

Discussion questions

What is the difference between science and pseudo-science, according to Popper?

What is Popper falsification criterion for science?

How does Popper think that science should make progress? *What do you think about his view?*

What is a scientific paradigm?

What is normal science?

What is an *ad hoc* hypothesis?

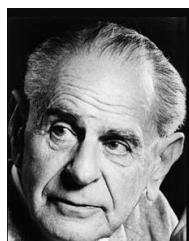
How does science make progress, according to Kuhn?

What does it mean that two paradigms are incommensurable?

Do you think that normal science a good way to do science?

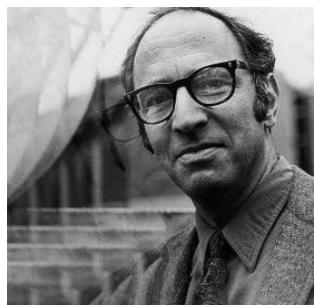
What is serendipity? *How important do you think it is in science?*

How do you think anomalies or counterexamples are treated in science? How do you think they should be treated?



...no matter how many instances of white swans we may have observed, this does not justify the conclusion that all swans are white.

(Karl Popper)



Thomas Kuhn (1922-1996)

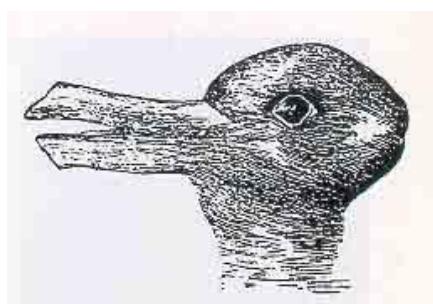


SERENDIPITY

Many discoveries in science happen because some had wisdom to see its potential value: post-it notes (bad glue), Viagra (heart medication), penicillin (mould growing in dirty petri dish). Samantha Copeland is one of the founders of the international Serendipity Society:

<https://theserendipitysociety.wordpress.com>

Gestalt-switch: Duck or rabbit? Same object, two perspectives.



A paradigm-changing discovery in astronomy



Astronomer Cecilia Payne-Gaposchkin's (1900-1979) work, suggesting that stars are composed primarily of a single element, hydrogen, revolutionised the field of astronomy and motivated a whole new scientific area, of astrophysics.

Her conclusions were initially rejected by her peers because it contradicted the accepted belief that the elemental composition of the stars was similar to the Earth. Later, her work was described as "the most brilliant PhD thesis ever written in astronomy".

Works: *Stellar Atmospheres; A Contribution to the Observational Study of High Temperature in the Reversing Layers of Stars* (doctoral dissertation 1925), *The Stars of High Luminosity* (1930), *Variable Stars* (1938) and *Variable Stars and Galactic Structure* (1954).

<https://www.nature.com/articles/d41586-020-00509-3>

Traditional scientific method versus Popper:

