

**Collected Works  
of  
Justice R.A. Jahagirdar (Retd)  
(1927-2011)**

# Scientific Temper

**Rationalist Foundation**

# Content

## Scientific Temper and Indian Citizenship

Scientific temper is prima facie the concern of the scientists, students of science or teachers of science. It is a frame of mind which a person carries with him when he enters the laboratory for scientific experience. On the other hand, citizenship is a question of status determined by the provisions of Part II of the Constitution of India and the Citizenship Act, 1955. No doubt a citizen may be a scientist. A scientist may also be a citizen. But why this question of “temper”? Is it one of those things like jeans and disco to talk of scientific temper because we are living in a scientific age?

It is a common belief that the age in which we are living is a scientific age. The basis of this belief is the great scientific achievements of the present age. Man has landed on the moon. Several satellites are orbiting around the earth. Man has in fact become a tourist in space. Great strides have been made in the fields of medicine, physics and chemistry. The progress made during the last 50 years is greater than the progress made since the infancy of mankind. It has been estimated that eighty per cent of the scientists born since the dawn of civilization are actually living today. One may justifiably be proud that India has the third largest number of scientists in the world today.

Yet in my opinion it is a mistake to call this age or for that matter any age as a scientific age. Only on the basis of the mass of scientific knowledge an age does not deserve to be called a scientific age. Probably when it is said that we live in a scientific age, it is meant that in our age there has been an intensification of inquiry and an acceleration of discoveries and inventions. One can also say that the present age is an age of high technology.

Nor is a particular society entitled to be called a scientific society to the exclusion of others. As archaeology, ethnology, history and sociology have demonstrated, man in every society has a certain amount of scientific knowledge. The amount, of course, varies a great deal among societies. In other words, science is a matter of degree, with some societies having only a small amount and others having a great deal more. Viewed in the long perspective, one can always discern a history of continuity and accumulation from the earliest pre-history of man to the present, though that history has been marked by different rates of development in different times and

different places (See *International Encyclopedia of Social Sciences*, Vols. 13-14, p. 92)

I would call that age scientific age in which the problems of the society are faced and handled by men with scientific temper. I would call that society a scientific society which is composed of men and women who display scientific attitude in their day-to-day lives. In order to understand what scientific attitude or scientific temper is, one must necessarily understand what science is.

Science is a system of knowledge, a body of knowledge, held together by a group of propositions which have been tested and found to be valid in the light of evidence gathered. It has been said that science is the eternal interrogation of nature by man. It is a quest for knowledge. It is “*dnyana*” which is the result of “*jidnyasa*”, the desire to know. In the heyday of the Greek intellectual activity, the Greeks called the manner of studying the universe “*philosophia*”, which meant love of knowledge. More simply it meant desire to know. The word “*science*” came into use very much later. The Aristotelian system of acquiring knowledge, known as the philosophy, dominated the western intellectual tradition till after the renaissance. The age of reason, the age of modern science, in fact of science, can be said to have begun with Francis Bacon who saw and demonstrated that Aristotelian system of predominant deduction hampered the progress of science. He established the importance of induction in the acquisition of knowledge. This necessarily required observation, experience and then experiment, if necessary. But before this the Greeks had fallen so much in love with the system of deduction, necessarily involving a set of axioms that they were bound to and did fall in two errors. First, they came to consider deduction as the only respectable means of attaining knowledge. Though they were aware that for some kinds of knowledge deduction was inadequate, they undervalued the earthly knowledge so that in the long run, the major premises of their syllogisms started becoming unreal. Secondly the Greeks came to think of axioms as absolute truths and to suppose that other branches of knowledge could be developed from similar absolute truths. In Aristotelian logic only a perfect circle can be good because the heavenly bodies moved in perfect circles. A hen laid eggs which are elliptical and therefore a hen cannot be perfect. Therefore, the females in other animals also are less perfect than males.

In astronomy, more than in any other branch of knowledge, the imperfections of the purely deductive method started becoming

manifest. The reign of Ptolemy was bound to come to an end sooner than later. Astronomy was the earliest science and was developed gradually on the basis of the records kept by men from time to time. The reasons for these records were primarily utilitarian, for agriculture for example. It was not meant for fixing the muhurta for marriage.

Though the Copernican revolution converted the geocentric universe into heliocentric universe, the foundations of the modern scientific method were laid by Galileo on the intellectual ground prepared by Francis Bacon. With Galileo, “science now began to liberate itself from the placenta of its mother, philosophy. It shrugged Aristotle from its back, turned its face from metaphysics to Nature, developed its own distinctive methods and looked to improve the life of the man on the earth”. (*The Age of Reason Begins*’ by Will and Ariel Durant, p. 586)

The turning away from metaphysics, development of distinctive methods, and the concern for improving the life of the man on the earth; these three are the important aspects of science that developed with and after Galileo. Each of them is almost equally important. But the second aspect, namely the distinctive methods developed by science, is more relevant in the context of the subject under discussion.

The method of science or the scientific method consists of formulating a hypothesis on the basis of the current knowledge and of gathering additional data or facts to test the validity of the hypothesis. The validity of the hypothesis is not tested merely by the gathered facts or data. The deductions of a hypothesis are worked out and they are also tested. Thus there is no self-evident truth. Hypothesis is a stage in the inquiry, and therefore it must provide the answer to the problem which has set the inquiry. A hypothesis may also be tested by an experiment in a given case. In the process, a hypothesis may be modified or in some cases may be thrown away in favour of another hypothesis. In other words, a scientist or a man with a scientific temper or attitude does not cling to a proposition merely because it is attractive or because it is more convenient or because it is after his own heart’s desire. You cannot impose your own hopes or desires on the course of the quest of knowledge. As Faraday has said: “The world little knows how many of the thoughts and theories which have passed through the mind of the scientific investigator have been crushed in silence and secrecy by his own severe criticism and adverse examination; that in the most successful

instances not a tenth of the suggestions, the hopes, the wishes, the preliminary conclusions have been realised” (quoted by Karl Pearson in “*Grammar of Science*”)

It is only after a hypothesis is tested and found valid, that it is placed on the pedestal of a theory. Even then its position is shaky. With the accumulation of more knowledge or with the need to explain some more phenomena, that theory may be found wanting. It may require correction, modification and some times a burial. Even the most intelligent, the most prolific scientist does not claim to be a treasure of revealed wisdom. However, he also does not accept unquestioningly the opinions handed down to him from the past. Though one of the conditions of a good hypothesis is that it must accord with the existing state of scientific knowledge, it may happen and it has happened that a hypothesis when tested may overturn the current thesis and a new era in scientific knowledge may be heralded. The Copernican revolution is a classic example of this type of development. In other words, a scientist is not afraid of a revolution in knowledge.

