

The Impact of the Potato

Jeff Chapman relates the story of history the most important vegetable

A	<p>The potato was first cultivated in South America between three and seven thousand years ago, though scientists believe they may have grown wild in the region as long as 13,000 years ago. The genetic patterns of potato distribution indicate that the potato probably originated in the mountainous west-central region of the continent.</p>
B	<p>Early Spanish chroniclers who misused the Indian word “Batata” (sweet potato) as the name for the potato noted the importance of the tuber to the Incan Empire. The Incas has learned to preserve the potato for storage by dehydrating and mashing potatoes into a substance called “Chuchu” could be stored in a room for up to 10 years, providing excellent insurance against possible crop failures. As well as using the food as a staple crop, the Incas thought potatoes made childbirth easier and used it to treat injuries.</p>
C	<p>The Spanish conquistadors first encountered the potato when they arrived in Peru in 1532 in search of gold and noted Inca miners eating Chuchu. At the time the Spaniards failed to realize that the potato represented a far more important treasure than either silver or gold, but they did gradually begin to use potatoes as basic rations aboard their ships. After the arrival of the potato in Spain in 1570, a few Spanish farmers began to cultivate them on a small scale, mostly as food for livestock.</p>
D	<p>Throughout Europe, potatoes were regarded with suspicion, distaste and fear. Generally considered to be unfit for human consumption, they were used only as animal fodder and sustenance for the starving. In northern Europe, potatoes were primarily grown in botanical gardens as an exotic novelty. Even peasants refused to eat from a plant that produced ugly, misshapen tubers and that had come from a heathen civilization. Some felt that the potato plant’s resemblance to plants in the nightshade family hinted that it was the creation of witches or devils.</p>
E	<p>In meat-loving England, farmers and urban workers regarded potatoes with extreme distaste. In 1662, the Royal Society recommended the cultivation of the tuber to the English government and the nation, but this recommendation had little impact. Potatoes did not become a staple until during the food shortages associated with the cultivation. In 1795, the Board of Agriculture issued a pamphlet entitled “Hints Respecting the Culture and Use of Potatoes”; this was followed shortly by pro-potato editorials and potato recipes in The Times. Gradually, the lower classes began to follow the lead of the upper classes.</p>

F	<p>A similar pattern emerged across the English Channel in the Netherlands, Belgium and France. While the potato slowly gained ground in eastern France (where it was often the only crop remaining after marauding soldiers plundered wheat fields and vineyards), it did not achieve widespread acceptance until the late 1700s. The peasants remained suspicious, in spite of a 1771 paper from the Facult de Paris testifying that the potato was not harmful but beneficial. The people began to overcome their distaste when the plant received the royal seal of approval: Louis XVI began to sport a potato flower in his buttonhole, and Marie-Antoinette wore the purple potato blossom in her hair.</p>
G	<p>Frederick the Great of Prussia saw the potato’s potential to help feed his nation and lower the price of bread but faced the challenge of overcoming the people’s prejudice against the plant. When he issued a 1774 order for his subjects to grow potatoes as protection against famine, the town of Kolberg replied: “The things have neither smell nor taste, not even the dogs will eat them, so what use are they to us?” Trying a less direct approach to encourage his subjects to begin planting potatoes, Frederick used a bit of reverse psychology: he planted a royal field of potato plants and stationed a heavy guard to protect this field from thieves. Nearby peasants naturally assumed that anything worth guarding was worth stealing, and so snuck into the field and snatched the plants for their home gardens. Of course, this was entirely in line with Frederick’s wishes.</p>
H	<p>Historians debate whether the potato was primarily a cause or an effect of the huge population boom in industrial-era England and Wales. Prior to 1800, the English diet had consisted primarily of meat, supplemented by bread, butter and cheese. Few vegetables were consumed, most vegetables being regarded as nutritionally worthless and potentially harmful. This view began to change gradually in the late 1700s. The Industrial Revolution was drawing an ever-increasing percentage of the populace into crowded cities, where only the richest could afford homes with ovens or coal storage rooms, and people were working 12-16 hour days which left them with little time or energy to prepare food. High yielding, easily prepared potato crops were the obvious solution to England’s food problems.</p>
I	<p>Whereas most of their neighbors regarded the potato with suspicion and had to be persuaded to use it by the upper classes, the Irish peasantry embraced the tuber more passionately than anyone since the Incas. The potato was well suited to the Irish the soil and climate, and its high yield suited the most important concern of most Irish farmers: to feed their families.</p>
J	<p>The most dramatic example of the potato’s potential to alter population patterns occurred in Ireland, where the potato had become a staple by 1800. The Irish population doubled to eight million between 1780 and 1841, this without any significant expansion of industry or reform of agricultural techniques beyond the widespread cultivation of the potato. Though Irish landholding practices were primitive in comparison with those of England, the potato’s high yields allowed even the poorest farmers to produce more healthy food than they needed with scarcely any investment or hard labor. Even children could easily plant, harvest and cook potatoes, which of course required no threshing, curing or grinding. The abundance provided by potatoes greatly decreased infant mortality and encouraged early marriage.</p>

