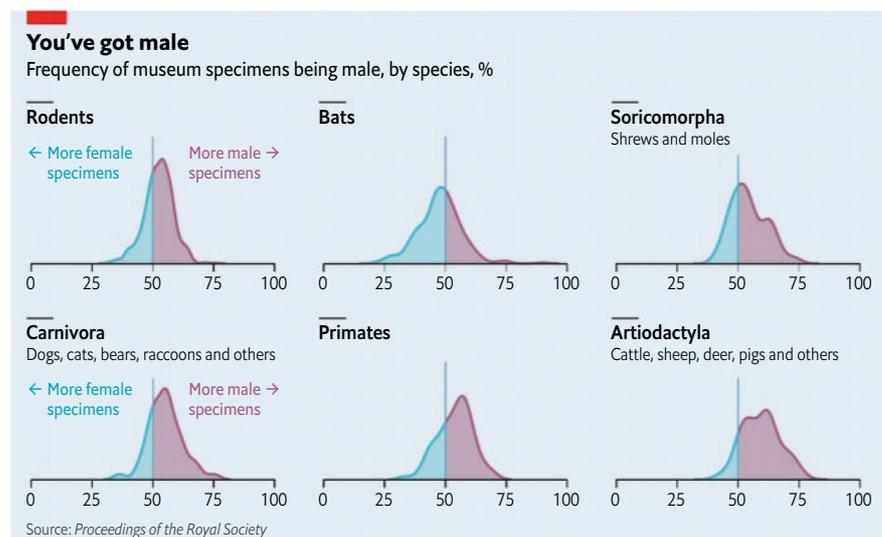
tends to be the male who has the splendid feathers or showy antlers, and thus attracts the hunter's attention. Similarly, if one sex is larger than the other it is almost always the male.

The other explanation is that males, being generally more aggressive, more likely to wander from where they were born, more curious and less fearful of novelty, are more likely to put themselves in the line of fire. These explanations are not mutually exclusive. And according to the researchers, both are probably true.

As the chart shows, the biggest male-bias seen in the six largest orders of mammals (rodents, bats, shrews and their kin, carnivores, primates and artiodactyls) is in the artiodactyls. These, the even-toed, or cloven-hoofed ungulates, include deer, sheep, goats, cattle and antelopes—all groups whose members often sport horns or antlers, and in which such headgear is more often found in males than females.

Among birds, meanwhile, analysis of the largest order (passerines, or song birds, which are 60% of bird species) showed that the proportion of specimens of a species that were male was directly related to how showy that species' male plumage was compared to the plumage of its females.

Demonstrating the importance of behavioural differences is harder. But it is difficult to come up with convincing hypotheses about hunting bias to explain results for groups like rodents and shrews, which are usually caught by trapping. Intriguingly, it may be the exception that proves the rule, here. Unlike those of the other large mammalian orders examined, collections of bats have a slight female bias. The researchers suggest this may be a result of the sexes often roosting separately, with female roosts being bigger. Past practice by bat collectors has been to collect entire roosts, thus accidentally collecting more females than males. ■





Inequality

The broken ladder

In the past, America was not as unequal as it has become—and as it might be in the future

FOR MOST of its history, America has been a more egalitarian place than Europe—at least, so long as you exclude the abomination of slavery. White migrants to the New World found it less class-bound than the old. Inherited wealth cast a shorter shadow. In 1810, according to Thomas Piketty, a French economist, the richest 10% of Americans controlled less than 60% of national wealth, compared with more than 80% in Europe. When industrialisation threatened to establish an aristocracy like those across the Atlantic, the social backlash was prompt and decisive. Reforms extended the vote to women and protected workers' rights, busted powerful monopolies and introduced an income tax. Franklin Roosevelt's New Deal finished the work begun in the late 19th century. By the 1950s, the American economy was not only the most advanced in the world, but was

The Triumph of Injustice. By Emmanuel Saez and Gabriel Zucman. *W.W. Norton*; 232 pages; \$27.95 and £21.99.

The Meritocracy Trap. By Daniel Markovits. *Penguin Press*; 448 pages; \$30. *Allen Lane*; £25.

Unbound. By Heather Boushey. *Harvard University Press*; 272 pages; \$27.95 and £22.95

once more a bastion of egalitarianism.