May I now summarise what I mean by scientific temper or scientific attitude? It is that frame of mind which has a thirst for knowledge, which recognises that knowledge can be acquired by observation, experience and experiment, if necessary. It is not by speculation alone that knowledge can be acquired. Though for some limited purposes, especially in Geometry, axioms have some use, a truly scientific mind will not accept anything as self-evident truth because somebody has authoritatively laid it down. A scientific mind is an adventurous mind. It is not afraid of truth because it may clash with established systems of thought, beliefs and superstitions - some of them claiming to be the products of mystic experience or metaphysical speculations. The scientific mind, the scientific temper, the scientific attitude - these are not the monopoly of a scientist. Indeed not all scientists display scientific approach in their daily lives. One need not be surprised if a professor of astronomy takes a bath after an eclipse.

On the other hand, any citizen, whether a scientist or not, or whether a student of science or not, can and should possess a scientific temper. “A Statement on Scientific Temper” prepared by a group of scholars and issued on behalf of the Nehru Centre, Bombay, in July 1981, mentions that “Scientific Temper involves the acceptance, amongst others, of the following premises:

- (a) that the method of science provides a viable method of acquiring knowledge;
- (b) that the human problems can be understood and solved in terms of knowledge gained through the application of the method of science;
- (c) that the fullest use of the method of science in every day life and in every aspect of human endeavour from ethics to politics and economics is essential for ensuring human survival and progress; and
- (d) that one should accept knowledge gained through the application of the method of science as the closest approximation of truth at that time and question what is incompatible with such knowledge; and that one should from time to time reexamine the basic foundations of contemporary knowledge.”

I am in total agreement with several consequences which follow from the above propositions. Scientific temper in the first place is wholly inconsistent with metaphysical attitude. Knowledge based upon metaphysical speculation cannot have a unity while all science is one. Each metaphysician has his own universe—based not on facts or knowledge but on quicksand. It is the unguided imagination, not the reason that is the foundation of metaphysics. Karl Pearson has very rightly asked:

“Why not trust a poet whose imagination is at least matched equally by mastery of words?” Metaphysics is nothing but the product of some obscure, untested, untestable process of internal cogitation. There are different schools of metaphysics, conflicting and contradictory with each other.

Scientific temper cannot, in the second place, go hand in hand with theology or religion, especially a theology or religion which has incorporated in it miracles. Almost all religions are based upon alleged revelations, beliefs in supernatural beings and in after-life and have fossilized rules of conduct called morality having no relevance to the secular, present day needs of mankind. Belief in supernatural beings capable of affecting human destiny is wholly dangerous to a rational living. It may lead to a lack of interest in present life and to a concern for an imaginary salvation in the other world. It also inculcates a feeling of guilt in the man for sins imagined or otherwise and prevents him from realising his potentiality as a human being. Belief in a book as the inspired word of God is inimical to secular search for knowledge.

Superstitions such as astrology are the enemies of scientific temper. Belief in astrology may lead to psychologically debilitating diseases or may inspire a person to unwarranted and unjustified adventures, depending upon what the astrological prediction is. Peddlers of prediction are multiplying by thousands in this country and are posing a great threat to the sanity of the society. Allied dangers are to be found in omenology and “numerology”.

Though the importance of scientific temper had been generally recognised, no specific role or place was assigned to it in the Indian Constitution as originally enacted. The Fifth Parliament by the 42nd Amendment to the Constitution inserted Part IVA which consists of only one article namely Article 51A. In Part III of the Indian Constitution are enshrined the Fundamental Rights. Part IV of the Constitution contains Directive Principles of State Policy. Part IVA enumerates what the Fifth Parliament regarded as the Fundamental Duties of Indian Citizens. Article 51 (A) says that “it shall be the duty of every citizen of India to develop the scientific temper, humanism and the spirit of inquiry and reform”. A true citizen of India, a good citizen of India, any one who swears allegiance to the Indian Constitution is duty bound to develop the scientific temper. I have taken the liberty of mentioning earlier some of the attributes of scientific temper and have also shown how some of the mental habits and systems of beliefs and superstitions are the enemies of the scientific temper. It is the duty of every true citizen of India to acquire those attributes and to wage war on the enemies of the scientific temper. How many people in this country are aware of this fundamental duty? How many, being aware, make any effort towards its fulfillment? The answer is highly disappointing.

Take the instance of elections in this country. It is a time for the display of the most blatant superstitions and blind faiths. Those who are contesting the elections for the legislative bodies created by the Constitution begin by praying to God, no doubt with an intense and burning desire to serve the people, that they should be given the opportunity of placing their lives at the disposal of the nation and the people. Many of them make pilgrimages before the elections and, if elected, alter the elections also. Many of them consult the astrologers for a propitious time for filing the nomination papers. Elections to the legislative bodies are the most secular affairs. The Constitution provides that a member of a legislative body should be elected by the people. This necessarily means that the votes of the people must be cast in favour of a candidate on the people making a free, conscious choice uninfluenced by any extraneous



considerations. Belief in the sovereignty of the people is the most elementary qualification for a candidate in an election. Does a candidate believe in the free choice to be made by the people? If he does, then he is violating his duty as a citizen of India by appealing to gods, pirs, darghas, etc., for his success in the elections. If he really believes in the power of the super natural beings to influence the electorate in his favour, he is assaulting the Constitution of India to which he must swear allegiance. One can understand a dictator like Idi Amin who has usurped power saying that he has been appointed by God as the President of his country. But it is indefensible for any elected functionary of this country to attribute his success to the intervention of a supernatural power. When, therefore, Sanjeeva Reddy proclaimed that he became the President of India (he said so in 1980) because of the blessing of Lord Venkateshwara of Tirumalai, he wiped out Articles 54 to 60 of the Constitution of India. Tragically rival candidates go often to the same deity or baba but success can come to only one candidate. I have mentioned elsewhere and I will repeat here that in order to enable a candidate to discharge his duty as a citizen of India provision must be made in the relevant laws that a candidate must state on oath that he has not prayed to any god or godman for his success in the election.