Questions 1-5

Do the following statements agree with the views of the writer in Reading Passage 1?

In boxes 1-5 on your answer sheet, write

- TRUE** **if the statement is true**
- FALSE** **if the statement is false**
- NOT GIVEN** **if the information is not given in the passage**

1. The early Spanish called potato as the Incan name 'Chuchu'.
2. The purposes of Spanish coming to Peru were to find out potatoes.
3. The Spanish believed that the potato has the same nutrients as other vegetables.
4. Peasants at the time did not like to eat potatoes because they were ugly.
5. The popularity of potatoes in the UK was due to food shortages during the war.

Questions 6 - 13

Complete the sentences below with **NO MORE THAN ONE WORD**.

Write your answers in boxes 6 - 13 on your answer sheet.

6. In France, people started to overcome their disgusting about potatoes because the King put a potato in his button hole.
7. Frederick realized the potential of potato but he had to handle the against potatoes from ordinary people.
8. The King of Prussia adopted some Psychology to make people accept potatoes.
9. Before 1800, the English people preferred eating with bread, butter and cheese.
10. The obvious way to deal with England food problems were high yielding potato.....
11. The Irish and climate suited potatoes well.
12. Between 1780 and 1841, based on the of the potatoes, the Irish population doubled to eight million.
13. The potato's high yields help the poorest farmers to produce more healthy food almost without

Saving the British Bitterns

A. Breeding bitterns became extinct in the UK by 1886 but, following re-colonisation early last century, numbers rose to a peak of about 70 booming (singing) males in the 1950s, falling to fewer than 20 by the 1990s. In the late 1980s, it was clear that the bittern was in trouble, but there was little information on which to base recovery actions.

B. Bitterns have cryptic plumage and shy nature, usually remaining hidden within the cover of reedbed vegetation. Our first challenge was to develop standard methods to monitor their numbers. The boom of the male bittern is its most distinctive feature during the breeding season, and we developed a method to count them using the sound patterns unique to each individual. This not only allows us to be much more certain of the number of booming males in the UK but also enables us to estimate the local survival of males from one year to the next.

C. Our first direct understanding of the habitat needs of breeding bitterns came from comparisons of reedbed sites that had lost their booming birds with those that retained them. This research showed that bitterns had been retained in reedbeds where the natural process of succession, or drying out, had been slowed through management. Based on this work, broad recommendations on how to manage and rehabilitate reedbeds for bitterns were made, and funding was provided through the EU LIFE Fund to manage 13 sites within the core breeding range. This project, though led by the RSPB, involved many other organisations.

