Chapter 7: The limiting principles of science

Society makes extensive use of sophisms or scientific justifications to reassure itself that what it asserts is true. Sophisms are also abundantly used to fool people about a belief by making it seem true. Scientific religion is based on the fear of being fooled and demands scientific proof. However, it is easy to see that these proofs prove nothing. This does not mean that science is a bad religion, but it reminds us that it is a religion like any other. Here are some basic principles to keep in mind when you are presented with scientific justifications.

Limiting principle number 1: Principle of the nullity of proof by example.

One example is not proof. Neither are a thousand examples.

It is accepted to say that a theory, an assertion, or a result has been scientifically studied and therefore proven when it is repeatable under defined conditions.
Here is a scientific demonstration that multiplication is equivalent to addition:
2 + 2 = 4
2 x 2 = 4
I tested it on pigs, cars and pajamas.
I interviewed a sample of 998 people.
I performed the calculation on computers of different brands, operating systems and resources.
In 100% of the cases, the addition corresponds to the multiplication. Figure established by statisticians whose diploma has been verified by a judicial officer. by a court official.
So I have scientifically proven that addition is equivalent to multiplication. So some people can convince themselves that this is basically true. However, it is not true, despite the many examples. And it is very easy to prove with the following principle.

Limiting principle number 2: A single counterexample is sufficient to prove a theory false.
2 + 3 = 5
2 x 3 = 6
and 5 is different from 6. So multiplication is not equal to addition.
Yet many, if not almost all, scientific studies associate a confidence or error rate with their result. addition is equal to multiplication within 20%. Or is equal in more than 99% of the cases. But if only one case cannot be explained, it means that the phenomenon studied is not understood. Scientists like to talk about anomaly concerning the counter example. But it is the theory that is an anomaly. Authentic science says that the theory is wrong if there is a single counterexample.

The study can make sense if the failed examples are explained by the fact that the conditions for applying the theory were not met. For example, one can imagine having an antidote to a poison that works below 38°C. A failure was observed because a patient had drunk hot tea just before, which deteriorated the antidote in the subject's stomach.

Limiting principle number 3: Experimental science evolves

Experimental science is based on concrete, observable phenomena. These sciences try to explain why a phenomenon occurs. The ability to reproduce a phenomenon transforms a hypothesis into knowledge. This is the experimental method. Physics, chemistry and biology are experimental sciences.

They are different from the exact or formal sciences, which only use logic on reduced hypotheses. We can cite mathematics or computer science as exact sciences. It is conceivable to consider their results as exact, unquestionable. But be careful not to take this statement as a dogma. For example, you can never be completely sure that logic has been used correctly all the time.

The parameters influencing the experiment are not known a
a priori. Potentially the whole universe has the possibility to influence an experiment. The job of the scientist is also to determine them.

The observation is done through measurements. These are subject to uncertainty that must be taken into account.

These experimental sciences are first of all a work of simplification. It is out of the human understanding to apprehend the whole universe at once. We start with an enormous amount of information and we try to simplify it to give it a meaning. The scientist isolates the causes and conditions of a phenomenon and describes the expected transformation according to a model.

The contribution of a scientist is to give a meaning or an explanation while his contemporaries only see a confusion of phenomena. Once his model has been understood, integrated and assimilated, other people can then contribute to a new or more refined understanding. Thus, in essence, the laws of experimental sciences are brought to be abolished to leave the place to new and more developed ones.

Therefore, it is contradictory to say that something is true on the basis of an experimental science, because this one will, by definition, soon be updated because of false areas.

Beware, many people call physics an exact science. Because "Nature obeys laws that have mathematical representations". This is an unproven hypothesis. Indeed, we find mathematical laws to explain phenomena. But because they are updated from time to time, it means that we cannot assert that a law is definitive. For example, Newton's classical mechanics was extended by Einstein's relativistic mechanics 218 years later. So if we do not know the eternal representation of a law, how can we know that it exists? The fact that Nature obeys immutable laws is a belief. And the fact that science has discovered these immutable laws is also a belief. These beliefs may be true, but they are not proven. It is possible that universal laws exist and science tries to provide a model as close as possible. This cannot be

called exact. That would be an abuse of language. It implies that what the physicist says is unquestionably correct. No, he is trying to make sense and to predict. Just like an astrologer. In fact, a famous physicist like Kepler was also an astrologer. His model is only an extrapolation of the cases he encountered. This extrapolation can use mathematical or computer tools. But the use of a mathematical model or a concept from an exact science does not mean that the model reflects reality exactly. It means that a theoretical model has been found that approximates observations under certain circumstances.