The evolution of inequality since that time thus represents a significant departure from American history. The incomes of the rich have grown much faster than those of the poor. From 1979 to 2016, the income of the top 1% of Americans grew by a cumulative 225%, compared with just 41% for the middle-class. Wealth inequality, too, has risen. Over the same period, the

→ Also in this section

80 An everyday epic

81 European cultural history

82 Plautilla Nelli's "Last Supper"

share of the country's wealth controlled by the top 0.1% more than doubled, to 20%. In continental Europe, meanwhile, the gap between rich and poor has widened only slightly. The share of total national income earned by the richest 1% of Europeans has increased by two percentage points over the past 40 years, compared with ten percentage points in America.

Political momentum is building for a response; several Democratic candidates for the presidency promise to introduce new wealth taxes (see Briefing). Even now, though, the origins of the malaise are poorly understood. Analysis tends to focus on proximate causes, such as globalisation or the impact of technology on the job market. These matter, but have also affected other rich countries. The source of America's troubles lies deeper.

Part of the problem is that American policy has exacerbated the effect of economic pressures. In their new book, "The Triumph of Injustice", Emmanuel Saez and Gabriel Zucman pin the blame for rising inequality squarely on the American tax system. The authors—both economists at the University of California, Berkeley—argue that taxation in America has become less progressive over the past four decades. In the 1970s the rich paid twice as much in tax, ►►

▶ as a share of their income, as the working poor (taking into account all taxes, including those at the state and local level). After President Donald Trump's tax reform in 2018, by contrast, the very rich paid a smaller share than many Americans in the bottom half of the income distribution. The 400 richest Americans paid an average tax rate of about 23% of income in 2018, according to the authors' estimates. Low-income Americans paid roughly 25%, the authors say, although this excludes transfer payments made to the very poorest households: a misleading omission, some critics reckon. Personal taxation is only part of the story, as the authors cursorily allow. Even so, the decline in the tax burden on the very rich, at a time of extraordinary growth in their incomes, is startling.

Only the little people

This analysis poses a question: why has American tax reform been so heedless of inequality? Messrs Saez and Zucman suggest a rationale. Economic injustice (as they see it) is a result of a simple cycle. The rich try to avoid tax, then win concessions from politicians who argue that attempts to get more from the wealthy are doomed to failure. This gambit foundered in the past, they say, because of a shared conviction of the value of collective, state-funded action. Erosion of that belief led to complacency in the face of avoidance and acceptance of widening chasms in wealth and power. The pair do not press their analysis further; economists, Mr Saez says, are "ill-equipped" to take on questions of values, important as they may seem.

Others are willing to try. In "The Meritocracy Trap", Daniel Markovits, a legal scholar at Yale, blames the loss of social solidarity, and much else besides, on the slow corruption of American meritocracy, which has ossified into a formidable caste system. As the economic premium on education rose, he explains, competition for places at elite institutions of higher education grew. That struggle has become an obstacle to success for all but the cognitive elite. The gap in academic achievement between the children of rich and poor families is now larger than that between black and white pupils in the era of segregation, Mr Markovits notes.

In theory, this is a fixable problem, as "Unbound", a new book by Heather Boushey, makes clear. Ms Boushey is the director of the Washington Centre for Equitable Growth, a left-leaning think-tank. Her book is a detailed account of the obstacles to a more egalitarian American future. Social cleavages described by Mr Markovits pop up repeatedly. The conditions into which children are born drastically influence their economic prospects as adults, Ms Boushey observes—from how likely they are to be arrested to the chance that

they will be an inventor or entrepreneur.

But those effects can be countered. Health at birth, for instance, has been shown to sway educational performance and employment prospects—suggesting that better access to pre- and post-natal health care could help. So could improved access to early childhood education. Studies of high-quality pre-kindergarten programmes find enduring benefits to recipients from poor backgrounds. High-income parents read to their children more and spend more time and money on intellectually enriching activities than do poorer parents. Higher wages at the bottom, as well as more predictable work schedules, could narrow the gap. Research finds that rates of upward mobility are higher in some places than others; zoning reforms or subsidies that encourage migration to thriving areas could loosen up America's class-bound hierarchy.

