

Part 1 - Questions 1 to 4

Question 1 - Which of the following sentences is correct?

- A) I'm so tired. I have worked since 6 o'clock this morning!
- B) I'm so tired. I worked for 6 o'clock this morning!
- C) I'm so tired. I have been working for 6 o'clock this morning!
- D) I'm so tired. I have been working since 6 o'clock this morning!

Question 2 - Fill the gaps with the correct choice:

Several countries _____ in the dispute.

- A) have involved
- B) were involved
- C) were involving
- D) had involved

Question 3 - Fill the gaps with the correct choice:

By 1967 the band _____ the top of the charts with a number one hit.

- A) has reached
- B) had reached
- C) had been reaching
- D) has been reached

Question 4 - Fill the gaps with the correct choice:

At the press conference, the explorers explained they _____ the missing man on an island in the North Atlantic.

- A) were finding
- B) find
- C) had been finding
- D) had found

Part 2 - Read the article "AUSTRALIA'S CATASTROPHIC RABBIT INVASION SPARKED BY A FEW DOZEN BRITISH BUNNIES" and answer the questions 5 to 7:

Question 5 - Mark the incorrect sentence according to the provided text.

- A) Thomas Austin brother's family had a property in Baltonsborough in southwest England
- B) domestic rabbits are probably better at evading predators than wild rabbits
- C) a shipment of two dozen wild English rabbits arrived near Melbourne on 1859
- D) Joel Alves analysed genetic data from wild rabbits across several countries

Question 6 - What Joel Alves and Francis Jiggins have in common?

- A) they work at the University of Cambridge, UK
- B) both are evolutionary geneticist
- C) they research ecological invasions at the University of Houston
- D) they have a property in Baltonsborough in southwest England

Question 7 - What helped in the expansion of rabbits at that time?

- A) climate
- B) burrow-digging
- C) fleeing stressful environments
- D) expansion of pastoral lands and widespread suppression of predators

Part 3 - Read Lethal Tides book review “THIS NAVAL OCEANOGRAPHER COULDN’T GO TO SEA BUT WAS KEY TO PLANNING WARTIME LANDINGS”, and answer the questions 8 to 10:

Question 8 - According to the text, what can be said about the outcome of the Battle of Tarawa?

- A) US military increased its oceanographic intelligence services after the battle
- B) 300 soldiers died during the assault only
- C) the US losses were celebrated by the American public
- D) Most of the US Navy landing boats found their way to Japanese shore safely

Question 9 - Mark the incorrect sentence according to the provided text.

- A) Mary Sears provided assessment regarding potential landing targets for the US Navy
- B) Emperor Hirohito of Japan encouraged oceanographic studies in his country that helped the US Navy
- C) Mary Sears and her team produced reports on the oceanographic settings of Pacific islands on board a Navy research vessel named after her
- D) Librarians used to help Mary Sears in the search for sources of information

Question 10 - According to the text, what can be said about Mary Sears and her career?

- A) Sears’ career was not influenced by the sexist thinking of the time she lived
- B) She worked at WHOI, on board a brand-new research vessel
- C) When she joined the Navy, her work dynamics had to change due to the fast-paced needs of the military
- D) she wrote the book entitled “Lethal Tides” after leaving active duty

Australia's catastrophic rabbit invasion sparked by a few dozen British bunnies

Genome analysis shows that most Australian rabbits are descendants of wild rabbits shipped to near Melbourne in 1859.

Smriti Mallapaty

A genomic analysis has helped to show that Australia's invasive rabbit population probably originated from a shipment of two dozen wild English rabbits that arrived near Melbourne on Christmas Day 1859. The study⁽¹⁾ also finds that the herd's wild ancestry probably gave it an advantage over previous arrivals.

Rabbits have invaded most of the Australian continent and have had a disastrous impact on ecosystems, threatening some 300 species of plant and animal, and causing hundreds of millions of dollars' worth of damage to the agriculture industry each year. "That single event triggered this enormous catastrophe, ecologically and economically, in Australia," says Francis Jiggins, an evolutionary geneticist at the University of Cambridge, UK, and a co-author of the study.