The preamble to our Constitution as amended in 1975, declares that the people of India have resolved to constitute themselves into a Secular Republic. Secularism is a necessary and important attribute of scientific temper. It is the duty of every citizen of India to practice the ideal of secularism. Secularism necessarily means the renunciation of religious or spiritual authority in the governance of the country. Laws affecting our life in this world must be freed from the shackles of religions which if at all may be left to concern itself with the matters of the other world.

It is in this light that one should view the importance of Article 44 of the Constitution which enjoins upon the State to endeavour to secure for the citizens a uniform civil code throughout the territory of India. Since questions such as marriage and adoption are purely secular questions, they must be governed by such provisions of law which are not founded upon any religious scriptures. So far, unfortunately, even these matters have been governed by the laws which had their origins in the religious scriptures. May be, in the infancy of mankind this was inevitable but as the civilization has progressed several centuries from its infancy it is now imperative that matters such as marriages and adoptions and even matters pertaining to succession

must be governed by a secular law. If you have a quick glance at the laws governing marriages you will notice that they are unequal in their treatment of men and women. They have always been loaded heavily against women. That women should not be treated unequally in matters of marriage and succession so property cannot for a moment be denied in the latter half of the twentieth century in which we are living. If this is so, at least in some part of the marriage and succession law you will have to move away from the shackles of religious laws. The Constitution guarantees equality amongst its citizens. It prohibits discrimination on grounds of religion, race, caste or sex or the place of birth. Once this basic postulate that the matters relating to marriages, adoption and succession to property are to be governed by a secular law is accepted, then there is no reason as to why different citizens following different faiths and religions should be governed by different civil codes though they may be secular codes. One need not go to the extent of saying that uniform civil code is necessary for national integration. Purely on rational and secular grounds it is possible to argue for and to fight for uniform civil code for all the citizens of this country. Persons opposing civil code based on secular basis and a uniform civil code for all its citizens are to that extent challenging the mandates given by the Constitution and therefore they are untrue to the Constitution. They are vociferous in claiming several privileges and benefits under the Constitution but they are reluctant to accept, and sometimes fanatically opposed to, the introduction of reforms which are the mandates of the Constitution.

There are secular questions for which there are secular and rational solutions and if people in the name of religion stand in the way of such solutions, then it is necessary to persuade them to give up their obscurantist attitude and to allow the march of secular India towards its progressive future. For example, India needs a very rapid economic development which will benefit the people at large. No economic progress can give fruits which will be available to the people of the country unless there is a proper and rational population policy. This rational and proper population policy must necessarily envisage birth control as its important part. In the earliest days of mankind religious commands required their followers to multiply their number and inhabit the earth. Given those times, that advice might have been proper and utilitarian because there was plenty of land available and natural resources abounded and it was not necessary for human beings to limit their numbers. If, however, today any person gives such advice, he will have to be regarded as

something less than sane. Such advice is not only disastrous in its consequences but contrary to the secular spirit and the provisions contained in our Constitution. "Free Thinker" of England has reported the advice given by Mother Teresa to the people of Egypt where she had gone that they should have children and they should have lots of children. It has been pointed out that this advice given by the Nobel Prize Winner is contrary to the population policy of the Government of Egypt. The "Free Thinker" rightly chides Mother Teresa for this advice. If her advice is followed, says "Free Thinker", the world will be flooded with large population and more and more slums will come into existence giving opportunities to people like Mother Teresa to serve the sick and disabled and to win further Nobel Prizes. It is, therefore clear that people who oppose policies such as family planning in a country like India where rapid economic development and rapid proliferation of the fruits of economic development are crying needs, are the enemies of the country and the opposition to the family planning is an assault on the need to develop scientific temper as enjoined by Article 51A of the Constitution.

The all-pervading influence of religion in every walk of life has several sinister consequences in this country. Today religion no longer wages any battle against science as it did in the 18th and 19th centuries. In that limited sense there is no open conflict between science and religion because religion has been beaten in the fight and has retreated to selected points but that does not mean that religion is not interfering in several spheres where it has no business to tread. Religious leaders today do not question the scientific progress that has taken place nor do they ridicule the various scientific achievements which have been made possible by the development of scientific attitude, scientific temper and scientific methods but they as well as certain godmen in this country have adopted certain stealthy manner of shaking the secular basis of the society. They are not in a position to cast doubt on the inexorable nature of scientific laws by adopting any intellectual process or method.

However, some of them come out with what to the uninitiated, unintelligent; gullible appears to be a miracle, a deviation from the law of universe. By indulging in such tricks as by producing matter out of nothing or by pretending to bestow boons upon the distressed, they raise themselves to the position of supermen of Hindustan. One or two such persons may not do any irreparable damage to the progress of the country but unfortunately when one or two such

persons get away with such things, there is a platoon and a battalion of them and multiplication in the population of these godmen poses a grave threat to the sanity and rational organisation of the society. It is a measure of the level of intelligence and intellectual integrity of this country that people like lawyers and judges who will not accept anything which is not supported by evidence in the Court, flock to such godmen and applaud the deeds and misdeeds of such godmen.