D. To refine these recommendations and provide fine-scale, quantitative habitat prescriptions on the bitterns' preferred feeding habitat, we radio-tracked male bitterns on the RSPB's Minsmere and Leighton Moss reserves. This showed clear preferences for feeding in the wetter reedbed margins, particularly within the reedbed next to larger open pools. The average home range sizes of the male bitterns we followed (about 20 hectares) provided a good indication of the area of reedbed needed when managing or creating habitat for this species. Female bitterns undertake all the incubation and care of the young, so it was important to understand their needs as well. Over the course of our research, we located 87 bittern nests and found that female bitterns preferred to nest in areas of continuous vegetation, well into the reedbed, but where water was still present during the driest part of the breeding season.

E. The success of the habitat prescriptions developed from this research has been spectacular. For instance, at Minsmere, booming bittern numbers gradually increased from one to 10 following reedbed lowering, a management technique designed to halt the drying out process. After a low point of 11 booming males in 1997, bittern numbers in Britain responded to all the habitat management work and started to increase for the first time since the 1950s.

F. The final phase of the research involved understanding the diet, survival and dispersal of bittern chicks. To do this we fitted small radio tags to young bittern chicks in the nest, to determine their fate through to fledge and beyond. Many chicks did not survive to fledgling and starvation was found to be the most likely reason for their demise. The fish prey fed to chicks was dominated by those species penetrating into the reed edge. So, an important element of recent studies (including a PhD with the University of Hull) has been the development of recommendations on habitat and water conditions to promote healthy native fish populations.

G. Once independent, radio-tagged young bitterns were found to seek out new sites during their first winter; a proportion of these would remain on new sites to breed if the conditions were suitable. A second EU LIFE funded project aims to provide these suitable sites in new areas. A network of 19 sites developed through this partnership project will secure a more sustainable UK bittern population with successful breeding outside of the core area, less vulnerable to chance events and sea-level rise.

H. By 2004, the number of booming male bitterns in the UK had increased to 55, with almost all of the increase being on those sites undertaking management based on advice derived from our research. Although science has been at the core of the bittern story, success has only been achieved through the trust, hard work and dedication of all the managers, owners and wardens of sites that have implemented, in some cases very drastic, management to secure the future of this wetland species in the UK. The constructed bunds and five major sluices now control the water level over 82 ha, with a further 50 ha coming under control in the winter of 2005/06. Reed establishment has principally used natural regeneration or planted seedlings to provide small core areas that will in time expand to create a bigger reed area. To date, nearly 275,000 seedlings have been planted and reed cover is extensive. Over 3 km of new ditches have been formed, 3.7 km of the existing ditch have been re-profiled and 2.2 km of old meander (former estuarine features) have been cleaned out.

Bitterns now regularly winter on the site with some indication that they are staying longer into the spring. No breeding has yet occurred but a booming male was present in the spring of 2004. A range of wildfowl breed, as well as a good number of reedbed passerines including reed bunting, reed, sedge and grasshopper warblers. Numbers of wintering shoveler have increased so that the site now holds a UK important wintering population. Malltraeth Reserve now forms part of the UK network of key sites for water vole (a UK priority species) and 12 monitoring transects have been established. Otter and brown-hare occur on the sites as does the rare plant, pillwort.

Questions 14-20

Choose the correct heading for paragraphs **A-H** from the list below.

Write the correct number, **I-VIII**, on your answer sheet.

- 14. Paragraph A _____
- 15. Paragraph B _____
- 16. Paragraph C _____
- 17. Paragraph D _____

Example: Paragraph A = VII

- 18. Paragraph F _____
- 19. Paragraph G _____
- 20. Paragraph H _____

List of Headings

I. research findings into habitats and decisions made

II. fluctuation in bittern number

III. protect the young bittern

IV. international cooperation works

V. Began in calculation of the number

VI. importance of food

VII. Research has been successful

VIII. research into the reedbed

IX. reserve established holding bittern in winter

Questions 21 - 26

Answer the questions below.