Breeding like rabbits

Historical records suggest that the first European rabbits (*Oryctolagus cuniculus*) in Australia arrived in Sydney in 1788, with the first colonizers. Ships bringing rabbits continued to dock along the coast for decades, but it wasn't until the second half of the nineteenth century that the population expanded significantly, spreading across the country at a rate of 100 kilometres a year.

Historical records also suggest that the rabbit expansion came after a shipment of animals that arrived for a certain Thomas Austin at Barwon Park, southwest of what is now Melbourne. His brother had trapped them around their family property in Baltonsborough in southwest England.

Joel Alves, an evolutionary geneticist at the University of Oxford, UK, and his colleagues wanted to find out whether genomic data corroborated the records. They analysed genetic data from 179 wild rabbits caught across Australia and in New Zealand, France and the United Kingdom, as well as 8 domestic rabbits of different breeds.

They found that most rabbits in mainland Australia were genetically similar, with mixed wild and domestic ancestry. Australian rabbits also shared more rare alleles with rabbits from southwest England than with those from elsewhere in the United Kingdom, suggesting that they originated in Baltonsborough. Looking specifically at mitochondrial DNA, which is inherited from the mother, the researchers concluded that most mainland Australian rabbits descended from about five females, introduced from Europe.

The researchers also found that the rabbits' genetic diversity declined the farther from Barwon Park the animals were caught, and that alleles that are rare or absent in wild rabbits

increased. The researchers say these patterns are consistent with the idea that most rabbits across Australia originated from Barwon Park. The team report their findings in the Proceedings of the National Academy of Sciences on 22 August⁽¹⁾.

"This is a very exciting paper on a very important and well-studied topic," says Martin Nuñez, who researches ecological invasions at the University of Houston in Texas. Using genetics to understand how unwanted animal invasions start can help to predict future invasions, he says.

Perfect storm

Overall, the team says that the rabbits' wild ancestry was an important factor in triggering their invasion of the continent. "Wild rabbits are different," says Alves. They exhibit traits such as fleeing stressful environments and burrow-digging, meaning that they were probably better at evading predators and surviving in difficult terrain than are domestic rabbits, he says. Historical records suggest that Austin requested wild rabbits, and that previous arrivals were largely domestic breeds.

The expansion of Australian pastoral lands and widespread suppression of predators around that time would have also helped their expansion. "It was like a perfect storm," says Alves. "You have the right rabbits in the right place at the right time, with the right changes in the environment."

"The genetic analyses appear very sound," says rabbit geneticist Amy Iannella, a consultant based in Adelaide, Australia. She adds that although the country's rabbit populations probably originated in Barwon Park, their rapid expansion might have been aided by people transporting the animals to other parts of the country, where they also began spreading. Rabbits are typically communal animals that rely on shelter for survival and juveniles rarely travel farther than 1 kilometre, she says. "The idea of rabbits moving fast enough at the invasion front to colonize Australia so quickly from a single release, well that feels extreme to me, given what we know about rabbit ecology."

References

(1) Alves, J. M. et al. Proc. Natl Acad. Sci. USA 119, e2122734119 (2022).

doi: <https://doi.org/10.1038/d41586-022-02297-4>

This naval oceanographer couldn't go to sea but was key to planning wartime landings

Mary Sears led a mostly female research team that was crucial to US operations in the Pacific theatre in the 1940s.

Alexandra Witze

Lethal Tides: Mary Sears and the Marine Scientists Who Helped Win World War II

Catherine Mueseche William Morrow (2022)

The Battle of Tarawa was a disaster from the start. In November 1943, during their first big foray in the central Pacific Ocean, US forces invaded this atoll in the Gilbert Islands, hoping to dislodge Japanese troops and push closer to Tokyo. But as soon as the assault began, it literally ran aground. Most of the landing boats smashed into a shallow coral reef, forcing marines to flounder their way to shore amid Japanese gunfire. One in five US troops died in the battle — 300 on the reef alone.

Death tolls among the Japanese defenders and Korean labourers were much higher. But the US losses sparked outrage in Congress and among the American public. The outcome at Tarawa led the US military to drastically increase its oceanographic intelligence services. Military leaders did not want to repeat the fatal miscalculation made in the run-up to the invasion of Tarawa, when planners had failed to fully account for the narrow tidal range of a neap tide, which caused the boats to run aground.

