

Academic Reading Paper 39

Tulips, Distances and Novelty

Time allowed: 1 hour

INSTRUCTIONS TO CANDIDATES

- Do not open this booklet until you are told to do so.
- Write your name and the date at the top of the answer sheet.
- Answer **all** the questions.
- Write your answers **on the answer sheet**, not in this booklet.
- You must transfer your answers within the hour. **No extra time is given for transferring answers in the Reading test.**
- Do not remove this booklet from the examination room.

INFORMATION FOR CANDIDATES

- There are 40 questions in this paper.
- Each question carries one mark.
- There are three passages, with 13, 13 and 14 questions.

These passages were written for this library. They are **not** reproduced from any published past paper. The format, timing and task types follow the published specification for the Academic Reading test so that sitting this on paper feels like the real thing.

You should spend about 20 minutes on Questions 1–13, which are based on Reading Passage 1 below.

The story that came from one pamphlet

Almost everybody has heard that in the 1630s the Dutch went collectively mad about tulips, that fortunes were staked on single bulbs, that maidservants and chimney sweeps traded them in taverns, and that when the price collapsed the country was ruined and men threw themselves into the canals. It is the standard illustration of a speculative bubble, it appears in economics textbooks, and it is reached for whenever a modern market does something foolish. Most of it is not supported by the records, and the reason it is repeated is worth following, because it is a lesson about sources rather than about markets.

The version everybody knows comes from a book published in 1841 by a Scottish journalist, and his sources were a set of pamphlets printed in 1637 by people who disapproved of the trade. Those pamphlets were satires. They were written to mock the merchants involved, they take the form of invented dialogues between characters with comic names, and their figures were chosen for effect rather than recorded from any transaction. A moralising pamphlet is evidence about what its author wanted readers to think, and it was read for two centuries as if it were a report of what had occurred.

The archives say something narrower and more interesting. Notarial records, which register contracts and disputes and were kept for entirely unrelated reasons, show that the trade involved a few hundred people rather than a nation, and that they were mostly wealthy merchants and skilled artisans who already knew one another through business, family and church. There is no evidence of servants speculating. Almost nobody was ruined, because almost nobody had paid: the contracts were promises to pay later, and when the price fell most of them were simply not honoured. No suicides connected to the episode have been found in the records at all, and the records of a Dutch city in that period are unusually complete.

What did happen is peculiar enough without the embellishment, and it turns on a fact about the plant. A tulip bulb can only be lifted and moved in summer, when the plant is dormant. Trading, however, went on through the winter, which means that what changed hands between autumn and spring was not a bulb but a contract for one: a promise to deliver a named variety, from a bulb still in the ground, which neither party could see, inspect or verify, and which might turn out on lifting to be a different variety altogether.

There is a second peculiarity and it explains the prices. The varieties that fetched the extraordinary sums were the ones with flamed and feathered patterns on the petals, and those patterns were not a property of the variety at all. They were produced by a virus, carried between plants by aphids, which disrupts the laying down of pigment. The virus also weakens the bulb, so the most valuable plants were the sickest and the slowest to multiply, and the pattern could not be reliably reproduced from seed at all. The rarest and most desirable object in the market was therefore one that could not be manufactured to order by anybody.

Prices rose through the winter of 1636 and into the new year, and collapsed in the first week of February 1637, apparently at an auction in Haarlem at which no bids were made. What followed was not ruin but a long argument about paper. The buyers refused to pay for goods they had contracted at prices that no longer existed. The sellers had bulbs in the ground and no purchasers. The courts declined to enforce the contracts, treating them as gambling debts rather than sales, and the disputes were eventually settled, city by city, at a small percentage of the agreed price.

