

You are going to read an article in which a young journalist talks about using social media to find a job. For questions 31–36, choose the answer (A, B, C or D) which you think fits best according to the text.

Mark your answers on the separate answer sheet.

Keeping pace with scientific publishing

Science correspondent Joe Cushing considers old and new ways of publishing scientific research

Journal-based peer review – the process of subjecting a scientific research paper to the scrutiny of others who are experts in the same field – is generally held up as the quality assurance mechanism for research. It professes to be an essential filter which prevents publishing flawed or nonsensical papers, and indeed is often touted as such in reassuring tones when scientists talk to the media or the general public. Reviewing a paper can delay its publication by up to a year; is that a price worth paying to ensure the trustworthiness of the published literature? Well, yes and no. And picking apart such issues reveals a great deal about the state of scientific publishing, which is very much in flux.

I'm not yet ready to abandon journal-based peer review. I'd still like to see all papers pass some sort of checking stage before formal publication, but I feel the ground moving. The growing use of preprints (drafts of papers which are posted online without having been peer reviewed, found in digital archives) is a crucial part of that shift because they bring academics back to what research publication is all about: the rapid dissemination of new results so they can be read, critiqued and built upon. Publication in journals has become more about renown and career advancement, and this has perverted both the motivations of authors and the job of reviewers.

Competition for prized spots in highly-regarded journals drives scientists to do some of their best work and the best journals certainly publish plenty of outstanding research. But the excessive rewards for publishing in top journals are incentives to corner-cutting, as stories streamlined by the omission of inconvenient data are more likely to be taken up. And the job of the reviewer also becomes distorted: it is more often now to decide, not whether a manuscript is any good, but whether it is good enough for the journal considering publication. For top journals that can depend as much on topicality or newsworthiness as scientific quality.

These problems are well known, but the tragedy for science is that too few people are willing to break away from the present system. However, as the eminent biologist Ron Vale argued recently – fittingly, in a preprint – preprints may be a way out of the impasse because they don't entail a major shift away from the

norm. That may seem an odd claim in view of the fact that preprint archives have been in existence for twenty years, yet preprints have not been adopted universally. This slow uptake is not only a reflection of the inherent conservatism of scientists, but also a result of the widespread misconception that journals won't accept manuscripts which have been posted online as preprints. There is also a fear that publication of papers without peer review risks opening the floodgates to 'junk science' – something which, so far at least, has yet to occur. Preprints may not be peer reviewed, but authors know full well that preprints are immediately opened up for critique and discussion by a worldwide community of reviewers.

Tanya Elks, a psychology professor, recalls: 'My paper was a critique of a published paper – a scenario which isn't well handled by the conventional journals. Under their system of anonymous peer reviewing, either the authors of the original paper are chosen as reviewers and there is a risk that the unscrupulous ones might block a critical paper; or they're not chosen and may justifiably complain about misrepresentation. As we posted a preprint, the original authors had their say and we could take their points on board. All the commentary is out in the open so readers can evaluate the quality of the arguments. The possibility of rejection by journals is less of an issue too, given that we'll still have the preprint and comments out in the public domain, so our work won't be wasted.'

Preprint archives enable, on a global scale, the informal scientific discussions once confined to correspondence between individuals. They could also become an effective outlet for negative results – a vital aspect of the scientific process often overlooked by the journals' excessive preoccupation with new discoveries. Furthermore, presence on preprint archives significantly increases the number of times papers are read and cited by others; a potent demonstration of the efficacy of dissemination through preprint. By harnessing the web's culture of openness and accessibility and recalling the collaborative, amateur ethos still at large within the scientific community, preprints should help to refocus attention where it matters – on the work itself, not where it is published.

