

Academic Reading Paper 28

Dust, Ulcers and Buildings

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.

A normal drought on the wrong soil

The southern Great Plains receive between fifteen and twenty inches of rain a year, and the figure matters less than its variability. Long dry runs are a feature of that climate rather than an interruption of it, and the grassland that covered the region had been shaped by them. Buffalo grass and grama send roots down several feet, hold together as a dense mat, and survive years in which almost nothing falls by going dormant and waiting. Under that mat the soil stayed where it was through every drought the region had ever had, which is a fair description of several thousand years of testing.

Two things removed the mat. The steel plough made it possible to cut sod that had turned earlier ploughs aside, and the price of wheat during and after the First World War made it profitable to do so on a scale nobody had attempted. Tractors did the rest. Between the middle of the 1920s and 1930, something like five million acres of grassland in the southern Plains were broken for the first time, much of it by operators who did not live there and who ploughed, sowed and left. A field belonging to somebody two states away is nobody's responsibility in a dry year.

The technique that was taught made the situation worse in a way that seemed sensible at the time. Farmers were advised to work the surface of a bare field into a fine tilth, on the reasoning that a layer of loose dry particles slows evaporation from the moist soil below. This is true, and in a wet year it is good advice. What it produces is a field covered in powder, with no roots in it, left uncovered through the windy months.

The rains failed in 1931 and did not return properly for eight years. The wheat did not come up, so there was no crop to hold anything, and the wind did what wind does to dry powder on an open plain. There were fourteen dust storms in 1932 and thirty-eight in 1933, and by 1937 the count for a single year had passed a hundred and thirty. In May 1934 a storm carried soil from the Plains as far as Chicago, Washington and ships several hundred miles out in the Atlantic.

The worst single day was 14 April 1935, remembered as Black Sunday, when a front of dust several thousand feet high crossed the Oklahoma panhandle and turned afternoon into darkness in a matter of minutes. People a few yards apart could not see each other. Cattle suffocated. The dust got into houses through closed windows and sealed doors, so that families ate with cloths over their plates and slept with wet sheets hung across the beds. The fine fraction of it got into lungs, producing a form of pneumonia that killed a number of children and elderly people that year.

What happened next is the best-timed piece of advocacy in the history of soil science. Hugh Hammond Bennett, who had been arguing for a decade that American farming was destroying the ground it depended on, was giving evidence to a Senate committee in Washington that same month. Knowing what

was on its way, he talked slowly, spun out his answers, and waited. When the sky outside the window went brown with soil from Oklahoma, he stopped and directed the senators to look at it. The Soil Conservation Service was established within weeks.

The measures that followed were mostly about keeping something on the surface. Ploughing along the contour rather than up and down slopes, leaving stubble and ridges instead of a smooth finish, alternating strips of crop with strips of cover, and rotating away from continuous wheat. The most visible programme planted a belt of trees from the Canadian border to the Texas panhandle as a windbreak, some two hundred and twenty million of them between 1935 and 1942, though the trees mattered less than the ploughing did.

The uncomfortable part is what happened afterwards. The rains returned at the end of the decade, wheat prices rose again during the next war, and much of the ploughing resumed. Dust storms came back in the 1950s and again in the mid-1970s, on a smaller scale each time. What now protects the region through a dry year is not chiefly the conservation practices but irrigation drawn from an aquifer laid down over millions of years, which is being pumped out faster than it refills. The buffer against the next ordinary drought is a finite quantity of water in the ground, and the region has replaced a vulnerability it understood with one that is easier to ignore because it cannot be seen from a road.

Questions 1–5

Complete the notes below.

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

How the soil came to be loose

What was there before

- Buffalo grass and grama send roots down several feet and hold together as a dense
1
- In a long dry run the grass survives by going **2** and waiting.

What removed it

- The steel plough could cut sod that had turned earlier ploughs aside, and the wartime wheat price made it worth doing.
- Between the mid-1920s and 1930, about **3** acres of grassland were broken for the first time.
- Farmers were advised to work a bare field into a fine **4** , to slow evaporation from the moist soil below.
- The advice is sound in a wet year; what it leaves is a field with no **5** in it, uncovered through the windy months.

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 Long dry periods are a normal feature of the region's climate.
- 7 The advice to work the soil into a fine surface was wrong in principle.
- 8 The Soil Conservation Service could require farmers to change their methods.
- 9 The tree-planting programme was the most effective of the measures taken.

Questions 10–13

Complete the sentences below.

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

- 10 There were fourteen dust storms in 1932 and in 1933.
- 11 In May 1934 a storm carried soil as far as ships several hundred miles out in the
.....
- 12 On Black Sunday a front of dust several thousand feet high turned afternoon into darkness in a matter of
- 13 The fine fraction of the dust produced a form of that killed children and elderly people.