Science and technology are today enormously powerful forces and we should try to make the fullest use of that power for the good of the society. Both science and scientific education are essential for the economic advancement of the country. This country having accepted economic development along socialistic pattern, it behoves all of us to develop scientific temper and to see that the secular and scientific march of this country is not deflected or obstructed by superstition and obscurantism and by people who propose and propagate superstition and obscurantism. In the early days of scientific development the scientists regarded that it was below their dignity to propagate scientific attitude and scientific outlook. To some extent the scientists worked in exclusive shell of their own and did not expose the work that they were carrying on to the gaze of the society. However, today no scientific achievement is regarded as scientific achievement unless it has been thrown open to discussion and shared and commented upon by the community at large. This was the reason why the Royal Society was established in England after Newton propounded his scientific theories. Prof. M. G. K. Menon, in his lecture on the Role of Science and the Responsibility of Scientists in National Development (Jawaharlal Nehru Memorial Lectures, 1973-79), has urged the scientific community to take up the task of building up scientific temper among the citizens of the country. Recalling an instance where Sir C. V. Raman was speaking to school children under the auspices of the Community Science Centre in Ahmadabad on "Why is the sky blue", Prof. Menon has mentioned that Sir C. V. Raman did not use any blackboard or slides but lecturing under the open blue sky made a magnificent impact. Fortunately today several tools for the propagation of knowledge are available and scientists can make full use of them and spread the scientific knowledge which will inevitably lead to the development of scientific temper among the people. The Statement of Scientific Temper prepared by Nehru Centre of Bombay to which I have made a reference earlier has briefly mentioned the role of scientific temper in India today. It has called upon all scientists, technologists, social scientists, educationists, teachers, mediemen to join hands and

undertake on priority basis the task of nurturing scientific temper. Our nation's survival and its future depend upon the upholding of the scientific temper. Superstition shall not pass and darken our portals.

Before ending, may I quote Jawaharlal Nehru who did more than anybody else to develop scientific institutions in this country. He has stated in his 'Discovery of India' (page 452) as follows:

“Too many scientists today, who swear by Science, forget all about it outside their particular spheres. The scientific approach and temper are, or should be, a way of life, process of thinking, a method of acting and associating with our fellow-men. That is a large order and undoubtedly very few of us, if any at all, can function in this way with even partial success. But this criticism applies in equal or even greater measure to all the injunctions which philosophy and religion have laid upon us. The scientific temper points out the way along which man should travel. It is the temper of a free man. We live in a scientific age, so we are told, but there is little evidence of this temper in the people anywhere or even in their leaders”.

## Science, Superstition and Supernatural

To talk of superstition in 21st century may sound quixotic. But, alas, it is not so. Superstition is not a windmill. The present writer, sitting in Mumbai, is faced with number of superstitions. Maharashtra is regarded as an advanced and liberal State. But it is in Mumbai, some years ago, the story of idol of Ganapati drinking milk originated and spread, through internet, to different parts of the world where Hindus lived. It is only a few days back, the birthday of “Shani” was observed in a village and it was attended by thousands of devotees. If Saturn is “Shani”, it was remarkable that Shani’s birthday is fixed because the scientists have not been able to calculate the birth of the Universe except saying that it was about 14 billion years ago. Even now our rulers go to temples and other places of worship to invoke the blessings of god or gods. The massive celebrations of Ganapati festivals all over India and especially Maharashtra, indicates that we have not imbibed scientific tempers, despite Article 51A of our Constitution. It is; therefore, appropriate to refresh our memory regarding science, superstition and supernatural events.

I will be describing science and scientific method shortly, but before that we must know what superstition and supernatural events are. Saint Paul said that faith begins where there is no evidence. In other words, faith is a belief in a fact without any evidence for it. How is it different from superstition? Concise Oxford Dictionary describes it “credulity regarding the supernatural; an irrational fear of the unknown or mysterious; ...” Superstition has a close connection with the supernatural which itself has been defined as state of mind attributed to or thought to reveal some force above the laws of nature. It is something magical or mystical. Superstition and supernatural thus overlap each other. Everything that is superstitious is not supernatural but everything that is supernatural is superstitious. Encyclopedia Britannica points out that superstitions are of various kinds. In the first place there are religious superstitions – prayers, fasting are religious superstitions. There are then cultural superstitions which vary from country to country, from region to region. Number ‘13’ is regarded as inauspicious among Christians as Judas was the thirteenth person at Last Supper. Similarly, number ‘3’ is regarded, in Western countries, as inauspicious whereas among the Hindus it is mandatorily good omen or auspicious. Hindus circumambulate God or any holy place three times. Normally holy water (“teertha”) is taken three times.

In my opinion, every religion is organised superstition. Test any tenet of religion on the anvil of present day knowledge and you will find it superstitious. As J.B. Bury has pointed out: "If the story of Noah's ark and flood is true, how is it that beasts unable to swim or fly inhabit Africa and the islands of the ocean? And what about the new species which were constantly being found in the New World and did not exist in the old? Where did the Kangaroos of Australia drop from?" (*A History of Freedom of Thought*, 1952 Edition, p.141) The "*Vishwaroopadarshan*" in Chapter XI of Bhagwad Gita is hopelessly contrary to the solar system as revealed by science.

"Yadnya" is a common superstitious practice in this country. "Yadnyas" are performed so that India might win a cricket match; there will be good rains or even a couple may have a child or a son. Different religions have different beliefs. They are characterized as peripheral beliefs as they are not central to the religions. They are in one sense cultural.

There are cultural superstitions which are unlimited in number and variety. They vary from country to country, from religious groups to religious groups and from region to region. I have already pointed out the practices surrounding numbers '13' and '3'. Among the cultural superstitions may be mentioned the preference of stones of a particular colour, wearing of amulets or rings, the dread of "mangal" in horoscopes.

Then there are social superstitions, the basis of which it is difficult to guess. The colour of clothes, particular pens, beliefs in the directions, "Vaastu Shastra", etc.

Why to object to such innocuous beliefs? An irrational practice indulged in repeatedly by an individual or a society debilitates that individual and that society. They present a grave threat to the rational basis of human society. A great hazard lies in the erosion of reasoning capacity of human beings, being an impediment to social and human progress. Another danger is that repetitive acceptance of superstitions requires some guru or priest to interpret them. This is putting the clock back.

Readers do not need a long dissertation on what science is. Nevertheless, it is better to refresh one's knowledge. The most common meaning of science is a body of established, verifiable and organised data secured by controlled observation, experience or

experiment. The scientific method is the method followed in obtaining such data.

At one time when the world was in the thralldom of Aristotle, it was thought that knowledge is obtainable by deduction only. It was Francis Bacon who thought that Aristotelian system of predominant deduction hampered the progress of science. In his book “Novum Organum” he proposed the inductive study of nature through inductive reasoning, experience and experiment. Will Durant called this book “as the firm clear for an Age of Reason” (*Age of Reason Begins*, p.174). But neither deduction nor induction itself was always sufficient. A scientist formulates a theory which he repeatedly tests to confirm that it is correct. Michael Faraday said:

*“The world little knows how many thoughts and theories passed through the mind of the scientific investigator have been crushed in the silence and secrecy by his own severe criticism and adverse examination that in the most successful instances not a tenth of the suggestions, the hopes and wishes that the preliminary conclusions have been realized.”*

(Cited by Karl Pearson in “Grammar of Science”)

That is the method of science – the scientific method. There is nothing esoteric in science.