- 31 In the first paragraph, the writer expresses doubt regarding the part that peer review plays in
- A provoking changes in the process of scientific publishing.
 - B affecting deadlines for publishing scientific papers.
 - C ensuring the quality of scientific research.
 - D reassuring the public about new research.
- 32 What does the writer feel that many scientists need to be reminded of?
- A the absence of peer reviewing with preprints
 - B the original aim of publishing scientific findings
 - C the ulterior motives which lie behind reviewers' comments
 - D the prestige which can be gained by being published in a journal
- 33 What does the writer accuse scientific journals of doing?
- A encouraging scientists to compete against each other
 - B trying to reduce costs in order to maintain their position in the market
 - C relying too heavily on reviewers to decide whether to publish an article
 - D choosing articles for their appeal rather than their scientific value
- 34 What does the writer admit may be an 'odd claim' in line 45?
- A the idea that it was fitting for biologist Ron Vale to argue his case in a preprint
 - B the assertion that adopting preprints does not require a radical change of behaviour
 - C the notion that too few scientists are pushing for a rethink of the peer review
 - D the suggestion that preprints will be readily accepted by the scientific community
- 35 What point does Tanya Elks make about her experience of posting a preprint?
- A Her work is less likely to be rejected now since others have made positive comments about it in public.
 - B She appreciated the fact that she could see what fellow scientists thought of her paper.
 - C It was unfair to use the authors of the research she was evaluating to review her paper.
 - D She chose a preprint because she feared her paper would not otherwise be published.
- 36 The phrase 'collaborative, amateur ethos' in the final paragraph refers back to the earlier phrase
- A 'correspondence between individuals' (lines 75–76).
 - B 'effective outlet for negative results' (line 77).
 - C 'preoccupation with new discoveries' (line 79).
 - D 'efficacy of dissemination' (lines 82–83).

Part 6

You are going to read four commentaries on the subject of living in London. For questions 37–40, choose from the commentaries **A–D**. The commentaries may be chosen more than once. Mark your answers **on the separate answer sheet**.

London

A Bridget Atkins

London is a cruel city. A quick walk from the steel and glass money temples of the financial district to one of the rundown estates fifteen minutes away shows you most of what you need to know about its harshness and problems. Depressing as that walk may be, I'd still recommend it more than struggling through the public transport network. It isn't just that the trains are overcrowded, overheated and unreliable – it's that you have to pay such an insulting amount for the privilege of travelling in such misery. Talking of contempt, I haven't even got on to landlords, rent, and the fact that a shoebox in London will cost you more than a palace outside London. That's not to say it's all bad though. I do rejoice in the internationalism of my city, the way I learn so much about different cultures and cuisines just by attending a local street party.

B Tim Christie

London is an endlessly inventive city. We've happily embraced using both the London Underground and Overground, cycling and walking, finding one-bed flats further away from the centre. Until now the trend has been to move further out to find a place to live, but it doesn't need to be like that. Some of the most interesting work going on in London now is around the politics of scarcity. We need to release spare space, as well as investigate new models for flexible living and co-housing. People talk about disparities between the haves and the have-nots, but I'd say there's no other place in the world where it's better to be an entrepreneur. You don't have to be born with a silver spoon in your mouth to make it here, and that's what I see – people who are in the process of making it or who already have – just in different places on a kaleidoscopic spectrum.

C Anna Fry

Aside from the fact that most people can no longer afford to live here, there also seems to be a sad conformity among those that do. The big beard, tight-trouser, hipster phenomenon, for instance, is essentially tribal and conservative. I do love the eclectic transport system though. You can make your way across the city by a multitude of transport modes; the whole city is pretty much anti car. Even if you're happy paying the congestion charge, you've still got to drive around in circles looking for a place to park. Get it wrong and there'll be one of London's finest parking attendants there to remind you with the much despised penalty charge notice. But I'm all in favour of that. We all have to breathe the air no matter if we're rich or poor, and that's what I love about the whole system. It's a great equaliser. Take it or leave it.

D Jon Bennett

I don't get the fascination with London's decrepit housing stock. It's overpriced and falling to pieces. All this talk of old-world charm, character and conservation areas, for what is essentially a totally dysfunctional stock of properties not fit for modern-day living. Unless you're a multi-millionaire that is, with money to burn on heating, only for it to go straight out the hundred-year-old windows. Because that's who's drawn here, unless we're talking about the run-down, gritty areas that attract outsiders from all walks of life. If it weren't for them, this would be a dull place to live. I love the way they colonise an area with pop-ups, cafés and art spaces, until they're priced out. The system seems to favour those living off their inheritance. Why else would you need to pay such a ridiculous sum just to get from A to B on a late-running, museum-piece transport system?