Ms Boushey frames her proposals as ways to reduce inequality while also aiding economic growth. For example, because highly unequal economies seem to rely more on credit booms to propel growth, redistributing income from rich to poor would make the economy less crisis-prone. Raising American test scores to the average across developed economies would boost output by an estimated \$2.5trn—or 12% of 2017 GDP—over the next 35 years.

This two-sided argument is persuasive, but is also an acknowledgment that the power to implement change rests with the winners. As Ms Boushey notes, the priorities of the rich receive more legislative attention than those of the poor. Political spending by the rich has risen alongside inequality, as has political polarisation; the resulting dysfunction suits the wealthy, given the popularity of redistributive tax and spending measures.

Convincing the well-off of the benefits of a less lopsided society may be necessary to remedy it. And perhaps, by couching their manifestos as a means to boost growth, and by reminding the rich that Americans are in it together, thinkers like Ms Boushey could begin to re-establish a lost sense of solidarity.

Just deserts

If Mr Markovits is right, however, that is a remote prospect. Subtly but corrosively, he thinks, the idea of meritocracy has validated inequality, because rich and poor alike "earn" their position. Success depends on educational achievement beyond the reach of many, but winners feel they deserve their spoils, while losers are asked to accept their fate. Restoring dignity to workers at the bottom may require the sort of organisation and activism that improved their lot a century ago. For some Americans, that upheaval could prove uncomfortable. ■

An everyday epic

Mother courage

Ducks, Newburyport. By Lucy Ellmann.

Bibliosis; 1,040 pages; \$22.95. Galley Beggar Press; £14.99

THE NAMELESS heroine of Lucy Ellmann's 1,000-page novel once had to endure a Wagner opera "so long it nearly killed me". What would she, an overworked, middle-aged mother-of-four who runs a baking business from her kitchen in Newcomerstown, Ohio (an actual place), make of the mammoth slab of print that she narrates, for the most part, in one unbroken sentence?

In this domestic epic, which was short-listed for the Booker prize, Ms Ellmann, an American-born novelist who lives in Scotland, seeks to make connections. She builds bridges and finds patterns that link home and away, near and far, the state of the family and the fate of the planet. Snatches of old songs, show tunes and opera arias punctuate the mighty flow of this interior monologue. So do the classic Hollywood movies (mostly of the Katharine Hepburn, Bette Davis and James Stewart vintage) that fill the narrator's thoughts, along with the plucky heroines of Jane Austen and Laura Ingalls Wilder.

Thus the anxious soliloquy of an ordinary—but acute and well-informed—woman in contemporary America incrementally binds the human frame to the body politic, the neighbourhood rubbish to the pollution that has left the magnificent old ▶▶



The value of pie

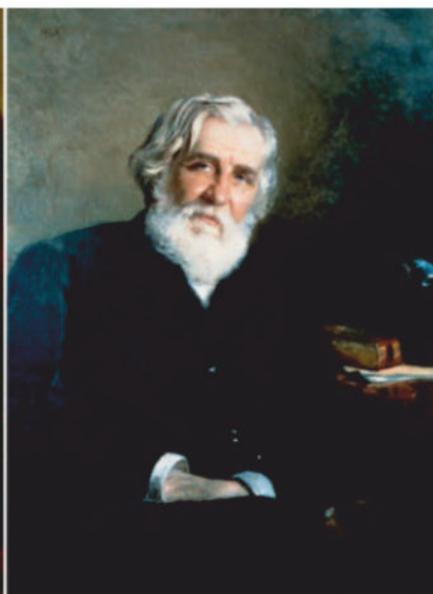
► Ohio river “full of mercury”. Ms Ellmann mourns ecosystems despoiled by modern humankind. The Native Americans of Ohio cherished their homelands for many millennia, but “the Europeans managed to just trash the place in a few hundred years”. Equally, “Ducks, Newburyport” itself forms a huge, sustainable ecosystem of storytelling. It is not so much a stream of consciousness as a vast delta of the mind, criss-crossed by tributaries and creeks.

Humans may have robbed the planet of its abundance, but their inner life teems and blooms: “there must be seven and a half billion of these internal monologues going on”. Ms Ellmann offers just one, over a single day. Her father, Richard Ellmann, wrote the definitive biography of James Joyce, and she nods to “Ulysses” and its everyday hero, Leopold Bloom. The narrator’s much-loved but absent husband (an expat Scot who teaches engineering in Atlanta and Philadelphia) is called Leo.

