

Academic Reading Paper 42

Canals, Bees and Defaults

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 canal that needed no locks

The idea of joining the Mediterranean to the Red Sea is very old. A channel running from the Nile eastwards to the Bitter Lakes existed in antiquity, was reopened more than once by rulers who found it silted, and was finally abandoned. What none of those works attempted was a direct cut through the isthmus itself, and by the eighteenth century the question was no longer whether anybody wanted such a canal but whether the ground and the water would permit one.

Napoleon's expedition to Egypt tried to settle it. The survey was led by Jacques-Marie Le Père, who worked across desert with the instruments of 1799, in short seasons, under conditions that made every measurement expensive. His conclusion was that the Red Sea stood about ten metres higher than the Mediterranean. If that were true, a direct cut would flood the delta unless it were fitted with locks along its whole length, and the scheme moved at once from difficult to forbidding. The figure was wrong. It went unchallenged for nearly fifty years, and every proposal drawn up in that period was drawn up around locks that were never needed.

A fresh survey in 1847, carried out by an international group that included the engineer Linant de Bellefonds, found that the two seas stand at effectively the same level. The correction did more than adjust a number. It removed the locks from every design, and in doing so it changed the character of the project completely: what had looked like an engineering problem of the first rank became a problem of moving an extremely large quantity of sand and rock from one place to another.

The man who took it on was not an engineer. Ferdinand de Lesseps was a French diplomat who had served in Egypt and who obtained a concession from Said Pasha in 1854 on terms that were generous to him and poor for Egypt. Excavation began in 1859 on a line of about one hundred and sixty-four kilometres between Port Said in the north and Suez in the south, across ground that included two shallow lakes and a good deal of nothing. No mountain range lay in the way and no river had to be crossed; the difficulty was quantity rather than obstacle.

The first years of digging were done by hand. Egyptian peasants were conscripted under the *corvée*, a long-standing obligation of unpaid labour, and worked in rotations of a month at a time, cutting the channel with mattocks and carrying the spoil away in baskets. The number who passed through the works over those years is usually put well above a million. In 1864 the *corvée* was ended under diplomatic pressure, and the company, deprived of the labour its estimates had assumed, was forced to buy dredgers and mechanical excavators instead. The machines then removed roughly three-quarters of the total volume in a fraction of the time the hand-digging had taken, which is why the canal was finished at all.

It opened in November 1869, having cost about twice what had been estimated. The debt fell mainly on Egypt, whose government had been persuaded to take a large stake and to pay for works the company should have funded, and in 1875 that government sold its shares to Britain in order to meet its creditors. Britain had opposed the canal for fifteen years, on the grounds that a French-controlled waterway to India was a strategic threat, and became its largest shareholder without having dug any of it.