Which commentator

expresses a different view from the other three commentators regarding the housing situation in London?

37

shares C's opinion on London's public transport system?

38

has a different view from A on the multi-cultural nature of London's population?

39

shares A's opinion on the inequality of wealth prevalent in London?

40

Part 7

You are going to read a magazine article about the ecological importance of the semi-aquatic animal, the beaver. Six paragraphs have been removed from the article. Choose from the paragraphs **A–G** the one which fits each gap (41–46). There is one extra paragraph which you do not need to use.

Mark your answers on the separate answer sheet.

Beavers

Beavers play an important role in keeping Rhode Island's waters clean

There are an estimated 30 million beavers across North America. As a keystone species, beavers enrich ecosystems around them. By building dams, they control water moving through their habitat, retaining the flow during times of drought and slowing it down during heavy rain and floods. This also creates beaver ponds – areas several meters deep they use for sleeping and eating. However, a study by the American Society of Agronomy says beavers are doing something more: they are now helping to remove nitrogen that has moved its way through soil into ground water and lakes and streams.

41

In time these plants die and decompose, consuming the oxygen from the waters, creating low oxygen levels that kill fish. While these dead zones are common in the Gulf of Mexico, they are also becoming a problem along northeastern U.S. coastlines. However, according to the study findings of Professor Arthur Gold and colleagues of the University of Rhode Island, this problem is less common where there are beavers.

42

Thanks to a naturally occurring bacterium present in the soil of beaver ponds, 5% to 45% of nitrogen in the water can be removed, depending on the pond and the amount of nitrogen present, the study found. This bacterium is able to transform nitrogen in the water into nitrogen gas.

43

This transformative power was tested by taking samples from the beds of beaver ponds, and adding nitrogen to them. These samples were large enough to incorporate the factors that generate

the chemical and biological processes that take place in the pond.

44

The experiments also found that 12% of the nitrogen gases created in the samples were nitrous oxide, a very potent greenhouse gas and air pollutant. To put this into perspective, considered over a 100-year period, nitrous oxide is calculated to have between 265 and 310 times more impact than carbon dioxide does. However, the scientists pointed out that the high amount was likely to be a result of some unique laboratory conditions and that it is unlikely these ponds would release that much of the gas in nature.

45

Most of these semi-aquatic animals are in areas with small streams, rather than big rivers, and the beaver dams in these smaller streams are usually the first to be removed. They are considered a nuisance because they block the waterways. This causes a decrease in beaver populations. It is therefore important that these areas remain untouched so they can positively affect nitrogen levels downstream. Professor Gold now hopes to study the ponds over a longer period and to investigate abandoned ponds to see if the nitrogen-retaining qualities remain after the beavers have gone.

46

In addition, these areas of water also attract other wildlife such as insects and birds which are vital to the ecosystem. Studies like the one carried out by Professor Gold may well give people a new-found appreciation for the beaver.

- A** These results have interesting implications. According to Julia Lazar, who was involved in conducting some of the work as part of her doctoral dissertation and is now working as an environmental consultant, it might change our attitude to beavers and their ponds.
- B** At the same time, the specimens were also sufficiently small to be easily replicated, managed and measured for numerous changes. The scientists then added a special type of nitrogen to the soil that allowed them to tell if the nitrogen levels were altered and how.
- C** 'Streamside wetlands are one example of such elements,' said Professor Gold, who studies these types of features in his research. But nobody had ever documented the role beaver ponds might play.
- D** Found in agricultural fertilizers, nitrogen is often introduced to such areas by runoff, eventually travelling to estuaries where rivers meet the sea. Once in the water system, it has been known to cause what is known as eutrophication. This is where a sudden increase in nutrients can cause blooms of algae to grow.
- E** This process is known as de-nitrification and means the nitrogen is no longer stored within the stream or pond, and thus can no longer degrade water quality further downstream. However, some of the nitrogen is not changed to gas, but instead is stored in organic soils.
- F** They are a species whose numbers crashed after widespread hunting 150 years ago, but with their return they are helping solve one of the major problems of the 21st century and that should not be underestimated. It is important to remember that those ponds would not be there without the beavers.
- G** When the team set out to conduct their research, they quickly realized the water retention time and organic matter build-up within beavers' ponds lead to the creation of ideal conditions for eliminating nitrogen. They then wanted to see how effectively this was done.