Limiting principle number 4: A statistical model is limiting

Man in his quest for understanding regularly reaches limits, cul de sacs. But his will to understand and predict is sometimes greater than his capacities. Mathematics offers a tool that allows us to investigate the next stage in our quest. It is the statistical study. As we are unable to understand what happens, we study the phenomenon in a black box. We will predict things not by applying a law of operation, but in relation to what has already happened. Using this type of approach is almost the only solution when you have a lot of hypotheses or input data.. This is for example the case in economics or meteorology. It is not surprising that these sciences are wrong in some of their results. They often associate a degree of confidence with their predictions. For this is not an exact science. Even if the tool used is taken from an exact science. Thus, when a theory integrates a statistical model, it is because the theorist has given up on understanding the phenomenon. He makes his impotence official. He may receive glory for the veracity of certain predictions and admiration for the complexity of his model, but if the impotence is feigned, then the actual science will remain in the same stage of evolution because it has given up on understanding. Science is the search for explanations. Science progresses when new and additional explanations are discovered. Statistics and correlations do not explain anything.

Limiting principle number 5: Statistical interpretation can say one thing and its opposite.

Here is a fictive example: we study the effect of a medicinal plant on a sample of 100 people who have a headache. It is compared to a treatment with a new chemical molecule. Among those who took medicinal herbs, 20 had fever and 11 saw their pain disappear within the hour, that is to say 55% of success. Among the 80 who did not have fever, 55 saw their pain disappear within the hour, i.e. 58.75% success rate. In total, 66 people were relieved with a medicinal herb (66%). In the study on the new chemical molecule, 50 had fever and 30 saw their pain disappear within the hour, i.e. 60% success rate. In the 50 who did not have fever, 35 saw their pain disappear within the hour, that is to say 70% of success. This gives 65 people relieved with the new molecule. So if the study is presented by the manufacturer of the new chemical molecule, he will say that in all categories of headache, his molecule has always obtained better results: category without fever: 70% against 68.75%. And in the category with fever 60% against 55%. If the study is presented

by the herbal vendor, he will say that by integrating all categories, the herbal medicine is overall more effective than the new molecule 66% relief against 65%. So even with identical study data, different conclusions can be drawn.
Now be aware that, in a medical statistical study, many factors can be integrated that will introduce possibilities of interpretations. For example, the efficacy criteria, the duration of the treatment before it takes effect, the duration of the efficacy because the symptoms may return after a time; the environment (food, air quality, ...). The power of the statistician is then preponderant in the conclusions. In fact a statistical scientific study is an oxymoron. These are two antinomic terms. In the same way as a cold flame. The word "scientific" comes from "knowledge" and "statistical" implies that nothing has been understood, and that it remains only to count and classify.

Limiting principle number 6: The illusion of proof.
The mathematician and logician Gödel stated and proved the incompleteness theorems. Namely, that in mathematics, what is true is not necessarily provable. There are true statements that cannot be proven. So if proof is your ultimate need to know or try something, you may be missing opportunities. On the other hand, bad people who have identified that you want a proof, will give it to you, even if they have to make it. Indeed, Gödel's incompleteness theorem also says that you cannot prove that your frame of reference (axiom system) is consistent. This means that you do not have a proof that the logical framework in which you are thinking does not contain contradictions. And the problem with running into contradictions is that you provide proof that something is true, but also, with the same logic, it can be proven false. It is sufficient to work with assumptions that you will accept as true but which in reality have non-obvious elements that are contradictory. The error comes from not identifying contradictions. What happens in everyday life is that we are required to demand evidence in order to know. These proofs are usually derived from elements that would also require proofs, but that society has accepted with habit. It can also be accepted because of trust. But in reality, there is no real certainty. Any reasoning that follows will not lead to anything sure. The conclusion that can be drawn from Gödel's work is that logic is not self-sufficient. However, some people assert things with great conviction. Even if it is a lie or an error. Faced with this type of person, the honest or authentic person is aware of the uncertainties and will at best be able to say that what is asserted is unfounded. But they will not be able to bring you proof, even if they are in the right. Thus, sometimes we are faced with lies that are asserted as true or proven, with great conviction, but the only contradiction that can be brought is uncertainty, which does not carry much weight for people who want proof.

In spite of all these warnings, you can still rely on science because it cannot be denied that it brings meaning, significance and explanations. Yes, but be aware that it is your choice, your conclusions, your deepest feeling, your intimate conviction ... like all other religions.