Readers need not scoff this giant pie in one gulp. Sampled at regular intervals, it tastes sweeter. The sheer ingenuity of Ms Ellmann’s wordplay, the fabulous profusion of her recipes, catalogues and inventories, from a freezer’s contents to confectionery brands, imbue every passage with fun as well as a sardonic poetry. Few novels have ever packed in so much culinary advice: the pies and cakes aside, see her chicken stock and beef chilli.

This onrush of introspection obliquely tells a sad family story. The sickness and early death of the narrator’s adored mother “wrecked my life”. Readers get to know devoted, dependable Leo and the four kids, “sulky Stace” (her first-born, with a previous husband), “pedantic Ben, obsessive Gillian, and pell-mell Jake”. They share the pensive protagonist’s self-doubt, shyness, memories of illness and her unwarranted belief in “the fact that” (a favourite phrase) “I can’t love or be loved”. They feel her fear of the violence all around her, from a disturbed deliveryman to weapon-toting Ohio males, schoolyard massacres, historic atrocities and the factory-farm annihilation of chickens. “Nobody seems to notice, cooking or motherhood,” she frets.

Conventionally punctuated, a briefer second story interrupts the first. It tells of a stray mountain lioness and her cubs who encounter the “graceless and brutal” human men who “never got enough of killing”. Slowly, these twin narratives of heroic maternity on hostile terrain converge. The novel’s odd title alludes to an act of rescue that made possible the narrator’s entire existence. Mothers, human or leonine, always remain “at the centre of the vortex”, while “after the apocalypse people will still need pie”. In the blighted future, the all-feeling baker hopes that “a few good movies will be made” and “a few good books written”. But very few better than this. ■



European cultural history

Ode to joy

The Europeans. By Orlando Figes.
Metropolitan Books; 592 pages; \$35.
Allen Lane; £30

FOR AN EXAMPLE of the cosmopolitan glamour and sheer brassiness of high European culture in the 19th century, look no further than the obsequies of Frédéric Chopin, which took place in a grand Paris church in 1849. Pauline Viardot (pictured left), a Spanish-born mezzo-soprano who had known the composer, sang Mozart’s “Requiem” to a packed congregation that included “the whole of artistic and aristocratic Paris”, as well as her lifelong admirer, the Russian author Ivan Turgenev (right).

Turgenev enjoyed her rendering, but complained peevishly of a poor use of stops by the organist. As for Viardot, she was genuinely upset by the loss of a friend but insisted on collecting every centime of her 2,000-franc fee (nearly half the cost of the funeral). The daughter of an impresario, her attitude to money—and life in general—was hard-headed. This fashionable event provides one of many vignettes etched in masterly detail by Orlando Figes, a British historian, in “The Europeans”.

Mr Figes is best known as a chronicler of Russia itself, and of the ways its cultural and political masters have juggled indigenous traditions with those from the West. In this latest work, the scene moves to the heart of Europe via the life and world of Turgenev, the most westernising of Russian prose-writers. Ambitiously, Mr Figes

sets out to tell both a big story and a small one. The larger narrative is the emergence, thanks to railways, cheap printing and an ever-growing middle class, of a transnational artistic scene, in which musical works and their performers, as well as writers and painters, were in perpetual motion. The micro-saga is that of the Russian writer, his favourite singer and her husband Louis Viardot, who formed an unlikely trio.

Viardot, a French opera manager, critic and scholar of Spanish and Russian, had married Pauline Garcia when he was 39 and she was 18. Soon he was negotiating appearances for her in places such as Berlin and Vienna, and eventually St Petersburg. There, in 1843, she enthralled the royal court, high society—and in particular, Turgenev, an impoverished blueblood and author. Throughout all these travels, the nascent railway system was a help, although the final part of the Viardots’ journey through Russia was made in a bumpy horse-drawn carriage.

Thereafter Turgenev spent as much time as he could in their company, whether in the spa town of Baden-Baden or in the environs of Paris. The soprano had no strong feelings for either of the two men who adored her, but she was capable of passion, as became clear when a young composer called Charles Gounod enchanted her with his looks and talent; the other men had to stand aside and bite their lips.

