WHAT is science? Some may define it as the study of nature; others may define it as the study of properties of the things found in nature. For some it is the study of both living and non-living entities present in nature or observing the natural phenomena.

But, all these statements do not exactly define science. Since ancient times human beings have observed and studied so many things in nature. For example, the ancient seers conceptualised nature as consisting of five basic elements i.e. earth, water, fire, wind and the sky implying the emptiness. Poets and philosophers too observed nature and expressed their ideas and perceptions. But were they talking science?

In ancient days, the solar, lunar and zodiacal movements were studied in depth and people tried their hand at astrological predictions. But we do not consider astrology as science.

So, what is science? Take the case of a person suffering from fever. About a hundred years ago, very few families possessed thermometers. Usually the fever was detected by feeling the pulse and by human touch. When there were clear signs of the patient lying down with high fever, which could not be cured by home remedies, the local physician or vaidyaraj was summoned to check the patient. During winters, while on the way usually his fingers would be colder. When he would feel the pulse, the fever would be estimated to be higher. He would advise keeping a water-soaked cloth on the forehead of the patient. But if the medicine man was called during the summers, his fingers would be hot. He would feel the same temperature less. This is because feeling the pulse with fingers does not enable one to exactly quantify the body temperature.

When thermometers were introduced, quantification to the extent of minimum 1 deg C became measurable. It was independent of the person checking it. There the science of body heat measuring came into the picture. The temperature of the body could be quantified in some numerical quantities and counted in units like Deg C or Deg F. So, in this manner the measurement of the temperature of the body became a scientific act using a thermometer.

The famous Archimedes principle was based on quantification. Archimedes fixed the densities of gold and copper in terms of volumes of water displaced. With these, he was able to evaluate the fractional quantities and the purity of gold.

So, science can be defined as quantification. Measuring any property, any physical entity or types of personal options when quantified in terms of numerical terms become scientific. Any approach that helps quantification is scientific.

Even in the socio-political field, quantification introduces what is called a scientific approach. About three to four decades ago, there were political observers who intuitively predicted the election results. After the statistical methods of judging the electoral trends were introduced, prediction of electoral results no more remained a speculation or expert guess. Depending on the sample size, the influencing factors or parameters accurately introduced, the electoral trend of election results
became predictable. This now becomes a scientific approach. Because voters' survey brings into the picture the quantification of the trend of voting.

For any hypothesis to hold, there are two conditions i.e. necessary condition and sufficient condition. In differential calculus, to judge either maxima or minima of a curve, the necessary condition is that the first derivative should be equal to zero. It is a necessary condition. The sufficient condition is, the second derivative should be a rational number either negative for maxima or positive number for minima.

In the same manner, for any study to be scientific, the first and primary condition is that in some form it should be possible to quantify some parameters connected to the object of study. The sufficient condition is that there should be some verifiable prediction possible.

It is to be noted that for the numerical predictions made on the scientific basis, the output should be verifiable. If the results do not match, then there should be scope to revise the calculations with further accuracy or additional factor introduction.

A very good example of this prediction is to be found in astronomy. Newtonian physics could exactly predict movement of planets, except Mercury, with slight variation. That variation was explained by relativistic effect of speed of the planet. This means the Newtonian quantification and predictions were valid for velocities which were not influenced by relativistic effects within the measurable limits.

Einstein’s theory of relativity was a great theory because it predicted seemingly unimaginable results like bending of light and these could be verified. Another good example was prediction of positron, the antiparticle of electron. More recently, it was the Higgs Boson.

So, even at the quantum level, where quantum statistical results implying more than one results are possible, it is predictable quantification that defines it as a scientific result. On the contrary, an astrologer can predict any event intuitively and these may come true. But if the predictions do not materialise, there is no way they can quantify the factor that made the result to go wrong. Just as influence of any particular planet on the life events cannot be quantified, so astrology will not become scientific as long as these influences are not quantified.

Earlier day artists were having very good sense of colourings. They would mix the basic colours and make a new colour which they could arrive at intuitively. These days with computer graphics, any artist can select a colour from the strip of colour spectrum available to him. If it is possible to make him read the RYB dot density, or the dot numbers that make up the final colour combination, then he will be able to give colours based on numbers rather than eye judgement and these can then be exactly replicated. This will be introduction of quantification in the realms of the intuitive field of arts. With more familiarity with numerical combination of basic colours, future artists will be devising the colour code in numerical formats i.e. they will be able to predict suitable colour shed for the drawing.

In the past an accomplished surgeon could operate the patient with expertise acquired over a period of years. Nowadays laser surgery has numerical controls. The cut to be given is controlled by a numerically controlled device. We consider it scientific.

So, to offer a basic definition of science: Science is quantification.

That also brings in the comparison between arts and science. While arts or artistic activity can be seen as expression of the inborn creativity in every human being in any form, it becomes science when accompanied by quantification.

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