

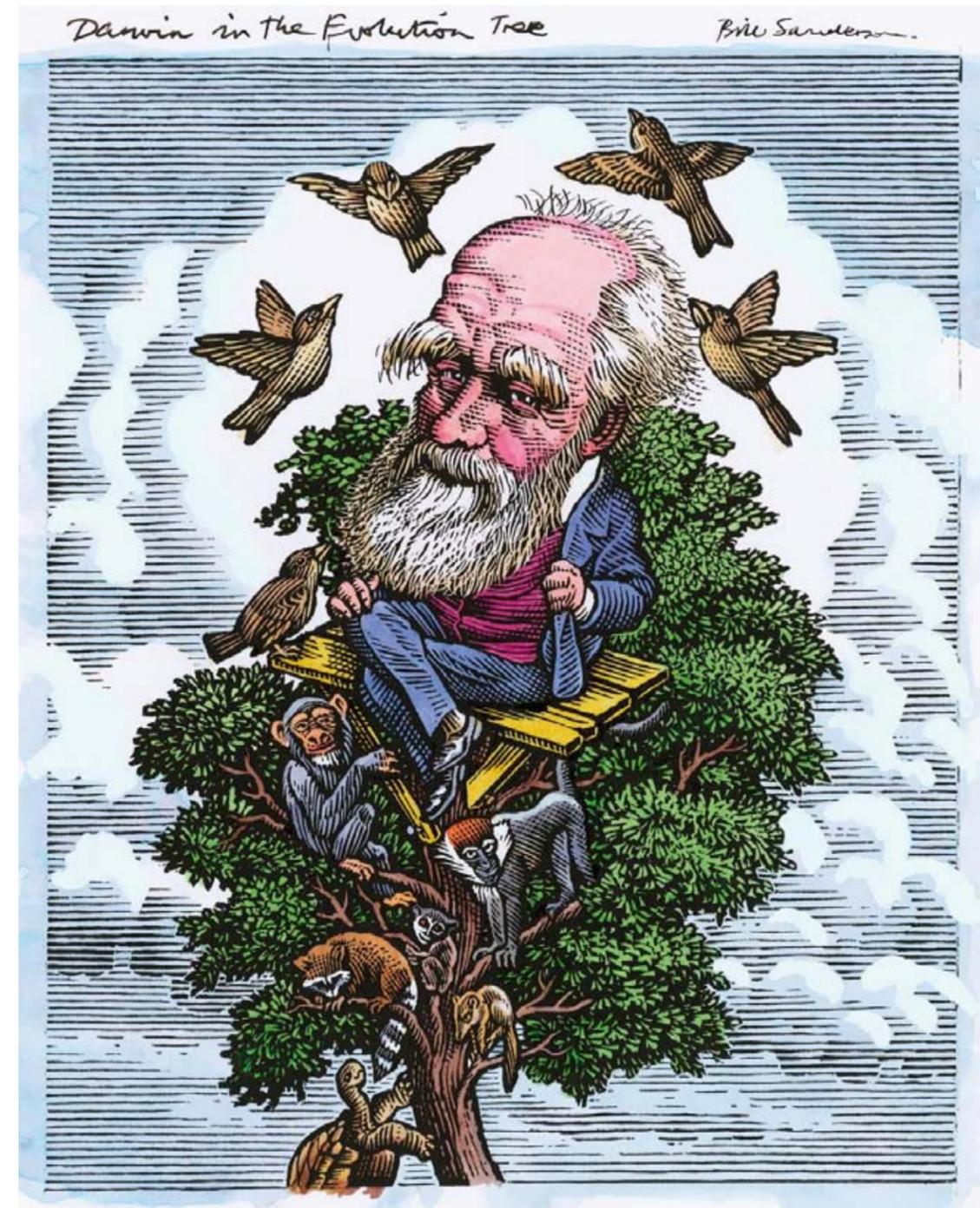
Understanding how evolution works

Darwin described how 'natural selection' drives evolution - the change, over generations, in the characteristics of individuals in a population.

He knew there were differences between individuals in any population. He recognised that these variations meant some individuals would be better suited than others to a particular environment and therefore more likely to survive, reproduce and pass on their characteristics to future generations.

Darwin's insight was that, over many generations, the selection of the individuals best suited to the environment would lead to the adaptation of a species. This 'natural selection' would ensure the 'survival of the fittest', as a changing environment selects for (and against) individuals with particular characteristics.

Darwin did not have our modern understanding of genes and genetics and yet his insights into inherited variation and selection, based on differential survival and reproduction, continue to have applications far beyond biology.

