

# De-extinction

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# Overview

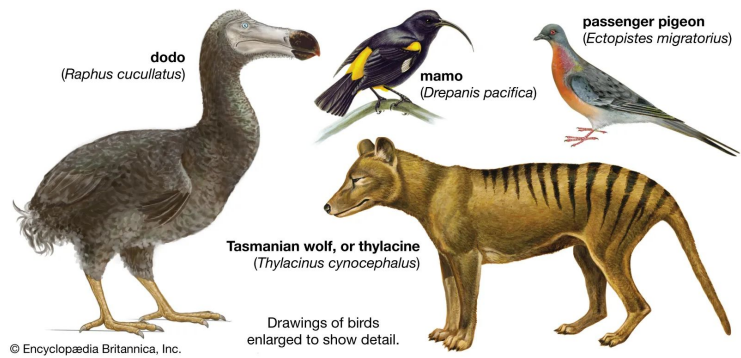
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# History

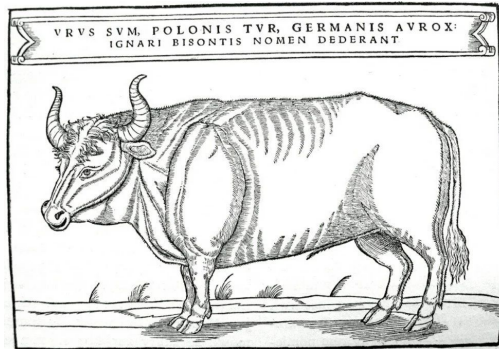
- 1990s sheep cloned
  - Using somatic cell nuclear transfer
    - Led to ideas of resurrecting animals
- 2009 de-extinction nearly accomplished



In the 1990s the development of a technique known as somatic cell nuclear transfer (SCNT), which was used to produce the first mammalian clone, Dolly the sheep (born 1996, died 2003). In 2009, using SCNT, scientists very nearly achieved de-extinction for the first time, attempting to bring back the extinct Pyrenean ibex. A clone was produced from preserved tissues, but it died from a severe lung defect within minutes of being born. The near success of the attempt sparked debate about whether species should be brought back from extinction and, if they are brought back, how it should be done and how the species should be managed.

# History

- First thought of in early 20th century
- Lutz and Heinz Heck
  - Crossbreed different types of cattle hoping to bring back a species of ox



In the 1920s and '30s, German zoologists Lutz and Heinz Heck crossbred different types of cattle in an attempt to back breed for an animal that resembled the aurochs (*Bos primigenius*), an extinct species of European wild ox ancestral to modern cattle. The Heck brothers crossbred modern cattle based on historical descriptions and bone specimens that provided morphological information about the aurochs but had no insight into the animals' genetic relatedness. As a consequence, the resulting Heck cattle bore little resemblance to the aurochs.

# History

- Alberto Fernandez-Arais
  - First person to be successful with de-extinction
- Attempted to use methodology on goat
  - Came back for 10 minutes



Alberto Fernández-Arias, head of the Hunting, Fishing and Wetland department in Aragon, Spain worked with his team in 2003 to bring a bucardo (a species of wild goat) back from extinction using cloning methodology. It was the first successful de-extinction. Unfortunately, the cloned bucardo only survived 10 minutes and died of respiratory failure. Fernández-Arias is committed to using current technology to ensure a more successful de-extinction.

# Implementation

Different ways to undergo de-extinction

- Cloning
- Selective breeding
- Genome Editing



For cloning scientists used the *somatic cell nuclear transfer (SCNT)* technique to generate an identical nuclear gene sequence to the donor of the somatic (non-reproductive) cell. Cloning is a feasible de-extinction approach for living species close to extinction because the resulting organism is identical. Cloning requires intact living cells; the process is more suitable for populations where some individuals remain, not those already extinct. Selective breeding is choosing partners to get the desired characteristics. You wouldn't be able to bring back the original species, but you could get pretty close with picking all of their distinct traits. Genetic engineering has been in development since the 1970s. *Genome editing*, first developed in the 1990s, manipulates a living organism's genetic material by deleting, replacing, or inserting a DNA sequence. Scientists use tools to make small changes to the organism's DNA.