Part 8

You are going to read an article in which a squash player writes about the fact that his sport is not included in the Olympic Games. For questions 47–56, choose from the sections (A–D). The sections may be chosen more than once.
Mark your answers **on the separate answer sheet**.

In which section does the writer

say that he's finding it difficult not to express his emotions?

47

express ignorance of certain sports?

48

outline the reasons behind particular decisions?

49

express admiration for some of his colleagues?

50

admit that it had seemed unlikely that his sport would be chosen?

51

acknowledge that he may be repeating a familiar argument?

52

show determination not to be put off his sport by the decision about the Olympics?

53

appear to be asking for advice from the reader?

54

express a fear that people are making fun of his sport?

55

suggest that squash players have had enough of trying to persuade the Olympic committee?

56

The Olympic Games and the sport of squash

Squash player Stuart Lee outlines his reaction to the decision not to include squash in the Olympic Games

- A** How should I and my fellow squash players react as our sport once again fails to earn a place at the next Olympic Games? With the increasing numbers of international competitions and the recent successful integration of women's and men's tours, one might be forgiven for thinking that the sport has arrived. Except, in Olympic terms, it hasn't. In fact, it's all over the place. For the umpteenth time, squash tried to sell itself and lost. We have pleaded for years and hoped to appeal to a very powerful governing committee responsible for the world's greatest sporting event, and were rejected again. Stop me if you've heard all this before, but over the years, we've dared to think (many times) that we were close to securing Olympic inclusion. Following our latest attempt, five sports were recommended as better options for the next Olympic Games.
- B** It was always going to be touch-and-go, as the host nation this time around has not traditionally been strong on squash. There was little surprise over the inclusion of baseball and softball – they'll fill arenas and put money in the bank. Surfing is also a fair choice: it's a tough sport, enjoyed by millions of people across the world. But then came sport climbing, and skateboarding. Judging by the reactions I've seen and heard, many people were unaware that such things even existed as sports. Climbing, yes, but what's 'sport climbing'? Do these sports have governing bodies and world titles? Are they televised? Are there rules? Do they have infrastructures and do millions of people do them? I'm not trying to be clever, just asking the questions. Any sport that encourages activity and participation is a great thing, I'm not here to denigrate anything that provides this outlet. I don't know enough about them to say what appeal they would give to the Olympics. Clearly more than squash.
- C** The official line from both the Professional Squash Association and the World Squash Federation has been extremely gracious, as always. Players have been told not to react negatively, criticise those in charge or lambast other sports, but we're struggling to stop ourselves at this stage. There's some feeling now that it's going to be very hard to keep responding peaceably, merely saying 'Oh well, maybe next time'. Everyone who asks us questions about the Olympics asks with disdain why other sports are selected before squash, and it now seems that disdain has turned to amusement. It was bad enough to play second fiddle to golf and rugby sevens, but at least people who asked for our reaction to those decisions understood that they are established and recognised entities. It has been back-breaking work for squash associations to lobby for inclusion year after year. We've produced swanky and expensive promotional videos with money we didn't have and we have enlisted every celebrity we could get our hands on to hold posters up saying things such as: 'Squash for the Olympics – I'm in – are you?'
- D** Nobody is quite sure why the sport has suffered these repeated failures. The Olympics is the biggest sporting event in the world. Of course we want to be there, we dearly want to be there but, with respect, all we ever do is try to justify ourselves. Our top players, who are by anyone's standards some of the greatest athletes alive, shouldn't need to do this. This is our sport, it is what it is, and it's getting better all the time. Take it or leave it. We want the Olympics and we hope the Olympics want us. When I heard the news of this latest rejection, I was in the US, playing in an international tournament, and all the players were comforted by the fact that the event had the crowds in raptures every night. It's a fine thing to play in front of such warm and enthusiastic people. The spectators may or may not have heard the news that was on all the players' minds, but squash goes on, Olympics or not.