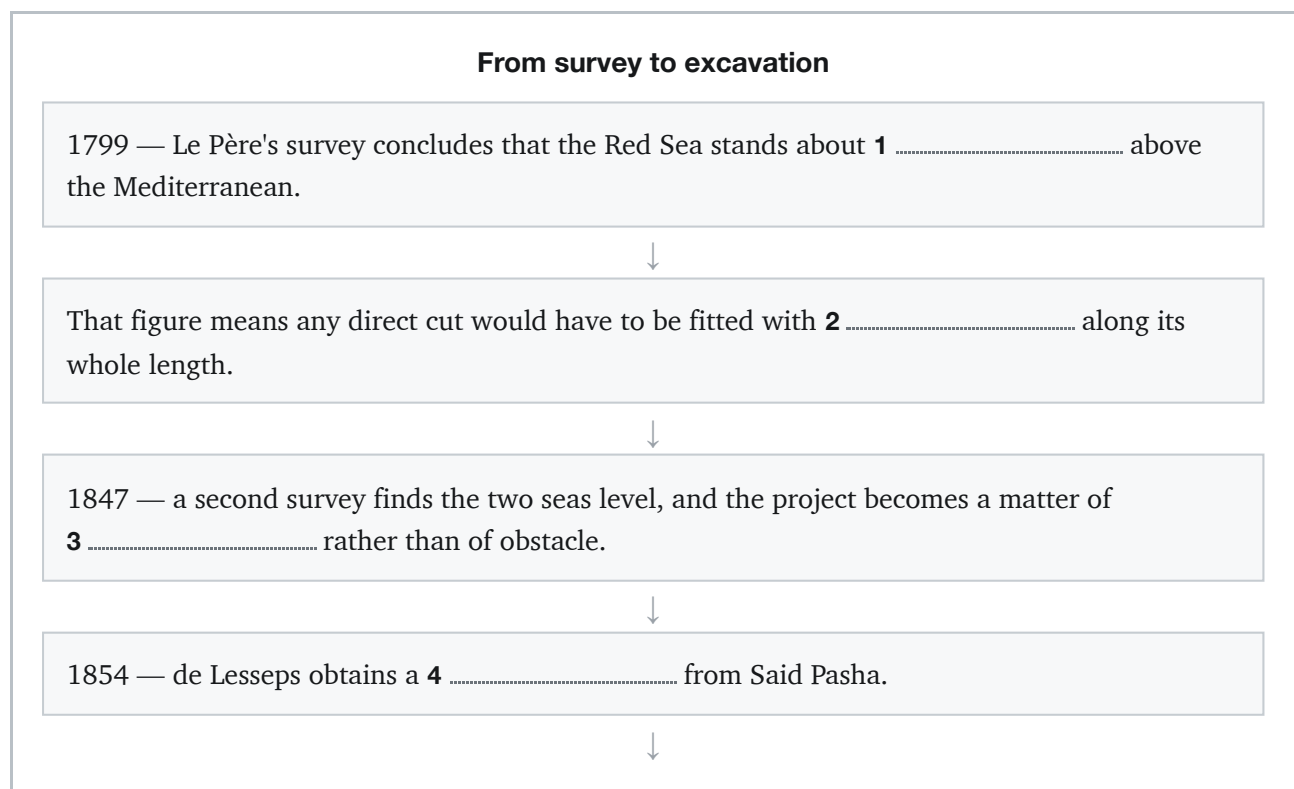
The physical fact that made the canal cheap to build is also the reason it matters beyond shipping. Because there are no locks, the Mediterranean and the Red Sea are joined by an unbroken body of water at the same level. For several decades this mattered less than it might have, because the Bitter Lakes lay across the route and were so much saltier than either sea that almost nothing could cross them alive. As water moved through year after year, the salinity of the lakes fell towards that of the sea, and the barrier stopped working.

What followed is among the largest movements of marine life ever caused by people. Several hundred species have travelled from the Red Sea into the Mediterranean and established themselves there, while traffic in the other direction has been slight, a one-sidedness usually attributed to the difference in water pressure and to the far larger pool of species available on the Red Sea side. The widening of the canal in 2015 increased the flow and the rate of arrivals with it. Whether this is a loss is not a simple question: several eastern Mediterranean fisheries now depend on species that were not there sixty years ago, and several native species have retreated from waters they used to occupy.

Questions 1–5

Complete the flow-chart below.

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



1864 — the corvée ends and the company has to buy **5** and mechanical excavators.

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** Le Père worked with the instruments available in his own day.
- 7** Machines removed a smaller share of the total volume than hand labour did.
- 8** The number of workers who died during the excavation is disputed.
- 9** Britain helped to finance the canal from the outset.

Questions 10–13

Complete the notes below.

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

After the opening

Money

- Opened November 1869.
- Final cost was about **10** the estimate.
- In 1875 the Egyptian government sold its **11** to Britain to pay its creditors.

Marine life

- For decades the **12** acted as a barrier, being far saltier than either sea.
- Movement the other way has been slight, partly because of the difference in water **13**