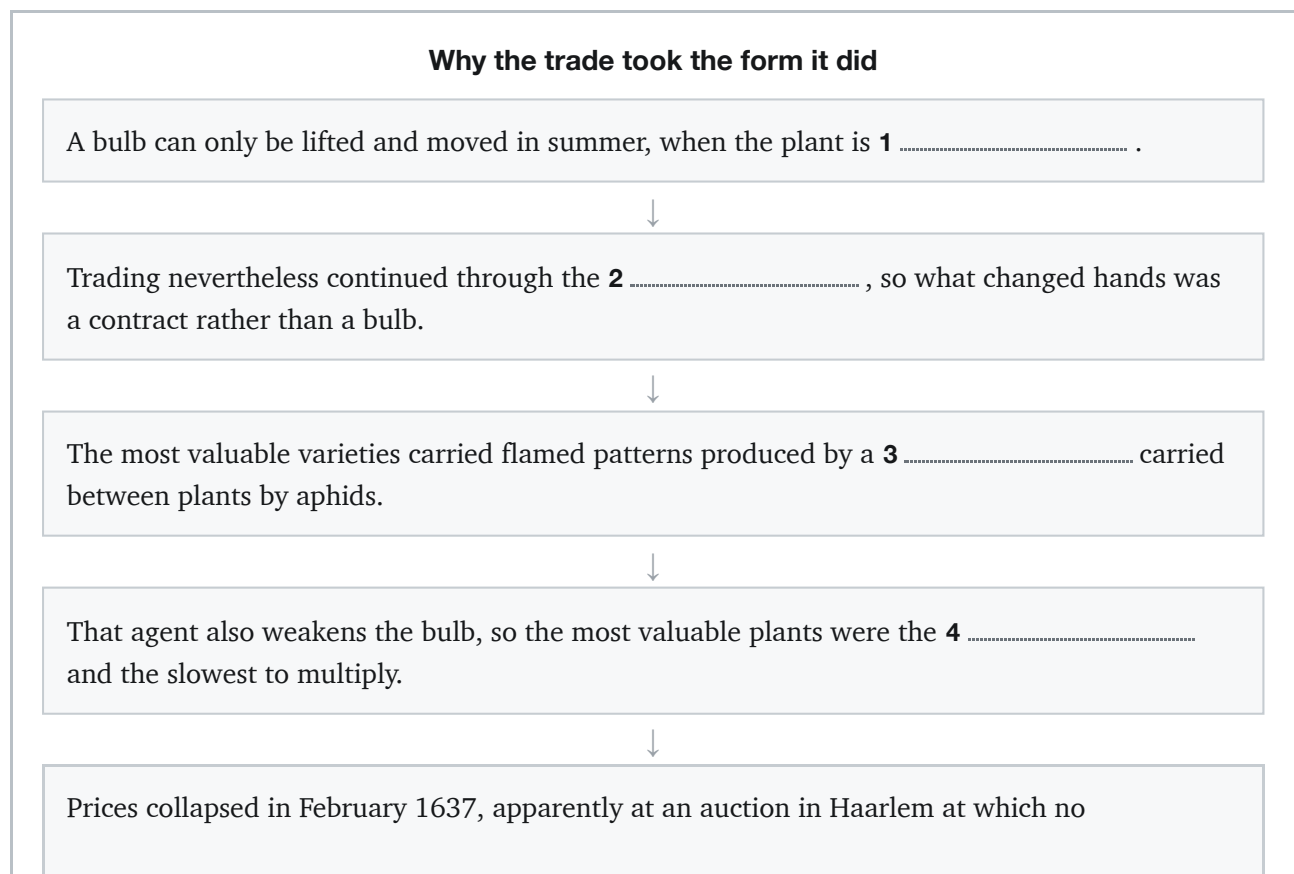
None of this means the episode was invented. Prices did rise to absurd levels, they did collapse, and a number of people lost money and a larger number lost trust in one another, which in a trading city is not trivial. What the archives correct is the scale and the consequences: a narrow speculation among people who could afford it, settled in the courts, with no measurable effect on the Dutch economy, which went on being the most successful in Europe for another fifty years.