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

The organism that was not supposed to be there

- A** Until the middle of the 1980s the cause of peptic ulcers was not in dispute. Ulcers were held to result from excess stomach acid, brought on by stress, diet and temperament, and the treatment followed from the theory: neutralise the acid, or suppress its production, or in severe cases cut the nerve that stimulates it. The drugs that suppressed acid production worked, in the sense that the ulcer healed and the pain stopped. They also had to be taken indefinitely, and they were among the best-selling medicines in the world, because in most patients the ulcer came back when they stopped, and this was understood as the nature of the disease rather than as a clue. A condition that returns whenever treatment stops is behaving like something that was suppressed rather than removed, and that reading was available to anybody who wanted it.
- B** Behind the theory sat a piece of reasoning that everybody accepted and nobody had tested. The stomach holds acid strong enough to strip paint, and it was therefore obvious that no bacterium could live in it. Nobody had put the proposition that way and gone looking, because it did not present itself as a proposition at all; it presented itself as a fact about acid. This was not a fringe belief; it was in the textbooks, and it meant that a bacterium seen in a specimen of stomach lining was by definition a contaminant that had arrived after the tissue was removed. The observation could not count as evidence, because the theory had already classified it as an error.
- C** Robin Warren, a pathologist in Perth, began noticing curved bacteria in gastric biopsies in 1979. What made him persist rather than dismiss them was that they were not scattered where a contaminant would be: they sat close against the surface of the lining rather than distributed through the sample, they appeared in about half the specimens he examined, and wherever they appeared the tissue underneath was inflamed while tissue without them was not. Told repeatedly that he was looking at contamination, he went on photographing and recording for two years, because contamination does not select for inflamed tissue and does not arrange itself against a surface.
- D** Barry Marshall, then a young physician looking for a research project, took the question up in 1981, and the two of them examined a hundred patients. The organism was present in almost every one of the patients who had a duodenal ulcer, and in a substantial minority of those who had nothing wrong with them. That is a correlation and they knew it, and the obvious objection was available: a damaged stomach might simply be easier to colonise, which would make the bacterium a passenger rather than a cause. Nothing in a set of biopsies can distinguish those two possibilities, and the pair knew that the argument would have to be won somewhere else.
- E** Growing it proved unexpectedly hard, and the breakthrough was an accident of the calendar. Culture plates in that laboratory were examined after two days and discarded. Over the Easter holiday of 1982 a batch was left for five, and colonies appeared. The organism had been growing all

along and nobody had waited long enough to see it. A technique that failed for months failed for a reason that had nothing to do with the biology of the stomach, and it is worth noticing how close the whole thing came to being abandoned as unculturable.

F The story most people know comes next, and it is the part that has been most distorted. In 1984 Marshall drank a culture of the organism and developed severe gastritis within days, which he documented by having his own stomach biopsied. It is a good story, it is the only part of the episode most people have heard, and it proved something real: the bacterium could infect a previously healthy stomach and cause inflammation there. It did not prove what it is usually said to have proved. He did not develop an ulcer, and a single subject who knows what he has swallowed is not a trial.

G What actually settled the question was slower and duller. Through the late 1980s and early 1990s, randomised trials compared acid suppression alone against acid suppression plus antibiotics, and found that patients whose infection was eradicated stopped relapsing while the others did not. That is the result that changed practice, and by 1994 an American consensus panel recommended antibiotics as standard. Two cautions survive: most people carrying the organism never develop an ulcer, so it is necessary rather than sufficient, and the eradication of an infection carried by a large fraction of the human species has consequences of its own that are still being counted.

Questions 14–18

Reading Passage 2 has seven sections, A–G.

Which section contains the following information?

Write the correct letter, A–G.

NB You may use any letter more than once.

- 14** a reason why an observation could not count as evidence
- 15** an acknowledgement that a famous demonstration is usually overstated
- 16** a clue in the existing treatment that was available to anybody
- 17** a note on how nearly the work was abandoned
- 18** a limitation that still applies to the accepted account

Questions 19–22

Look at the following statements and the list of people below.

Match each statement with the correct person, A or B.

NB You may use any letter more than once.

List of People

- A** Robin Warren
- B** Barry Marshall

- 19** He noticed that the bacteria appeared only where the tissue was inflamed.
- 20** He infected himself and had his own stomach examined.
- 21** He was looking for a research project when he took the question up.
- 22** He was told repeatedly that what he had seen was contamination.

Questions 23–26

Complete the summary using the list of words, **A–H**, below.

List of Words

- A** contaminant
- B** passenger
- C** calendar
- D** holiday
- E** inflammation
- F** sufficient
- G** necessary
- H** textbooks

Why it took so long

Because acid was believed to make the stomach uninhabitable, any bacterium seen in a specimen was classed in advance as a **23** Even once the correlation was established, the organism might have been a **24** rather than a cause, and nothing in a set of biopsies could separate the two. Culturing it finally succeeded because of an accident of the **25** The settled position today is that the infection is **26** rather than sufficient for an ulcer.

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

Why buildings outlive their purposes

A building is usually discussed as though it were one object with one lifetime. It is not. It is a set of systems with wildly different lifetimes bolted together and given a single name, and almost everything that goes wrong with buildings over the long run comes from that fact being ignored at the moment they are designed, when everybody involved is thinking about how the thing will work on the day it opens.