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

What the dance says

- A** A honeybee that has found food returns to the hive and, on the vertical face of the comb in the dark, walks a figure of eight. The straight run in the middle is the part that carries the information. Its angle away from vertical is said to correspond to the angle between the sun and the food as seen from the hive, and the length of time the bee spends on that run is said to correspond to the distance. If this is right, the returning forager is describing a place that the bees around her cannot see, in a code, and that is a considerable claim to make about an insect.
- B** The claim belongs to Karl von Frisch, who spent most of a working life establishing it. From the 1920s onwards he marked individual bees with paint so that they could be followed, moved feeding stations to known distances and bearings, watched the dances that followed and recorded where the recruits went. The correspondence he found between the angle of the run and the direction of the feeder, and between its duration and the distance, was consistent across many years of observation, and in 1973 he shared a Nobel Prize for it. By then the account had been in the textbooks for two decades.
- C** From the late 1960s Adrian Wenner and his colleagues attacked the conclusion, and it is worth being clear about what they were attacking. They did not deny that bees dance, or that the dance correlates with the location of the food. They denied that other bees use it. Their alternative was odour: a recruit smells the food on the dancer, leaves the hive, and finds the source by following the scent through the air, which would produce exactly the same correlation without any message being read.
- D** The objection was serious rather than perverse, and the reason is methodological. In every experiment of von Frisch's design, a dance and an odour travelled together, so no result could separate them. Wenner could also point at facts that sat awkwardly with the language account: recruits are often slow to arrive, a large proportion never arrive at all, and bees are known to rely heavily on smell in other parts of their lives. A correlation is compatible with two mechanisms until an experiment is built that they disagree about, and for thirty years no such experiment had been built.
- E** James Gould built one in 1975, using a detail of bee anatomy. A dancing bee in a dark hive orients her run to gravity, but if a light is shining inside she orients to the light instead. Bees have three simple eyes on the top of the head, and a bee whose simple eyes are painted over needs a much brighter light before she will switch. Gould painted the dancers' simple eyes and left the recruits' alone, then lit the hive dimly. The dancers, unable to register the dim light, went on dancing with respect to gravity; the recruits, who could see it, read those same dances with respect to the light. They then flew to a location that no bee had visited and where nothing had been placed, arriving at the spot the mismatch predicted. No odour was available at an empty patch of field.

- F** That settled the question the argument had been about, and it did not settle a second one. The dance carries spatial information that recruits can and do use: this is no longer in dispute. How much difference it makes to a colony is a separate matter and remains open. Experiments that scramble the directional content of dances, by turning the hive on its side or by other means, have found the cost to be small in some environments and large in others, with the difference apparently lying in how patchy and how distant the food is. In a temperate meadow the information may add little to what a bee could find by searching; in a tropical forest, where a flowering tree may be a kilometre off and worth a great deal, it may be decisive.
- G** One caution has been earned the hard way. The habit of calling this a language did real damage to the argument, because the word carries commitments the evidence does not support. The dance is not learned, it cannot be recombined to say something new, it says nothing that is not about a location and a quantity, and the bee cannot be asked a question, nor can she be told anything she did not go and see for herself. Some of the heat in the long dispute came from opponents attacking the word and defenders hearing an attack on the observations, which were never the same target.

Questions 14–18

Reading Passage 2 has seven paragraphs, A–G.

Which paragraph contains the following information?

Write the correct letter, A–G.

NB You may use any letter more than once.

List of Paragraphs

- A** Paragraph A
- B** Paragraph B
- C** Paragraph C
- D** Paragraph D
- E** Paragraph E
- F** Paragraph F
- G** Paragraph G

- 14** a statement of what the behaviour would amount to if the claim were correct
- 15** an acknowledgement that one experimental design could not tell two explanations apart
- 16** an account of how a difference between two groups of insects was produced
- 17** a claim that the value of the behaviour depends on the surroundings
- 18** a comment on the effect that one word had on the dispute

Questions 19–22

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

Match each statement with the correct researcher, A–C.

NB You may use any letter more than once.

List of Researchers
A Karl von Frisch
B Adrian Wenner
C James Gould

19 followed individually marked insects over many years

20 accepted that the behaviour occurs but denied that other insects make use of it

21 exploited a difference in how bright a light has to be before an insect responds to it

22 held that a competing explanation had never been excluded by the experiments

Questions 23–26

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

23 What made the objection difficult to dismiss?

A Bees had been shown not to dance in natural conditions.

B A dance and a smell always arrived together in the experiments.

C Von Frisch had not marked the bees he studied.

D Recruits reached the feeder more quickly than expected.

24 What was the decisive feature of Gould's result?

A The recruits arrived faster than they usually did.

B The recruits went to a place with neither food nor scent.

C The dancers stopped dancing when the light was on.

D The recruits took no notice of the dance at all.

25 According to the passage, which question remains open?

A whether recruits are able to use the dance's directional content

B how much difference the dance makes to a colony in practice

C whether bees can smell food carried on a returning forager

D whether the dance is performed in the dark

- 26** Why does the writer say the word *language* did damage?
- A** It made the behaviour appear less remarkable than it is.
 - B** It implied properties the evidence cannot support, so the two sides ended up attacking different things.
 - C** It was introduced by critics in order to ridicule the claim.
 - D** It delayed recognition of the work by the Nobel committee.

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

The bias towards doing something

A study of several hundred penalty kicks in professional football produced a result that has been quoted ever since. Goalkeepers jump to the left or to the right in roughly nine cases out of ten. The ball, meanwhile, goes towards the centre of the goal about a third of the time, and a keeper who simply stays where he is saves a noticeably higher proportion than one who dives. The optimal strategy is available, it is cheap, it requires no skill that a professional lacks, and almost nobody uses it. Keepers know the numbers. They dive anyway.