At one time when smallpox was prevalent (now it is eliminated all over the world), it was thought that smallpox was an infliction from a Goddess. In India it was called a “Devi” and in Mumbai a temple was erected to “Sheetala Devi”. An interesting incident is worth mentioning. Dr. Edward Jenner of Scotland asked his milkmaid why she has not got smallpox when people of her class had all got it. Her answer was simple: “Doctor, I have got cow-pox and so I cannot get small-pox.” The doctor thought that one who has got cowpox – a smaller infection - would not get the larger infection, smallpox. This was his observation as also of Sarah Nelves, the milkmaid. Dr. Jenner took small matter from her infected hand and inserted it into the arm of a boy called James Fibs who was later found to be immune to smallpox. This was experiment; observation and experiment. That is scientific method. But still Sheetala Devi in Mumbai is being worshipped. That is superstition about supernatural.

Unfortunately, many men and women take recourse to amulets, application of oil or ashes to the body. They get well, as they



should, in most cases. The experience is correct but the conclusion is wrong when they think they are cured because of amulets or ashes.

The scientist tries to get rid himself of all faiths and beliefs when seeking answer to any question. He does not depend upon or seek answers in revelations as religions have done. The man of science seeks evidence in the case of all traditions of beliefs and practices.

By supernatural, we understand information, beliefs, theories, claiming origin other than verified or verifiable experience or events contrary to known processes of nature. It is “out of the world”. Production of wine from water alone, resurrection of the dead, and creation of the world - these are all supernatural events unverified and unverifiable. Old Testament tells us of the arrest of the sun through space so that the Jewish could kill a few more Canaanites. You will find many more fanciful fables in Bible, Ramayana and Mahabharata. These supernatural stories are to be found in all religious books. Some times we find a sprinkling of it here and there in social habits, customs, etc. King John I propounded the theory of divinity in Kings and divine right of Kings. Unfortunately, his son Charles I was beheaded and in due course democracy - the rule of the people - came.

Most religions have in common the view that sometime, somewhere God or Gods, supernatural beings, communicated to some man, who later came to be regarded as a Prophet, information on the origin and nature of man and the world. In all such cases, the revelations occurred so long ago that the person to whom these revelations were made has been buried and we cannot analyze the facts.

The most serious aspect of the supernatural is not the so-called revelations, but the miracles, the myths and guesses and the injunction that all this must be taken on faith; not to do so is forbidden, it is a sin. With the birth and progress of sciences, the revelations are found to be inaccurate and false. Yet people cling to them. The revelations have been of no assistance in the progress of the society and the world. Those revelations were guesses in the light of the then extant knowledge.

No doubt, today many “intellectuals” reject much of anthropomorphisms. So they have invented theory of intelligent design. They retain a distillate of the supernatural in the form of beliefs, or design or “moral purpose” of the universe. Is this

superstition or belief in supernatural? After all, the world is amoral.

The theory of personal immortality is to be found in Karmavad in India. It is partly mythological, partly supernatural, partly philosophical. The Bhagwad Gita teaches you that atma drops old clothes and acquires new ones. The body perishes; the atma survives. But it is the body which is born and which becomes "bhasmibhoot". How are, then, the effects of one's "Karma" visited upon a man? This internal conundrum is practically insoluble.

The ethics of supernaturalism may also be considered – not philosophically but from a common sense point of view. The ethics of science is simple: absolute honesty in recording and presenting data to arrive at truth. It is possible to argue that supernaturalism is an early attempt at learning about man and the world. We can have thus no quarrel with Jesus, Confucius or Zoroaster who did not talk of supernatural. But today to accept the prophets with revelations is not pardonable. It is impossible to condone the tyranny to which Galileo was subjected. Intellectual tyranny is as immoral as, or worse than, physical tyranny. The supernatural theories of sin, personified evil, redemption, eternal damnation, etc., do create disturbances in man's emotional life and debilitate him in the long run.

Science nurtures inquiry; the supernatural stifles it. The two are obviously incompatible. To suppress inquiry, freedom of thought, quest for truth is itself immoral or unethical. Supernatural is a foe of science; so also superstition. Every superstition has a shade of supernatural in it; every supernatural is superstition. To a humanist who believes in autonomy of man, both are dangerous.

## **Astrology and Astronomy**

Readers of “Radical Humanist”, it is assumed, are generally rationalists and do not believe that supernatural events influence human life. They obviously do not believe in astrology. This should be true of all educated people. But, alas, all educated people are not rationalists. A scientist will go home and protect himself from the evil effects of eclipse and take a bath after the eclipse. There are educated people who empty vessels of all cooked food, instead of keeping it in the refrigerator, before eclipse because it is believed that any food which has received “radiation” of the eclipse is inedible.

Though, it is assumed, humanists and rationalists do not believe that planets and stars influence human affairs, they are not always able to tell why they do not believe. As rationalists, they should have a sound, rational, scientific basis for not believing, which they do not always have. They must possess knowledge as to why the planets and stars have no influence on human affairs. This is my excuse in writing this article.

Concise Oxford Dictionary (COD) defines “astrology” as the study of movements and relative positions of celestial bodies interpreted as having an influence on human affairs. Without the assumption that such movements have influence on human affairs, the study would be a part of astronomy which the COD describes as the scientific study of celestial bodies. “Scientific study” means an investigation according to rules for performing observations, drawing inferences and, if necessary, performing experiments.

“The fault, dear Brutus, lies not in our stars but in ourselves”, thus wrote Shakespeare living in 16th Century. Apparently, the Bard of Avon did not believe in astrology, though Julius Caesar and Brutus, living in centuries earlier believed. The belief in astrology was or is limited to India or other eastern countries. It was at one time widespread in Western countries, though now it is not. It is still accepted in Africa on a wide scale. In India, or course, it is very popular even among the educated. As readers must have noticed, almost every newspaper carries weekly forecast. The forecasts are in vague language and two forecasts do not agree.