Choose **NO MORE THAN THREE WORDS AND/OR A NUMBER**.

- 21. When did the bird of bitten reach its peak of number?
- 22. What does the author describe the bittern’s character?
- 23. What is the main cause for the chick bittern’s death?
- 24. What is the main food for chick bittern?
- 25. What system does it secure the stability for bittern’s population?
- 26. Besides bittern and rare vegetation, what mammal does the protection plan benefit?

Question 27

Choose the correct letter, **A, B, C or D**. Write your answers on your answer sheet.

- 27. What is the main purpose of this passage?
 - A. Main characteristic of a bird called bittern.
 - B. Cooperation can protect an endangered species.
 - C. The difficulty of access information of bittern’s habitat and diet.
 - D. To save wetland and reedbed in the UK.

Extinct: the Giant Deer

Toothed cats, mastodons, giant sloths, woolly rhinos, and many other big, shaggy mammals are widely thought to have died out around the end of the last ice age, some 10,500 years ago.

A. The Irish elk is also known as the giant deer (*Megaloceros giganteus*). Analysis of ancient bones and teeth by scientists based in Britain and Russia show the huge herbivore survived until about 5,000 B.C. – more than three millennia later than previously believed. The research team says this suggests additional factors, besides climate change, probably hastened the giant deer’s eventual extinction. The factors could include hunting or habitat destruction by humans.

B. The Irish elk, so-called because its well-preserved remains are often found in lake sediments under peat bogs in Ireland, first appeared about 400,000 years ago in Europe and Central Asia. Through a combination of radiocarbon dating of skeletal remains and the mapping of locations where the remains were unearthed, the team shows the Irish elk was widespread across Europe before the last “big freeze.” The deer’s range later contracted to the Ural Mountains, in modern-day Russia, which separate Europe from Asia.

C. The giant deer made its last stand in western Siberia, some 3,000 years after the ice sheets receded, said the study’s co-author, Adrian Lister, professor of palaeobiology at University College London, England. “The eastern foothills of the Urals became very densely forested about 8,000 years ago, which could have pushed them on to the plain,” he said. He added that pollen analysis indicates the region then became very dry in response to further climatic change, leading to the loss of important food plants. “In combination with human pressures, this could have finally snuffed them out,” Lister said.

D. Hunting by humans has often been put forward as a contributory cause of extinction of the Pleistocene megafauna. The team, though, said their new date for the Irish elk’s extinction hints at an additional human-made problem – habitat destruction. Lister said, “We haven’t got just hunting 7,000 years ago – this was also about the time the first Neolithic people settled in the region. They were farmers who would have cleared the land.” The presence of humans may help explain why the Irish elk was unable to tough out the latest of many climatic fluctuations – periods it had survived in the past.

E. Meanwhile, Lister cast doubt on another possible explanation for the deer’s demise – the male’s huge antlers. Some scientists have suggested this exaggerated feature – the result of females preferring stags with the largest antlers, possibly because they advertised a male’s fitness – contributed to the mammal’s downfall. They say such antlers would have been a serious inconvenience in the dense forests that spread northward after the last ice age. But, Lister said, “That’s a hard argument to make because the deer previously survived perfectly well through wooded interglacials [warmer periods between ice ages].” Some research has suggested that a lack of sufficient high-quality forage caused the extinction of the elk.

High amounts of calcium and phosphate compounds are required to form antlers, and therefore large quantities of these minerals are required for the massive structures of the Irish Elk. The males (and male deer in general) met this requirement partly from their bones, replenishing them from food plants after the antlers were grown or reclaiming the nutrients from discarded antlers (as has been observed in extant deer). Thus, in the antler growth phase, Giant Deer was suffering from a condition similar to osteoporosis. When the climate changed at the end of the last glacial period, the vegetation in the animal's habitat also changed towards species that presumably could not deliver sufficient amounts of the required minerals, at least in the western part of its range.