The explanation the researchers offered is not about football. A goal conceded after a dive reads as bad luck: the keeper guessed, the guess was wrong, these things happen. A goal conceded while standing still reads as a failure to try. The keeper is being judged on effort as well as on outcome, and the two are not scored the same way, so the strategy that maximises saves is not the strategy that minimises blame. Faced with that gap, people take the one that protects them.

Once the shape is visible it turns up wherever a decision is watched. The asymmetry is not in the outcomes but in how the outcomes are read afterwards. A harm that follows an intervention is attributed to circumstances; a harm that follows restraint is attributed to the person who did not intervene. Since institutions review decisions mostly when something has gone wrong, and since the reviews are conducted by people subject to the same asymmetry, the pressure runs one way and it never stops running.

Medicine has studied its own version of this more honestly than most fields. Antibiotics continue to be prescribed for illnesses they cannot affect, in part because the consultation is difficult to end without an action in it. Investigations are ordered that will change nothing, and then produce incidental findings that require further investigation. The response has been to make restraint explicit. Guidelines that once listed only what to do now list, in the same typeface and with the same force, what not to do, precisely because an omission has to be written down before it can be defended.

It would be easy to stop there, and it would be wrong. The opposite failure is at least as common and at least as expensive. People stay in arrangements that are plainly not working because leaving requires a decision and staying does not. Repairs are deferred until the deferral costs more than the repair would have, and the bill arrives attached to nobody's name. Responses to spreading epidemics have been late far more often than they have been early, and the cost of being a week late compounds in a way the cost of being a week early does not. Anyone who has watched an organisation avoid a choice for two years knows that inaction has a bias of its own, and that it can be defended indefinitely because nothing has visibly been done.

The two observations are not in conflict, and putting them together gives something more useful than either. What the cases have in common is not a preference for acting or for waiting. It is that one of the two options is being taken by default, and a default is never examined. Acting is almost always a deci-

sion: somebody proposes it, somebody approves it, it has a date. Waiting is usually not a decision at all. It is what happens while no decision is made, which means nobody has to say what it is for, what it costs, or what would end it. It has no author and therefore no critic.

The concession has to be made without hedging, because the argument is often used as cover. There are situations in which speed dominates everything else and hesitation is simply the expensive error, and in those situations a demand for more information is not prudence. It is a way of avoiding a decision while appearing careful, and it is one of the most reliable manoeuvres in institutional life. Anybody who has said the words let us gather more data has sometimes meant them and has sometimes not.

The practical suggestion is small. Before waiting, write down what would end the wait: the number, the date, the event that would make you act. This does two things. It converts waiting from a default into a choice, which means it can be reviewed by other people and can be found, later and in public, to have been wrong. And it removes the main advantage inaction currently enjoys, which is not that it is safer but that it leaves no record of anybody having decided anything.

Questions 27–32

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 goalkeepers are unaware of the figures on penalties.
- 28** The writer holds that the people who review decisions are subject to the same bias as the people who make them.
- 29** The writer thinks penalty-takers should change where they aim.
- 30** The writer regards a bias towards acting as the more serious of the two errors.
- 31** The writer accepts that a request for more information is sometimes genuine.
- 32** The writer believes large organisations already record what would end a period of waiting.

Questions 33–36

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

List of Words

- A default
- B decision
- C critic
- D record
- E strategy
- F outcome
- G delay
- H reviewer

Why one option escapes examination

The two failures are not in conflict. What they have in common is that one option is being taken as a **33**, and anything taken that way goes unexamined. Acting is nearly always a **34**: it has a proposer, an approver and a date. Waiting usually is not, so nobody has to say what it costs or what would end it, and it has no author and therefore no **35** Writing the ending condition down in advance leaves a **36** that somebody chose.

Questions 37–40

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

List of Endings

- A after something has gone wrong.
- B it leaves no trace of anybody having decided.
- C a goal let in while standing still looks like a failure to try.
- D the cost of being early compounds faster than the cost of being late.
- E an omission has to be written down before it can be defended.
- F patients ask for treatments they do not need.
- G diving raises the proportion of penalties saved.

- 37 Goalkeepers dive instead of standing still because
- 38 Institutions examine their decisions mainly
- 39 Clinical guidelines now set out what should not be done because
- 40 The chief advantage inaction currently has is that