## De-extincting in present day

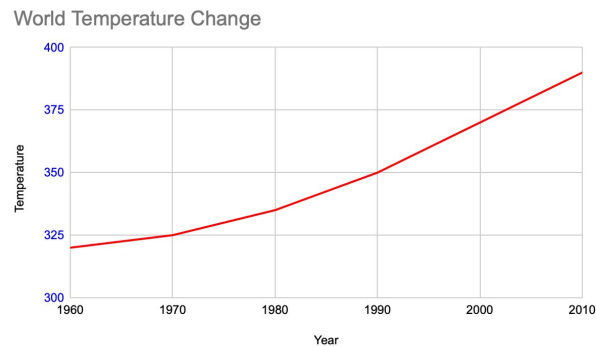
- Wanted to do in Woolly Mammoths
- Professor George Church
  - Lead in de-extinction
- Woolly mammoths could potentially be the answer to climate change



Resurrected mammoths would populate the permafrost and avert its melting by turning wet tundra into dry grasslands, which better sequester carbon and reflect sunlight, keeping the permafrost cooler and helping, thereby, to save the planet

# Climate change

- Very big problem in our lives
- Bringing back woolly mammoths could help with this

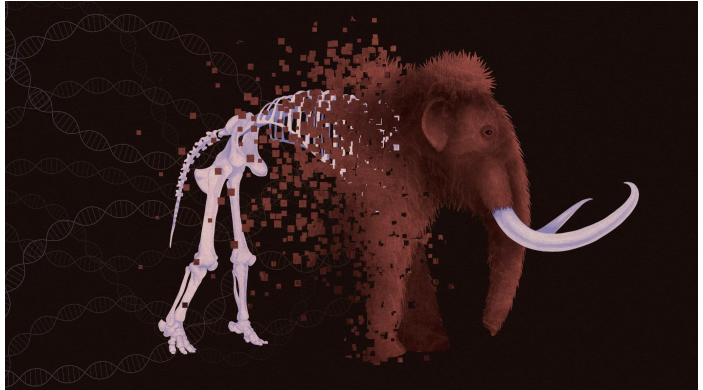


Climate change has been a huge problem in our world for decades. There are many solutions to this problem but the woolly mammoth is an brand new idea.



## Benefits

- Expand specie diversity
- Bring back animals that have been wiped out
  - Gives humans a second chance
- Can rescue ecosystems



Many of the animals that have gone extinct on our planet passed away before modern science developed. With de-extinction the animals could be brought back and modern science could excel. Another benefit is it can help our ecosystems. Bring back animals that were once wiped out can bring more help into the environments were other species are being wiped out.

## Cons

- Habitats for extinct animals drastically different
- If species was once destroyed wouldn't it disappear again?
- Potentially dangerous consequences
- Cause extinction of other animals



Many species were wiped out due to humans and our industrialization. Now since climate change is worse than it was 50 years ago, wouldn't those species just die again? If we bring back an animal that was once extinct that could have terrible consequences. Wouldn't it just be better for the animals to stay extinct rather than change our society as it is. Introducing new animals into ecosystems can affect the food web and lead to more species resulting in extinction.

## Summary

- De-extinction may not be such a good idea
  - Very expensive, might do more harm than good



De-extinction is a scientific advancement that could drastically change how our world is thought about. Animals are often the answer to large health questions, and bringing back extinct species could help figure out more solutions. Personally, I disagree with de-extinction because I think if the species was already extinct the first time what would stop it from happening again. I also think that it is extremely expensive to find this question out resurrecting woolly mammoths.

# Reference

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