In *Lethal Tides*, Catherine Mueseche highlights the little-known career of Mary Sears, the chief US naval oceanographer during the Second World War. Sears ran the office that compiled research about tides and currents, the shapes of the ocean floors and other oceanographic data that were crucial to war operations. Mueseche's sympathetic depiction portrays Sears as an experienced marine scientist who persevered through the sexism that stopped her from going to sea as an academic, leading her to become a highly influential operative in the military.

Sears had many advantages growing up. Born to a well-off family in Massachusetts in 1905, she was educated at an exclusive girls' school in Boston and attended Radcliffe College in Cambridge, Massachusetts. But she could not escape the assumptions that Radcliffe students were not as talented as the men studying at nearby Harvard University, or that a woman with a family could not have a career. At Radcliffe, she began working on zoological specimens, mostly plankton, and, as a graduate student, spent summers doing research in the coastal village of Woods Hole, Massachusetts, when her mentor, the marine biologist Henry Bryant Bigelow, worked at the Marine Biological Laboratory there.

Her studies put Sears front and centre when the Woods Hole Oceanographic Institution (WHOI) was founded in 1930, with Bigelow as its first director. Sears was one of the institution's first staff members, working to organize collections of plankton, jellyfish and other marine creatures. She was, of course, confined to the laboratory, because Bigelow did not allow women to conduct research on board WHOI's brand-new research vessel.

Joining the war effort

But her position at WHOI equipped her with skills that would prove useful during the war. While working with Bigelow, she met visiting oceanographers from other nations and forged connections she maintained throughout her entire career. She learnt to quickly pull together reports of discoveries and determine the finds' importance. And she knew that the United States lagged behind in the burgeoning field of oceanography.

She joined the Navy in 1943 through a casual act of sexism. When oceanographer Roger Revelle needed someone to replace him in an administrative position at the Navy's Hydrographic Office, he asked around for someone who was not considered crucial to wartime research. Sears was identified as the only non-essential person at WHOI, and so she moved to Washington DC.

The team she led was small, and consisted mostly of members of the women's branch of the Naval Reserve. They produced reports on the oceanographic settings of Pacific islands that the Navy was thinking about invading. The intelligence included not only basic information, such as tidal ranges and underwater topography, but also assessments of how ocean currents, the time of day, the weather and other factors might contribute to the success or failure of military tactics. Even microscopic sea life could give away the presence of a night-time operation if the water contained organisms that glowed when a submarine passed through them.

Sears shifted from the snail-like speed of academic publishing to the fast-paced needs of the military. Navy officials came to her just a few months before planned operations, asking for a detailed assessment of potential landing targets to be done immediately. She would often get knocks on her door in the middle of the night and would go to the office to put together tidal tables for yet another small Pacific island.

She had help. *Lethal Tides* is something of a paean to scientific librarians, such as Mary Grier, who worked for Sears by gathering reference material. There was no googling of publicly available information back then — Grier had to meticulously scour obscure sources of information to track down the data she needed. This was more than oceanographic research: it was military intelligence. And, ironically, some of it was sourced from Japan itself. Emperor Hirohito, who took the throne in 1926, was an amateur marine biologist who stimulated oceanographic research in Japan in the 1920s and 1930s. A Japanese naval survey of the western North Pacific Ocean became a key source for Grier when assessing the coasts of the many small islands the US Navy was interested in.

Mueseche, a paediatric surgeon and author, keeps the focus on Sears and her team, and does not analyse wider trends in oceanography during and after the Second World War. But that narrow focus serves the book well. The narrative speeds up as the US military advances in the Pacific region, ultimately setting up the battle for Iwo Jima in February 1945 and the invasion of Okinawa weeks later.

After leaving active duty in 1946, Sears settled at WHOI for the rest of her career. She founded two major oceanographic journals and became the first woman to have a Navy research vessel named after her, albeit posthumously. But before all of that, she made a trip to Europe in 1946 — where Norwegian colleagues let her sail aboard one of their research vessels, no questions asked.

Nature 608, 665-666 (2022)

doi: <https://doi.org/10.1038/d41586-022-02287-6>

Gabarito Inglês:

1 – D

2 – B

3 – B

4 – D

5 – B

6 – B

7 – D

8 – A

9 – C

10 – C