

= Boiling frog =

The boiling frog is an anecdote describing a frog slowly being boiled alive . The premise is that if a frog is put suddenly into boiling water , it will jump out , but if it is put in cold water which is then brought to a boil slowly , it will not perceive the danger and will be cooked to death . The story is often used as a metaphor for the inability or unwillingness of people to react to or be aware of threats that rise gradually .

While some 19th @-@ century experiments suggested that the underlying premise is true if the heating is sufficiently gradual , according to contemporary biologists the premise is false : a submerged frog gradually heated will jump out .

= = The science = =

As part of advancing science , several experiments observing the reaction of frogs to slowly heated water took place in the 19th century . In 1869 , while doing experiments searching for the location of the soul , German physiologist Friedrich Goltz demonstrated that a frog that has had its brain removed will remain in slowly heated water , but an intact frog attempted to escape the water when it reached 25 ° C.

Other experiments showed that frogs did not attempt to escape gradually heated water . An 1872 experiment by Heinzmann demonstrated that a normal frog would not attempt to escape if the water was heated slowly enough , which was corroborated in 1875 by Fratscher .

Goltz raised the temperature of the water from 17 @.@ 5 ° C to 56 ° C in about ten minutes , or 3 @.@ 8 ° C per minute , in his experiment which prompted normal frogs to attempt to escape , whereas Heinzmann heated the frogs over the course of 90 minutes from about 21 ° C to 37 @.@ 5 ° C , a rate of less than 0 @.@ 2 ° C per minute . In " On the Variation of Reflex Excitability in the Frog induced by changes of Temperature " (1882) William Thompson Sedgwick writes : " in one experiment by Scripture the temperature was raised at a rate of 0 @.@ 002 ° C per second , and the frog was found dead at the end of 2 ½ hours without having moved . "

In 1888 Sedgwick explained the apparent contradiction between the results of these experiments as a consequence of different heating rates used in the experiments : " The truth appears to be that if the heating be sufficiently gradual , no reflex movements will be produced even in the normal frog ; if it be more rapid , yet take place at such a rate as to be fairly called ' gradual ' , it will not secure the response of the normal frog under any circumstances " .

Modern sources tend to dispute that the phenomenon is real . In 1995 , Professor Douglas Melton , of the Harvard University Biology department , said , " If you put a frog in boiling water , it won 't jump out . It will die . If you put it in cold water , it will jump before it gets hot ? they don 't sit still for you . " Dr. George R. Zug , curator of reptiles and amphibians at the National Museum of Natural History , also rejected the suggestion , saying that " If a frog had a means of getting out , it certainly would get out . "

In 2002 Dr. Victor H. Hutchison , Professor Emeritus of Zoology at the University of Oklahoma , with a research interest in thermal relations of amphibians , said that " The legend is entirely incorrect ! " . He described how the critical thermal maximum for many frog species has been determined by contemporary research experiments : as the water is heated by about 2 ° F , or 1 @.@ 1 ° C , per minute , the frog becomes increasingly active as it tries to escape , and eventually jumps out if the container allows it .

= = Use = =

= = = As metaphor = = =

The boiling frog story is generally offered as a metaphor cautioning people to be aware of even gradual change lest they suffer eventual undesirable consequences . It may be invoked in support of

a slippery slope argument as a caution against creeping normality . It is also used in business to reinforce that change needs to be gradual to be accepted . Oppositely , the expression " boiling frog syndrome " is sometimes used as shorthand to invoke the pitfalls of standing pat .

The story has been retold many times and used to illustrate widely varying viewpoints . Among them : in 1960 about sympathy towards the Soviet Union during the Cold War ; in 1980 about the impending collapse of civilization anticipated by survivalists ; in the 1990s about inaction in response to climate change and staying in abusive relationships . It has also been used by libertarians to warn about slow erosion of civil rights .

In the 1996 novel *The Story of B* , environmentalist author Daniel Quinn spends a chapter on the metaphor of the boiling frog , using it to describe human history , population growth and food surplus . Pierce Brosnan 's character Harry Dalton mentioned it in the 1997 disaster movie *Dante 's Peak* in reference to the accumulating warning signs of the volcano 's reawakening . Al Gore used a version of the story in a *New York Times* op ed , in his presentations and the 2006 movie *An Inconvenient Truth* to describe ignorance about global warming . In the movie version the frog is rescued before it is harmed . This use of the story was referenced ironically by writer / director Jon Cooksey in the title of his 2010 comedic documentary *How to Boil a Frog* .

Christopher Brookmyre used *Boiling a Frog* as the title of his novel that used gradual political corruption as a background to the thriller .

Law professor and legal commentator Eugene Volokh commented in 2003 that regardless of the behavior of real frogs , the boiling frog story is useful as a metaphor , comparing it to the metaphor of an ostrich with its head in the sand . Economics Nobel laureate and *New York Times* op @-@ ed writer Paul Krugman used the story as a metaphor in a July 2009 column , while pointing out that real frogs behave differently . Journalist James Fallows has been advocating since 2006 for people to stop retelling the story , describing it as a " stupid canard " and a " myth " . But following Krugman 's column , he declared " peace on the boiled frog front " and said that using the story is fine as long as you point out it 's not literally true .

= = = In philosophy = = =

In philosophy the boiling frog story has been used as a way of explaining the sorites paradox . It describes a hypothetical heap of sand from which individual grains are removed one at a time , and asks if there is a specific point when it can no longer be defined as a heap .