

What kind of Science should the Common Man Imbibe?

The present age is the age of science & Technology. We all talk of scientific Temper. Science subjects are compulsory at school level. It is pertinent, therefore to ask "what kind of science do we wish the common man to imbibe?".

It is obvious that the common man will imbibe science only if he finds that in some way it helps him to face everyday problems.

I shall try to define science and derive therefore, what I consider the scientific methodology and shall try to indicate how these methods are of everyday relevance.

Science is an eternal search for Truth. This Truth is universal and everlasting. The conclusions of science are therefore reproducible and predictable. The test of the truth is in its applications.

When we do not have the whole truth, we can start with a truth limited to a given domain and still make progress. We know the earth is round. But in every life we work as if it is flat.

We depend on our senses for all information. Even our logic is dependent on the experiences we gain from our senses. Science accepts that senses are the only route to discovering the truth. In this it differs from religion. Science does not accept "revelations" as truth.

The methods of science are therefore derived from the above assumptions.

1. **Observations:** Observation is the basis of science. Awareness sharpens our observation. Instruments are an extension of our sensory organs. We need to train ourselves to observe better.
2. **Quantification:** Quantification raises the value of all information. Measurement is the foundation for quantification. It improves the resolution of our observation. That is it helps to differentiate between observations. Unfortunately lack of measurement and quantification are common weaknesses in our society – often even in the scientific community. Quantification includes not only the measurement but also the concepts of error and accuracy.
3. **Organisation of Information:** However valuable the information may be – it is almost useless if it is not organised. Organisation includes classification, tabulation, pictorial representation etc. In this connection the observations of Al Beruni, the 11th Century traveller on the state of Indian science is very relevant. He commented that we lacked classification and gave equal value to "pearls" and "rubbish".
Organising information reflects organising our thoughts. It arises from both creativity and tidiness. It often makes all the difference between the right conclusion and the wrong one. Again this is so basic to progress that we need to train our children in this from the kindergarten stage itself.
4. **Comparison of Information:** This is an important process in the scientific thought. We compare only after we bring the observations to a common base. This sounds common place but its implications are deep in everyday life. The farmer rarely calculates yields/ acre or hectare and can hardly calculate the rate of application of fertiliser or pesticides. The urban shopper hardly knows the price per kg of the packaged product he buys.
By not bringing out comparisons we lose the opportunity to adopt the better of two alternatives and improve. Comparison also implies exchange of information.
5. **Recording of Information:** Lack of recording habit is another cultural weakness in our society. A large part of our history has been written for us by ancient travellers. We do not realise that information is a Capital Asset and by not recording it we are throwing away the assets. And we spend more money to collect it again or forego the use of it and suffer the consequences – lack of progress.
6. **Recognise Trends & Patterns:** This is an intellectual skill. This should also be practiced. We can start from the kindergarten and train our new generation to

look for patterns and trends. From trends and patterns, we begin to question why and how?

7. Hypothesis: This leads us to make a hypothesis. We should not be satisfied with one hypothesis. We should form the habit of making alternatives – this is what we call rational thinking. But we often forget that we can rationalise almost contradictory observations and without all the basic observations and information being confirmed, rational thinking leads us nowhere. Making hypothesis without basis in sound information can be counter productive.
8. Experimentation: Last but not the least, testing of the hypothesis is the important step we cannot forget. Every experiment is a test of a hypothesis. This testing is also a skill. Experimentation needs manipulative and organisational skills. We need these also in our everyday life. Experimentation is not only for the specialists and the R & D establishments. To say that "I will learn and find out by trying" is research and "I will keep improving" is development. Our society must adopt this spirit of R & D. I believe that our society learning the above methods of science is going to be far more important than learning the laws of physics or the formulae of chemistry. What is more, once the methods of science are imbibed, they will be motivated to learn the concepts of science by themselves.

In the old days, land was the source of all wealth and landlords became all powerful. Then came the Industrial Revolution Industries started generating more wealth than land. Industries needed Capital for setting up. So those who had capital became centres of power.

In the coming age, Information Handling and Access is going to be more important than land or capital, in generating new wealth. Collecting, important for all sections of our society, if we do not want any section to be deprived of the fruits of progress. This is why the methodology of science which generates all the information is going to be critical in all walks of life.