It is, therefore, instructive to learn as to how astrological forecast became the fashion of the day. It is necessary to know the basis of astrology even for those who do not believe in forecast. Carl Sagan

has mentioned that in America it is a matter of polite conversation in parties. Nobody adjusts his programme as dictated by forecasts. Astrology has existed for thousands of years. But theories about how the planets influence, assuming they do, the earth and earthlings have changed from era to era.

Stars and planets have served as guides to travelers on sea and land when there were no maps. The stars were at some time so important that we called them “devas” (gods). Nakshatras were also important for the cultivators. Later, when five planets, then known, wandered through Nakshatras. They also received their status as “devas”. The Nakshatras, the “grihas” (planets) and their conjunction were thought to be able to produce good or evil effects, thus giving rise to astrology.

The members of the priestly class (Jyotishis) who were able to predict the movement of Nakshatras and planets were shrewd persons. Originally the predictions were for the whole world, as it originally was, and later they were narrowed down to apply to individuals. Gullible people, out of fright or curiosity, believed these Jyotishis. It was not difficult to work upon the minds of weak persons. For example, the sun became an object of worship because the sun was thought to be Dev (god). Even now many morning walkers can be seen to do “pranams” to sun which is regarded as “Surya Narayan” in Hindu mythology. Even a High School student knows that sun is a star made up of hydrogen and helium gases in solidified form.

It is advisable to know the size of the universe and the distances between the earth, the stars and planets. Apart from the worshippers of the sun, generally the people will be surprised to know that the sun is only a star – the only star about which we have some knowledge. It is one of a billion of stars which are millions and millions of miles away from the sun and we know little about them. It is sufficient to realize that all the planets we know revolve around the star sun and the planets together with sun form what we call solar system or solar world. I am of the opinion if you know even elementary factors of solar system, you will disbelieve astrology. No astronomer will ever believe in astrology. No astrologer, even having elementary knowledge, will try to understand the significance of astronomical facts. Sir Julian Huxley has, in his autobiography, mentioned that our universe is like pebbles on the seashore and man is a creature in a pebble.

I am taking the liberty of mentioning few facts of astronomy for the purpose of understanding the claims of astrology. (Those interested in greater details may fruitfully refer to books on Astronomy by Patrick Moore, former President of British Astronomical Association, and Iain Nicolson, a Senior Lecturer in Astronomy. Both books are with illustrations). What is being stated here is accepted knowledge of astronomers.

Formerly it was believed that the earth was the centre of the universe and that planets and stars revolved around it in a circular motion. Copernicus concluded after a study that it was the sun that was at the centre of the universe and that planets revolved around the sun. Subsequent to his death in 1543 C.E., Galileo, an Italian professor of mathematics, confirmed the view of Copernicus. After him, Kepler explained that the universe could be explained and better understood if the sun is at the centre and the planets moved around in orbits which were not circular, but elliptical. Why? Newton explained that it was because of gravitational force of the sun. This is not the place for elucidating Kepler's laws and Newton's principles.

The extant astronomical knowledge shows that there are nine planets of various sizes and masses which are revolving around in various orbits at different speeds. Earth revolves around the sun in an elliptical orbit in approximately 365 days giving rise to a year while it rotates around its own equator in approximately 24 hours giving rise to a day. The astronomers have calculated that the earth is 91 millions of miles away from the sun. Two planets, Mercury and Venus, are nearer to the sun – 36 and 67 millions of miles, respectively. Saturn (Shani), which has a prominent place in Hindu mythology, rotates at 10 hours, revolves around the sun in 29 years and is 886 million miles away from the sun. The other planets are still far away from the sun. Readers will note the vast differences of the planets from each other and from the earth. Does it stand to reason that they can have any influence on man who is one of the billions and billions of creatures on the earth?

There are better reasons why belief in astrology cannot be sustained. According to Parasar School of Astrology, which is the most popular school on astrology, there are nine planets which include the sun, the moon, Rahu and Ketu. It is now known that the sun is a star, not a planet; the moon is a satellite of the earth and not a planet;

and Rahu and Ketu do not exist at all. Yet these entities are said to exist and influence human beings. Besides, the astrologers did not take into account newly discovered planets – Uranus, Neptune and Pluto. These planets have been knocking in vain at the doors of astrologers for recognition.

An ill-founded belief, particularly in South India, is that “Rahukala” is inauspicious and humans should not do any work at that time. All the trains, planes, buses plying at that time should be ill-fated. It is ridiculous to imagine that a train should wait for the green signal of astrologers to move. Imagine the scenes at the bus stands, railway stations and airports.

I have given some distances above. The distances of stars are so vast that they are measured in what is called a light year. Light travels in space at a speed of 186,000 miles per second (300,000 Kilometres). Light year means the distance light travels in one year. On this scale, it is seen, the nearest star is over 4 light years away. An interesting example has been given by Prof. K.D. Abhyankar of Osmania University, Hyderabad. The largest planet in the solar system is Jupiter which is 43 light minutes away and the farthest planet, Pluto, is 5½ light hours away. If an astronaut goes to Pluto and communicates with us, it will take five and half hours to reach us through radio message. The stars are further away. Does it stand to reason that stars and planets can have influence on us?

Prof. Abhyankar points out that our solar system is insignificant compared to the universe. The earth on which we live is a tiny speck in the solar system, says Prof. Abhyankar, man is nothing compared to the earth physically. Man is intellectually among the topmost creations of nature. We should see to it that we use our intellect in rational and logical thought and not fall prey to superstitious beliefs which are remnants of an earlier, less developed, stage of civilization.

Let us concentrate on earth instead of all planets. The earth, as seen earlier, revolves around the sun in an elliptical orbit in about 365 days. This elliptical orbit is hypothetically divided into 12 parts, constellations. The Saturn stays in each constellation for 2½ years. The Saturn travels 29½ years around the sun. If one is born when Shani is in line with the constellation under which one is born, the constellation preceding and following the constellation under which one is born are significant according to Indian astrology. The time

in the constellation when one is born and the two constellations – one preceding and one following – is 7½ years – that is Sadesat in Indian languages. This period of 7½ years is the most dreaded period for Hindus. It is hurtful and potentially dangerous. Please think about this.

