Natural Phenomenon and Universal Truths

*"**To doubt everything or to believe everything are two equally convenient solutions; both dispense with the necessity of reflection.***
Instead of a summary condemnation we should examine with the utmost care the role of hypothesis; we shall then recognise not only that it is necessary, but that in most cases it is legitimate."
(Henri Poincaré: Science and Hypothesis, 1905, tr. Judd Larmor)

In Henri Poincare´s "*Science and Hypothesis*", written in 1905, When Poincare talks about convenient solutions, he´s really saying solutions that sounds good for the human ear. Everyone likes a solution, and if it´s a convenient one, or a comfortable one, then it´s just about perfect. Everyone likes to be right. If you were to make a claim regarding why the sky is blue, and it turns out that you guessed it was because of Rayleigh-scattering, then you´d be very happy. Poincare indirectly tells us that this is a problem.

Humans like to be right. It feels good. When we´re right, endorphins are released in our body. This means that humans are naturally biased. If you have an idea about what the truth might be (without any reasonable evidence, you just believe it), you might be inclined to believe that it is indeed the truth. This isn´t such a big problem in our daily lives, but for a scientist such as Poincare, it´s a massive problem.

Science would be an absolute mess (and many people believe that it actually is a mess) if all scientists were biased. It´s important for scientists to not be biased, or they, as I´ve already said, will be inclined to believe that what you have proposed is the absolute truth. This means that if you propose a hypothesis, you´ll stick to that hypothesis no matter how much evidence is given against it. This will in turn lead to scientists being unproductive, which means that society is wasting money (remember that science is largely funded through taxes).

This is, however, not what Poincare is really worried about. His real problem is the way in which we propose solutions to problems. Some like to dismiss it by saying it´s the work of God, others, mainly scientists, use the scientific method to dissect a natural phenomenon and examine it further until they reach, what they consider, a valid conclusion. Poincare, as a scientist, is obviously inclined to go for the scientific way of reasoning, and this is indeed what he proposes.

Poincare says that, instead of claiming to know absolute truths, we make hypothesises. That is, we give a possible explanation to, for example, a natural phenomenon. Sounds simple enough; everyone can propose a possible explanation for a natural phenomenon. What´s important is that we set some limits. The hypothesis has to be falsifiable; it must be possible for others to test your hypothesis. This means that claims such as "Man was formed in Gods image." or "I can do magic!" are simply rejected.

We´re left with claims that explain the world around us, mainly through the use of empiricism (observation). Let´s take tectonic plates as an example. Back in the days, a wise man proposed that the land we humans live on, was once connected and acted as one massive continent; Pangea. To prove this, in the scientific sense, he gathered evidence. Evidence that was found included species of animals that live in both west-Africa and the eastern parts of south-America, maps that literally showed that south-America fit in western Africa and so on. This

was deemed enough, and we now have a theory of tectonic plates. Through the use of satelites and cameras we have found out that it is true that the continents are moving around, which makes the existence of a former Pangea quite likely.

What´s important for us to examine here, is what was done to give an answer to such a hard question. “Has the earth always been like this? Has the landmass on earth moved around?” are some of the questions that might have been asked. The hypothesis would´ve been something along the lines of: “No, the earth has not always been like this.” And so they went out to prove it. Evidence was gathered. One piece of evidence is usually not enough, in this case too, so they had to gather a lot. When enough evidence was gathered, they published their results for the rest of the scientific community to see. Obviously, it was accepted (maybe not at once) so the hypothesis was “upgraded” to a theory. The Theory of Tectonic Plates. This line of reasoning is what the man himself, Henri Poincare, described as “.. necessary, but that in most cases it is legitimate.”

However, Poincare´s proposition that we should use the scientific method to reach truths does have its problems. It turns out that it is virtually, philosophically and logically impossible to reach universal truths through the use of the scientific method. Universal truths meaning, truths that hold everywhere and any time. For something to hold in all cases, we must *know* that it holds in all cases. This type of certainty can only be reached through proofs in fields such as philosophy, mathematics and logics (through the use of axiomatic systems, something science lacks). As an example, we know that the sum of the angles in a given triangle is equal to pi radians, or 180 degrees. We know this because a logical and mathematically rigorous has been given that proves it. The same thing can´t be said about science. We can´t say that a scientific theory holds everywhere. We simply don´t know, and we really don´t have a pattern (a rule of interference, as one would say in logic) of reasoning that would help us achieve this.

One could sum this problem up as the problem of induction, a problem that has been known to the ancients. Even here one can see the difference between science (empirical fields in general, really) and rigorous fields such as mathematics. In mathematics you also find induction, but through the use of, for example, basic set theory, you know that induction works in mathematics (if certain criteria are fulfilled). Science lacks this logical tool that mathematics has. For the layman, this really means that it´s pretty much impossible for science to reach conclusions that we can be 100% certain about.

Karl Popper makes a good point on this. He rejects induction in the scientific method. He proposes that we can´t *really* be sure about whether our theory really is true. If we claimed that it did, we´d be doing induction, and that´s bad. Instead, he proposes that we falsify our proposals. In other words, test your hypothesis, test your theory and you’re your law. The more they hold, the ”stronger” they are. If you´re lucky enough to end up on the surface of Planet X (where X is a planet not in our solar system) one day, you´d actually be helping science. Although literally all scientists are sure that gravity would exist on that planet, you can´t really be sure if you haven´t tested it. Chances are, there would be gravity, but even if there weren´t any, you´d still be helping science. This would mean that the theory of gravity needs a lot of adjustments.

Popper doesn´t reject science in the sense that he dismisses it as a useless tool. Popper is a smart man, and he realized that the modern world around us is proof enough of fact that science does indeed work. Popper simply tells us that we can´t really reach universal truths through the use of the scientific method. A rather primitive example could be sheep. You

have probably seen sheep, and if you´re one of those who have only seen white sheep, you´d be inclined to believe that only white sheep exist. This is inductive reasoning, and this is what Popper rejects. We know that there exists sheep that are not white.

Poincare´s proposition is legitimate and very considerate. He makes a valid point that a more legitimate way of reasoning, or reaching truths about the world around, could be done through the use of the scientific method. This, however, does lead to a couple of problems. One of these problems include the problem of induction, a problem philosophers such as Popper has dealt with. Popper proposes a logically consistent solution to the problem of induction by saying that science really can´t claim to be 100% certain about anything.