F. The extinction of megafauna around the world was almost completed by the end of the last ice age. It is believed that megafauna initially came into existence in response to glacial conditions and became extinct with the onset of warmer climates. Tropical and subtropical areas have experienced less radical climatic change. The most dramatic of these changes was the transformation of a vast area of North Africa into the world's largest desert. Significantly, Africa escaped major faunal extinction as did tropical and sub-tropical Asia. The human exodus from Africa and our entrance into the Americas and Australia were also accompanied by climate change. Australia's climate changed from cold-dry to warm-dry. As a result, surface water became scarce. Most inland lakes became completely dry or dry in the warmer seasons. Most large, predominantly browsing animals lost their habitat and retreated to a narrow band in eastern Australia, where there were permanent water and better vegetation. Some animals may have survived until about 7000 years ago. If people have been in Australia for up to 60 000 years, then megafauna must have co-existed with humans for at least 30 000 years. Regularly hunted modern kangaroos survived not only 10 000 years of Aboriginal hunting, but also an onslaught of commercial shooters.

G. The group of scientists led by A.J. Stuart focused on northern Eurasia, which he was taking as Europe, plus Siberia, essentially, where they've got the best data that animals became extinct in Europe during the Late Pleistocene. Some cold-adapted animals, go through into the last part of the cold stage and then become extinct up there. So you've actually got two phases of extinction. Now, neither of these coincide – these are Neanderthals here being replaced by modern humans. There's no obvious coincidence between the arrival of humans or climatic change alone and these extinctions. There's a climatic change here, so there's a double effect here. Again, as animals come through to the last part of the cold stage, here there's a fundamental change in the climate, reorganization of vegetation, and the combination of the climatic change and the presence of humans – of advanced Paleolithic humans – causes this wave of extinction. There's a profound difference between the North American data and that of Europe, which summarize that the extinctions in northern Eurasia, in Europe, are moderate and staggered, and in North America severe and sudden. And these things relate to the differences in the timing of human arrival. The extinction follows from human predation, but only at times of fundamental changes in the environment.

Questions 28-32

Complete the following summary of the paragraphs of Reading Passage 3.

Using **NO MORE THAN THREE WORDS** from the Reading Passage for each answer.

Having been preserved well in Europe and Central Asia, the remains of the Irish elk was initially found approximately **28** _____. Around **29** _____, they were driven to live in the plain after being restricted to the Ural Mountains. Hunting was considered as one of the important factors of Irish elk's extinction, people have not started hunting until

30 _____ when Irish elk used to get through under a variety of climatic fluctuations.

The huge antlers may possibly contribute to the reason why Irish elk extinct, which was highly controversial as they live pleasantly over the span of **31** _____. Generally, it is well-known that, at the last maximum ice age, mammals become extinct about **32** _____

Questions 33-35

Choose **NO MORE THAN THREE WORDS AND/OR A NUMBER**.

33. What kind of physical characteristics eventually contributed to the extinction of Irish elk?
34. What kind of nutrient substance needed in maintaining the huge size of Irish elk?
35. What geographical evidence suggested the advent of human resulted in the extinction of Irish elk?

Questions 36-39

Choose the letter **A - D** and write your answers on your answer sheet.

36. the continents where humans imposed a little impact on large mammals extinction
37. the continents where the climatic change was mild and fauna remains
38. the continents where both humans and climatic change are the causes
39. the continents where the climatic change alone caused a massive extinction

- | |
|---|
| <p>A. Eurasia</p> <p>B. Australia</p> <p>C. Asia</p> <p>D. Africa</p> |
|---|

Question 40

Which statement is true according to the Stuart team's finding?

- A. Neanderthals rather than modern humans caused the extinction in Europe
- B. Paleolithic humans in Europe along kill the big animals such as Giant deer
- C. climatic change was not solely responsible for the megafauna extinction in Europe
- D. moderate and staggered extinction was mainly the result of fundamental climatic change