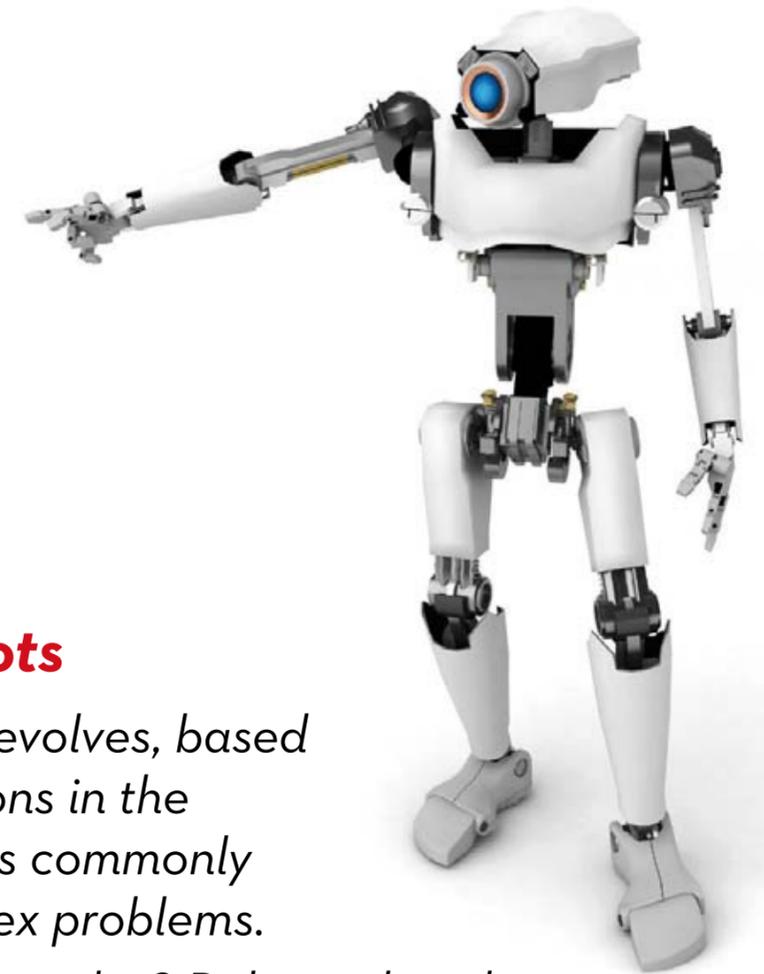




Wheat grain

Naturally selected improvements

Natural selection doesn't only work in nature the same principles to develop better crops and it can even help us make robots...



Taming the wild

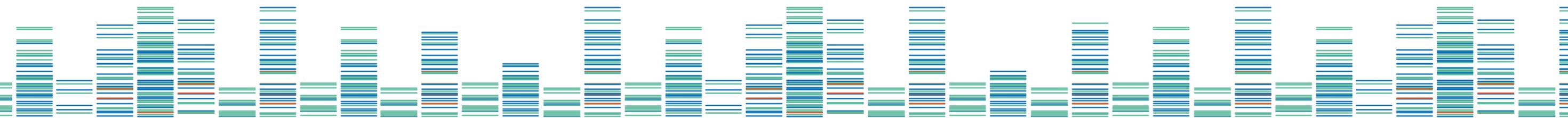
The earliest farmers collected seeds from the wild plants that they liked to eat. Year on year, they selected seeds from the plants that produced the best yields, the best tasting food or were the easiest to process. Farmers sowed seeds from these 'better' plants to produce next year's crop and, since their characteristics were inherited, crop plants quickly became very different from their wild ancestors.

About 100 years ago, plant and animal breeding became much more efficient because breeders could combine the understanding from Darwin's theory of natural selection with Mendel's theories of inheritance. This is still the basis of all crop and livestock improvement.

Evolving better robots

Computer software that evolves, based on whether small variations in the software 'survive' or not, is commonly used to solve very complex problems.

Can we build robots that evolve? Robots already exist where the control system is designed to evolve, for example as the robot works out how to move around in a particular space. Remarkably, researchers have described robots evolving ways of communicating with each other to complete a joint task. Researchers are exploring the evolution of robot bodies by allowing body designs to evolve in computer simulations, before the robot is constructed.





Does natural selection tell us anything about society?

Evolutionary ideas can explain abstract concepts such as languages, social structures, economic and political systems.

Do languages evolve?

Fab, groovy, cool, wicked... what is next in the sequence?

The way words are used or the meaning they are given is constantly changing. New words, and variations on existing words, are created and may spread into general use. Other words and meanings may fall into disuse. Increasingly, languages are intermixed, with words being shared directly, rather than translated. These variations provide an opportunity for the selection and inheritance of changes.

Researchers have spotted startling parallels between the laws that govern evolution of language and those that govern the evolution of species.

Economics - survival of the fittest?

In a landscape filled with abundant capital and easy credit, hedge-funds thrive on easy pickings and banks flourish on a diet of cheap mortgages.

When times are good, in both economics and the natural world, diversity abounds as organisms (and organisations) evolve to fill specific niches. In bad times those that can't adapt, perish.

Today, financial institutions find themselves in an unfamiliar landscape; to survive they must conform to new regulations and market conditions. Those that can respond to the selection pressures in the new environment will live to fight another day.