The useful way to see it was set out by Stewart Brand, drawing on work by the architect Frank Duffy. The site is permanent. The structure — foundations and load-bearing frame — lasts from thirty years to several hundred. The skin, the external surface, gets replaced about every twenty as it weathers or as fashion moves. The services, meaning wiring, plumbing, heating and ventilation, wear out or become obsolete in seven to fifteen years. The layout of internal walls changes every few years in a commercial building. The furniture moves weekly. Six layers, each changing at its own rate, in one object.

Trouble arrives when a fast layer is bound to a slow one. Run the ducts through the structural frame and the building cannot be re-serviced without major works, so at the point when the services expire, which is certain and soon, the choice is between an expensive intervention and living with a failing system. Fix the internal walls into the structure and the layout cannot follow the use. The building has not aged badly. It has been prevented from doing the one thing it was always going to need to do.

This explains a pattern that otherwise looks like an insult to architects. The buildings that adapt best over a century are usually the plain, cheap, unloved ones: warehouses, mill buildings, terraced houses, the huts a university put up as a temporary measure and is still using sixty years later. They adapt because nothing in them was optimised. Generous floor-to-ceiling heights left room for services nobody had imagined, unremarkable structural grids happened to suit uses nobody had in mind, and no part of the design was so committed to one purpose that changing it felt like vandalism.

The buildings that age worst are frequently the ones designed most carefully for a stated purpose, and this is not a coincidence but a consequence. The more precisely a structure is fitted to an activity, the more completely it depends on that activity remaining what it was, and activities change faster than buildings. A trading floor built for people shouting at each other, a library built around the physical storage of a card catalogue, a hospital wing built around a particular machine: each was an excellent solution to a problem that stopped existing.

None of which means everything should be a shed. Some purposes genuinely require a building committed to them, and pretending otherwise produces the other failure, which is the flexible space that serves nothing well. A concert hall is a room shaped by acoustics and it cannot also be a swimming pool. An operating theatre has requirements that cannot be met by leaving options open. The right response to a genuinely fixed purpose is to build for it properly and to expect the building to be worth demolishing when the purpose goes, rather than to compromise it in the hope of a second life that will not arrive.

The choice, then, is not between flexible and purpose-built. It is a question that has to be asked layer by layer, and asked out loud: how long do we expect this use to last, and which layers are we prepared to fix to it? A structure meant to stand for a century should not be committed to anything that will change in twenty. Services should be reachable on the assumption that they will be replaced three or four times. And a decision to bind the layout to the frame should be recorded as what it is, which is a decision that this building will be adapted with a demolition contractor.

What makes this hard is that the costs fall in the wrong order. Optimising for the known use is cheaper now, looks more competent now, and produces a better building on the day it opens. The cost arrives twenty years later, will be paid by somebody else, and will be described at the time as the building being old. Very little in the way any of this is commissioned, funded or judged pushes anybody towards the longer question, which is why it usually has to be asked by whoever cares enough to be a nuisance about it, and why the answer is so often given after the concrete has been poured.

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 every building should be built to be adaptable.
- 28 The writer accepts that a purpose-built design produces a better building on its opening day.
- 29 Warehouses are cheaper to convert than terraced houses.
- 30 The writer believes buildings that age badly do so because their architects were careless.
- 31 The writer holds that some buildings are worth demolishing when their purpose ends.

Questions 32–35

Complete each sentence with the correct ending, A–G, below.

Endings

- A the services cannot be replaced without major works.
- B nothing in them was optimised for anything.
- C the activity it was fitted to stopped existing.
- D it will be paid by somebody else and blamed on the building's age.
- E the architects who designed them were unusually skilled.
- F they were built to a standard structural grid agreed in advance.
- G flexible space serves every purpose equally well.

- 32 If ducts are run through the structural frame,

- 33 Plain and unloved buildings adapt well because
- 34 A trading floor built for people shouting at each other became useless when
- 35 The cost of optimising for the known use is hard to weigh because

Questions 36–40

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

- 36 According to the passage, how often are a building's services likely to need replacing?
- A Every three to thirty years.
 - B Every seven to fifteen years.
 - C Every twenty years.
 - D Every thirty to three hundred years.
- 37 Which position does the writer reject?
- A That a concert hall should be committed to its purpose.
 - B That the layers of a building change at different rates.
 - C That leaving all options open is a safe general policy.
 - D That the cost of a design decision may fall on later occupants.
- 38 What does the writer say about generous floor-to-ceiling heights in old buildings?
- A They were designed in anticipation of future services.
 - B They left room for services nobody had imagined.
 - C They made the buildings expensive to heat.
 - D They were required by the regulations of the time.
- 39 How does the passage describe binding the internal layout to the structural frame?
- A As the cheapest way to build.
 - B As a decision that the building will be adapted with a demolition contractor.
 - C As standard practice in commercial buildings.
 - D As a way of extending the life of the structure.
- 40 Which of the following best expresses the writer's recommendation?
- A Ask, layer by layer, how long the use is expected to last and what may be fixed to it.
 - B Build everything as a flexible shed.
 - C Design each building precisely around its stated purpose.
 - D Replace services more often than they wear out.