The persistence of the other version is the part worth noticing. It survives because it is a good story, because it teaches a lesson people want taught, and because each retelling cites the previous one rather than the records. It has been corrected in the scholarly literature repeatedly since the 1980s, and it continues to appear, which suggests that a story with a moral in it is considerably harder to displace than a story with only facts in it.

Questions 1–5

Complete the flow-chart below.

Choose **NO MORE THAN TWO WORDS AND/OR A NUMBER** from the passage for each answer.



5 were made.

Questions 6–9

Do the following statements agree with the information given in Reading Passage 1?

Write **TRUE** if the statement agrees with the information, **FALSE** if the statement contradicts the information, or **NOT GIVEN** if there is no information on this.

- 6 The 1637 pamphlets were written by people opposed to the trade.
- 7 The writer says the episode has been exaggerated but did not occur.
- 8 The Scottish journalist knew that his sources were satirical.
- 9 The courts enforced the tulip contracts as ordinary sales.

Questions 10–13

Complete the sentences below.

Choose **NO MORE THAN TWO WORDS AND/OR A NUMBER** from the passage for each answer.

- 10 The version most people know comes from a book published in
- 11 The trade involved a few people rather than a nation.
- 12 Disputes were finally settled at a small of the agreed price.
- 13 The Dutch economy remained the most successful in Europe for another years.

You should spend about 20 minutes on Questions 14–26, which are based on Reading Passage 2 below.

The ruler came first

- A** Everything that is known about the size and age of the universe rests on being able to say how far away something is, and that is the hard part. A faint point of light in a telescope may be a dim object nearby or a brilliant one far off, and nothing about the point itself distinguishes the two. Angles can be measured to great precision and tell you nothing about depth. What is needed is a class of object whose true brightness can be established independently, so that its apparent brightness gives its distance. Such an object is called a standard candle, and the first useful one was found by somebody who was not permitted to choose what she worked on, or to follow it up.
- B** Henrietta Leavitt was employed at Harvard as one of a number of women hired to measure and catalogue photographic plates, at about thirty cents an hour, on tasks assigned to her. Examining plates of the Magellanic Clouds she studied a class of star that brightens and dims on a regular cycle of days or weeks, and noticed that the ones that took longer to complete a cycle were consistently brighter. She had measured well over a thousand of these stars before the pattern was clear enough to state. Because all the stars in that cloud are at roughly the same distance from us, their apparent brightnesses could be compared directly, and the relationship she published in 1912 was therefore not between period and appearance but between the period of a star and its true brightness.
- C** That is the ruler. Find such a star anywhere at all, time its cycle with a clock, and its true brightness follows; compare that with how bright it appears from here and the distance follows from simple geometry. Leavitt did not use it herself, because measuring distances was not what she had been employed to do, and the division of the work between those who measured and those who interpreted was strict. The relation had to be calibrated by others against nearby examples whose distances were known by other means, before it could give absolute distances rather than relative ones, and it remains the bottom rung of the distance scale to this day, with every longer measurement calibrated against it.
- D** Meanwhile Vesto Slipher was measuring something different at Flagstaff in Arizona. Taking spectra of the faint spiral patches then called nebulae, he found that the lines in them were displaced towards the red end, and that the displacement implied they were moving away from us at hundreds of kilometres a second. By 1917 he had measured over twenty of them, at the limit of what his instrument could do, and nearly all were receding. Nobody knew what the objects were, or how far away, so nobody could say what the result meant. A velocity without a distance is a number without a picture.
- E** Edwin Hubble settled what they were in 1923, by finding one of Leavitt's stars in the Andromeda nebula and applying her relation. The distance it gave was far beyond any plausible edge of our own galaxy, by a factor that left no room for argument. The spirals were not clouds within the

Milky Way; they were other galaxies, and the universe was suddenly very much larger than anybody had supposed it to be the year before. In 1929 he combined his own distances with Slipher's velocities and reported the relation that carries his name: the further away a galaxy is, the faster it recedes, in direct proportion to the distance.