The existence and sustenance of life on earth is made possible by the star – sun. The sun is not too far away; otherwise we would be frozen. It is not too near, lest we be burnt. This fact is a far cry from the claim that the star affects you otherwise. Horoscopes are charts containing the pictures of constellations, including the constellation under which you are born. Despite the distances of constellations and stars shown above, people try to match horoscopes for marriages. It is safer to have medical certificates of intended spouses to check whether they have HIV or Aids.

Thousands of people perished in “Kanishka” plane disaster, Latur and Gujarat earthquakes, Andhra Pradesh cyclone, Tsunami disaster, etc. Were they all born under the same constellation? The effect of planets (grihas) can be seen by the fact that in February, 1982, eight planets were in conjunction (Ashta Griha Koot), but nothing untoward happened, despite the astrological predictions of doomsday.

In France, one institute sent to about 200 persons a horoscope and a statement of events for the previous five years, requesting them to inform whether the horoscope represented their life and whether the statement contained the real incidents in their life. Ninety percent of the correspondents agreed with the horoscope and the statement. What is unusual about it? It was the same horoscope and the statement – faith played the trick.

Michael Gangerin, in a book, has claimed that “astrology is a faith that speaks the language of science and a science can only find the justification of its principles in faith.” Astrology is built upon faith. Is it a science? Science is never built upon faith.

Why is astrology accepted by the people? Once Barnum, the owner of a circus, explained that his show consists of several items and there is at least one item which is liked by some. Similarly, astrological predictions and the weekly forecasts. “You are very brilliant but use your brilliance”. This vague forecast is accepted by every reader. So the astrology is born.

At some time there was a craze for Vedic astrology. A close reading of Vedas discloses that nowhere the Vedas contain any reference to astrology. Nor do the Upanishads. One cannot help referring to the fact that University Grants Commission invited the Universities in India to start astrological courses. This was when Murlī Manohar Joshi of the BJP was HRD Minister. Fortunately, most of the Universities declined the invitation.

Is astrology a science? The answer is an emphatic “No”. Astrology makes use of no basic rules. Are failed predictions accepted disproofs of theory, as true scientists do? Astrologers have probably not heard of Copernicus, Galileo, Kepler and Newton and the knowledge accumulated over centuries. It can be argued that weather forecasts often are found to be false or inaccurate. But in weather forecasting, a complex calculation of various conditions is involved. Weather forecasters admit that sometimes they go wrong. Do the astrologers admit similarly? There is no experimentation or testing of facts. There can be only one science of a subject for the whole world whereas there are many systems of astrology which quite often contradict each other.

Why do some people believe in astrology? Firstly, astrology has psychotherapeutic effect which brings solace to human mind. I have already referred to Barnum effect. If you fail in anything, you can always blame the stars. If you succeed, point out what is good in the forecast. There is always, in each forecast, both good and bad. The age old refuge of the astrologers is “The stars only compel; they do not compel.” Even a Papal advisor Francesco Guicciardini bemoaned: “How happy are astrologers if they tell one truth to hundred lies, while other people lose all credibility if they tell one lie to hundred truths.”

“Stargazing and astrology, forecasting luck or unlucky events by signs, prognosticating good or evil, all these things are forbidden”, said Buddha. Vivekananda said that astrology is a sign of weak minds. Stephen Hawkins in a speech in Delhi observed that the reason most scientists don’t believe in astrology is that it is inconsistent with our theories which have been tested by experiments. In 1975, 189 scientists, including 19 Nobel Prize Winners, pointed out that people who believed in astrology have no concept of the distances from the earth to planets and stars. They advised that we must all face the world and “we must realize that



our future lies in ourselves and not in the stars". Echo of Shakespeare quoted above.

As a humanist I regard astrology as anti-humanist. It denies the free will of man. It is anti-science. The edifice of modern science is built upon of sifting sands of constantly questioning. Science is constant interrogation of the world whereas astrology is stagnant. It is immoral because a criminal might argue that he committed a crime because the stars compelled him to. Astrology, strictly defined, denies the possibility of choice. At least in this 21st Century man must shake off his belief in astrology.

# Evolution, Creationism and Intelligent Design

In 1925, the State of Tennessee in the U.S.A. passed a law forbidding teachers in publicly supported schools of the State from teaching that humans had evolved from lower forms of life. Since Charles Darwin had, from a mass of examples, shown that every species had evolved from a lower form of life, the State law was clearly anti-evolution. To challenge the constitutionality, a teacher named John Thomas Scopes taught his class on evolution. He was prosecuted.

Unfortunately, the local population and the Judge who tried the case were intensely anti-evolution. William Jennings Bryan, who had failed to win Presidentship three times, was the Judge. Clarence Darrow, the famous atheist criminal lawyer, defended Scopes. The trial, known as Scopes trial or monkey trial, ended in the conviction of Scopes. In appeal, the conviction was set aside on technical grounds. There was no further appeal by the State. There was a change in the Board which managed the school and the new Board also did not pursue the matter.

The verdict was ridiculed inasmuch as it held that the theory of evolution was not a science and creationism was science. There is no other case in U.S.A. or in any country which suggests that evolution is not a science. As is well known, the U.S. Constitution prohibits religion from the State and naturally the State-supported institutions such as schools.

What is science? There are two methods by which knowledge is gained; The deductive method and the inductive method.

All men are rational,  
Aristotle is a man.

Therefore it follows that Aristotle is rational. But if the major premise was “some men are rational”, in order to prove that Aristotle is rational, one has to include him in “some men”. This can be done only by induction. Induction is the method by which one arrives at knowledge on the basis of evidence. You cannot guess knowledge. You can induce or arrive at or prevail upon. A scientist propounds a hypothesis and proceeds to collect evidence to see whether that hypothesis is correct. All crows are black. By noting that every crow which he comes across is black, he propounds that all crows are black. This is theory – though it is a

falsifiable one. One white crow anywhere in the world falsifies the theory that all crows are black. In other words, a proposition which is based upon evidence or extant facts is taken as true till something contrary appears.