Mr Figes refrains from judgment about his protagonists and lets the densely woven detail speak for itself. Louis Viardot ►►

In communion

FLORENCE

More than 450 years after it was created, the first “Last Supper” painted by a woman has gone on public display

SHE SET the table with elegant cutlery, sparkling glasses and intricately decorated bowls. The white cloth, once freshly ironed, bears the trace of a concertina of folds. In Plautilla Nelli’s “Last Supper” (c.1560)—the earliest known version of the theme painted by a woman—Jesus and the 12 Apostles feast on lamb, lettuce, bread and wine. Under the table, the men’s toes peek out from beneath their robes. Above, the men respond to Jesus’s prediction that one among them will betray him. Judas sits alone on the opposite side to the group, his face stern and unmoving.

Last week at the Museum of Santa Maria Novella, Florence, Nelli’s 21-foot-long painting was put on display to the public for the first time, more than 450 years after it was created. It has undergone four years of extensive restoration work. “I wanted to give her a voice,” said Jane Fortune, the founder of Advancing Women Artists (AWA), the American charity which led the effort to salvage Nelli’s masterwork. Fortune, who died in 2018, had estimated that there were more than 1,500 pieces of historic art by women in Tuscany; in 2009 she set up AWA to research into these neglected paintings, repair them and place them in museums. “True restoration is when the

public can see a work and learn that it’s part of history,” Linda Falcone, AWA’s director, says.

Born to a wealthy family in 1524, Nelli was sent to a convent at the age of 14. Rather than being sites of passive prayer, “convents were centres of creativity and power”, says Ms Falcone. Half of all literate women were sent to them, as many families could afford a dowry only for the eldest daughter. Nelli’s life within the cloistered walls of Santa Caterina di Cafaggio was productive. She taught herself and the other nuns to paint, and set up such a successful art workshop that the convent became financially self-sufficient, selling devotional pieces to noblemen. Giorgio Vasari, an art historian, wrote in 1550 that her works were so popular “it would be tedious to attempt to speak of them all”.

Yet Nelli’s “Supper” was her most revolutionary undertaking. Only the best Renaissance artists dared capture the moment when Jesus warned his followers that his death was imminent. The large, dramatic scene demanded ambition, creative verve and technical precision. Painting was prescribed as a way for nuns to ward off sloth, but their scenes were expected to be modest, decorative pieces. By making this work, Nelli and

the team of nuns that assisted her were presenting themselves as equal to the men who had tackled the subject.

Though the painting has its flaws—shadows do not always fall where they should, the beards are unconvincing, proportions are occasionally askew—it is bold and evocative with its use of thick brushstrokes and jewel-like colours. Nelli also pays close attention to the human details on her holy subjects, such as the cuticles on fingernails and the curl of eyelashes. “There aren’t other devotional Last Suppers with such a strong sensual touch,” says Rossella Lari, the conservationist who led the restoration.

For the past few decades Nelli’s pock-marked painting loomed over Santa Maria Novella’s friars in their private quarters. Though the monks were understandably disappointed to see it go, they have been given an exact reproduction; the restored original can now be viewed by Florence’s locals and the millions of tourists who visit the city each year. Nelli never painted a self-portrait, so it is hard to imagine the author of such a compelling piece. But with her “Last Supper”, she made sure that her name would be remembered. “Sister Nelli,” an inscription at the top of the painting reads; “Pray for the Paintress”.



A feast for the eyes

emerges as a quiet hero, Pauline Viardot as a ruthless but likeable pragmatist and Turgenev as an insufferable prig whom posterity (and perhaps Louis) could forgive only because of his excellent, observant prose.

As a tale of an awkward but enduring relationship between three outstanding people, this book shines. But it also aspires to be a kind of anti-Brexit parable, tracing one of the most powerful developments in the

19th century, the creation of a single market in culture. Mr Figes certainly shows that entirely unexpected relationships, clashes and synergies can emerge when talented people from different corners of Europe have the money and the technological means to interact. But he acknowledges, too, that countervailing cultural forces were at work, such as the German nationalism of Wagner. (Pauline Viardot admired

the German composer while Turgenev, despite his love of things Teutonic, felt instinctively hostile. Out of deference to the lady he worshipped he changed his mind, and then only with “a certain effort”.)

Trends in the world of culture are never straightforwardly linear. As “The Europeans” shows, the shifting relationships between flawed, fickle human beings are messier still. ■