- F** The result had already been published. Georges Lemaître, a Belgian priest and physicist, had derived an expanding universe from general relativity in 1927 and had used the same velocity data, together with the distances then available, to estimate the rate of expansion. His paper appeared in a Belgian journal with a small readership, in French, and was little noticed outside a handful of people who were already corresponding with him. When it was translated into English in 1931, the paragraphs containing the estimate were missing.
- G** That omission was for many years presented as an act of suppression, and it is not. Lemaître's own correspondence with the journal that published the translation was found and examined, and he had removed the passage himself, on the ground that Hubble's measurements were by then better than his own and there was no purpose in reprinting a superseded number. The episode is a useful reminder that an anomaly in a historical record is more often explained by something ordinary than by a conspiracy, and that the way to find out is to look for the letters rather than to reason about motives.

Questions 14–20

Reading Passage 2 has seven sections, A–G.

Choose the correct heading for each section from the list of headings below.

Write the correct number, I–X.

List of Headings

- i Why a point of light gives no distance
- ii Why a point of light gives a distance
- iii A pattern found by somebody assigned to measure
- iv A pattern found by somebody assigned to interpret
- v How the ruler is used, and who did not use it
- vi Speeds without any distances to attach them to
- vii What the faint spirals turned out to be
- viii A result published earlier and little read
- ix An omission explained by something ordinary
- x An omission never satisfactorily explained

14 Section A

15 Section B

- 16** Section C
17 Section D
18 Section E
19 Section F
20 Section G

Questions 21–24

Look at the following contributions and the list of people below.
Match each contribution with the correct person, A–D.

List of People	
A	Henrietta Leavitt
B	Vesto Slipher
C	Edwin Hubble
D	Georges Lemaître

- 21** He established what the faint spiral patches actually were.
22 She found a relation between how long a cycle takes and how bright the star truly is.
23 He derived an expanding universe from theory before the relation was measured.
24 He measured displacements towards the red end of the spectrum.

Questions 25–26

Choose the correct letter, A, B, C or D.

- 25** Why could the stars in the Magellanic Clouds be compared directly?
- A They were all the same size.
 - B They are all at roughly the same distance from us.
 - C They had all been measured by the same observer.
 - D They complete their cycles at the same rate.
- 26** What does the passage say about the missing paragraphs in the 1931 translation?
- A They were removed by the journal's editors.
 - B Lemaître removed them himself, because better measurements existed.
 - C They were lost in the translation process.
 - D No explanation has ever been found.

You should spend about 20 minutes on Questions 27–40, which are based on Reading Passage 3 below.

Against originality

Originality is the criterion nobody argues with. A doctorate must make an original contribution to knowledge. A grant application must explain what is novel. A job candidate must have done something that has not been done. The demand is so universal that it is rarely examined at all, and when it is examined it turns out to be doing a great deal of damage in exactly the places it was put there to protect.

The first difficulty is that originality is easy to produce and hard to produce usefully. Any question that nobody has asked can be asked, and the reason most of them have not been asked is that the answer would not be worth having. A researcher required to demonstrate novelty, and judged on that before anything else, has a reliable route available: find a combination of variables nobody has tried, run it, and report it. The result is new, it satisfies the criterion, and it is unconnected to anything, so that it will be cited by nobody and built on by no one.

The second difficulty is that the criterion actively forbids the most valuable thing a field can do, which is to check itself. A replication is by definition not original. It cannot be published in the journals that matter, it will not win a grant, and it does nothing for the career of the person who performs it. The consequence has been visible for the last fifteen years across several disciplines: a literature full of striking single findings, a large proportion of which do not survive being tried again, and which nobody had tried again for years because there was no reward attached to doing so and a certain amount of hostility attached to publishing the result.

What is usually offered against this is the observation that there is nothing new under the sun, that every idea is a recombination of older ones, and that originality is therefore an illusion. This is unhelpful in a different direction. It is true in a trivial sense and false in the sense that matters, since some recombinations transform a field and most do not, and a criterion that cannot distinguish between them has not replaced the one it criticises so much as abandoned the job.

The useful description sits between the two. In most fields the productive unit is not a new idea but a new joint: an existing technique applied to a problem it was not built for, two literatures that had not been introduced, a method from one scale used at another. The people who do this are frequently described as unoriginal by those who assume that novelty must be visible in the components rather than in the arrangement. What they are doing is difficult, and what makes it difficult is knowing both sides well enough to see that they fit, which takes years and looks from outside like having done nothing.

There is a further cost, which falls on students. A person told that their contribution must be original, before they have any sense of what a field contains, will reliably conclude that they must avoid whatever has already been done, which is the opposite of the instruction they need. The reason to know a litera-

ture thoroughly is that this is the only way to see where it is thin. Novelty is what you notice at the end of that process, and requiring it at the beginning produces work that is unprecedented because it is uninformed.

The concession is that genuine novelty exists, that it is the most valuable thing there is, and that no reform should pretend otherwise. Occasionally somebody sees something nobody has seen, and the whole apparatus of research exists to make that possible. The objection here is not to novelty as an outcome of the work. It is to novelty as a gate: a thing that must be demonstrated in advance, in a paragraph, by a person applying for money to do work they have not yet done.

What would follow is not complicated. Fund and publish replication as a category, so that checking somebody else's work is a career rather than a favour done at one's own expense. Ask applicants what question they are answering, and why it matters if the answer turns out either way, rather than what nobody has done before. And when assessing a piece of work, ask whether it changes what the reader should now believe, which is a question a competent reviewer can answer and which happens to be satisfied by a good replication, a good synthesis and a genuinely new result alike, without any of them having to pretend to be one of the others.

Questions 27–31

Do the following statements agree with the claims of the writer in Reading Passage 3?

Write **YES** if the statement agrees with the claims of the writer, **NO** if the statement contradicts the claims of the writer, or **NOT GIVEN** if it is impossible to say what the writer thinks about this.

- 27** The writer thinks genuine novelty is unimportant.
- 28** The writer accepts that unusual combinations of variables can be produced easily.
- 29** Some disciplines require replication more urgently than others.
- 30** The writer believes the claim that all ideas are recombinations settles the matter.
- 31** The writer holds that students should know a literature thoroughly before seeking novelty.

Questions 32–36

Complete the summary below.

Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

What the criterion does

A researcher judged first on novelty can always find an untried combination, and the result will be new and **32** to anything. Worse, the criterion forbids the one thing a field most needs, since a replication is by definition not **33** The writer's own account places the productive unit not in a new idea but in a new **34**, and warns that requiring

novelty at the start of a student's work produces something unprecedented because it is

35 The test he proposes is whether a piece of work changes what the reader should now **36**

Questions 37–40

Choose the correct letter, A, B, C or D.

- 37** Why does the passage say most unasked questions have not been asked?
- A Nobody has had the necessary equipment.
 - B The answer would not be worth having.
 - C They are forbidden by grant committees.
 - D They have in fact all been asked already.
- 38** Which position does the writer reject?
- A That a good synthesis can change what a reader believes.
 - B That originality is an illusion because every idea is a recombination.
 - C That replication should be a fundable category of work.
 - D That some recombinations transform a field and most do not.
- 39** How does the passage describe people who join two literatures together?
- A They are frequently called unoriginal by others.
 - B They avoid reading widely.
 - C They rarely succeed.
 - D They are the only genuinely original researchers.
- 40** Which of the following best expresses the writer's proposal?
- A Fund replication, ask what question is being answered, and judge whether the work changes what should be believed.
 - B Remove novelty from all assessment criteria.
 - C Require every doctorate to be a replication.
 - D Publish only work that has been repeated successfully.