In 1831 A.D. a young man of 22 years joined a ship as a mate. The ship was named "Beagle". As the ship sailed down the east coast of South America and up the west coast, Darwin collected plant and animal life of various forms. He found that various finches showed evolution from lower life to higher life. Further studies showed this to be the case of other animals also. Darwin inferred that a species evolved from a lower life to a higher life. This was true of man also. This was the evolution of man. This theory is based upon massive evidence, not contradicted by any other evidence. Hence Darwinism is a theory and a scientific theory. To this day it holds the field. The theory of Darwinism (of evolution) has been modified and sharpened in the 20th century by advances in genetics and mutations. For this article it is not necessary to go into details of subsequent developments.

But the forces of darkness are never easily defeated. Fundamentalists like Bryan kept alive the attack on evolution. The obscurantists, in Scopes trial, had won the battle but they lost the war in the long run. The intelligent and intellectual public and all the scientists accepted the theory of evolution as modified by subsequent scientific knowledge. They obscurantists, however, insisted that the world was a creation, created by the creator. This is the sum and substance of creationism. Later they abandoned the literal first chapter of the Bible containing the account of Genesis.

As recently as 2005, the attack on science in general and the theory of evolution continued. Most of the debate has taken place in U.S.A. where there are many fundamental sects. In Kitzmiller v. Dover, there was a concealed challenge to Darwinism. Judge Jones ruled conclusively and in strongly worded language that intelligent design was not a science. He explained:

"ID (Intelligent Design) violates the centuries old ground rules of science by invoking and permitting supernatural causation; (2) the argument of irreducible complexity central to ID employs the same flawed and illogical contrived dualism that deemed creation science in the 1980s, and (3) ID's negative attacks on evolution have been refuted by the scientific community."

Somewhat echoing Judge Jones' language, an Arkansas Federal Court reviewed the creationist movement and concluded that it was nothing but a disguised attempt to teach the Bible in the science class. In 1988, the U.S. Supreme Court dealt with a Louisiana law as advancing a particular religious belief. As early as in 1799, a wall of separation, in the language of Thomas Jefferson, had been erected between the Church and the State by the First Amendment. Thereafter the U.S. Supreme Court has consistently held illegal the introduction of religion in public institutions. In one case, Justice Hugo Black, a devout Christian and a Sunday School Teacher, held that even a non-denominational teaching is prohibited. He pointed out that religions like Buddhism and Humanism did not believe in God.

Fundamentalists were shrewd and clever. They abandoned their stand on the literal interpretation of the Bible and mounted a new, more insidious attack on evolution. They spoke vaguely of a creator and were careful not to use the words of the Bible. They, however, argued that evolutionary theory was full of flaws and could not be true. Therefore creationism was true.

In order to prove that the theory of evolution was not true, they resorted to quoting out of context, misquotations and distortions and did not examine the evidence so assiduously collected by Charles Darwin. They contended that their view was correct without adducing evidence in support. Though they did not seek the ouster of evolution from the schools, they demanded that creationism be given equal time. Their constituency is usually the churchgoers who knew no science or scientific method.

Creationists seek the propaganda value of being able to say that their views are based upon science. Even the scientific (actually technological) instruments are attributed to creationism. They do not answer the question as to what creationism is and how it is scientific. Where is the evidence of creation except that universe is a creation and there must be a creator. All scientific research and investigation show that the universe came into existence billions of years ago. Yet one Mr. James Usher, an Irish seventeenth century archbishop, propounded that the creation of man took place on 23rd October 4004 B.C. His calculation was based entirely on Bible.

Creationists are losing ground, if they have not lost it already. So Intelligent Design (ID) people have taken over. ID claims that certain features of the universe and of living things are best explained by an intelligent cause; there cannot be an undirected process such as natural selection. It is a new, 'respectable' name for creationism and has been canvassed by one Charles Thaxton. The difference between creationism and ID is that ID does not name a creator; it claims only that some things are too complicated to have come into existence without a creator. In this way ID tries to avoid religious cloak and presents itself as a scientific theory. To be taught in a school, a claim must not only be scientific; it must also be well established. How do you explain the explosion of "kanishka" in which hundreds of innocent lives, including those of women and children, were lost? To take a recent example – Tsunami. ID does not and cannot explain it. The U.S.A. is repeatedly battered by hurricanes. It is not very intelligent. There are earthquakes, epidemics, famines, etc. and no amount of intelligence can explain these things. After all, it is law-governed universe and only science can explain these things. No scientist worth his name has subscribed to the theory of I.D.

## The “Monkey” Trial

It is more than two centuries ago that the profounder of the theory of evolution was born. In 1859, Charles Robert Darwin published his first book viz. “Origin of Species”, followed by “Descent of Man”. It is true that almost simultaneously one Alfred Wallace canvassed the same theory of evolution. Unfortunately, Wallace was poor and working in the Far East. Unfortunately, again, Wallace despite evolution was a believer in Genesis of the Bible.

I am giving some details of what is known as “monkey” trial. It was by anti-Darwinists as they thought, wrongly, that Darwin taught that man had descended from monkey as a result of evolution. What Darwin implied was that as a result of evolution of thousands, perhaps millions, of year’s age man and monkey had common ancestor. In any case, what Darwin taught was clean contrary to “Genesis” in the Bible which is regarded as a word of God.

Logically, what the opponents are saying is hopelessly wrong. After all, The Bible was written by a man or men when God created the world. How could they know how God created the world as mentioned in Genesis. However, the Church has now accepted that Darwin may be right and that Genesis was allegorical. Creationists and those who canvass Intelligent Design theory are not logical, let alone rationalists.

In 1910 the Presbyterian General Assembly had enunciated “Five Fundamentals” as basics of Christianity. Those five were the miracles of Christ, the Virgin birth, the Crucifixion, the Resurrection and the Bible as directly the word of God.

Darwinism was obviously inconsistent with or contrary to the five fundamentals mentioned, especially to Genesis in the Bible. As is well known, the U.S. Constitution as amended by the First Amendment forbids the teaching of religion in schools. The Constitution does not prohibit the teaching of non-religious or scientific subjects. There is, what Thomas Jefferson said, a wall of separation between the State and religion in U.S.A. The reverse, however, is not true. The Constitution has no embargo on instruction of scientific subjects. At the same time the Constitution does not bar teaching of scientific subjects. Evolution, which is a scientific subject, can be taught in school.

The State of Tennessee thought otherwise – at least the legislators in that State. Because the theory of evolution is, in effect, anti-Christianity, a law was passed making it an offence to teach Darwinism. One John Scopes was a teacher in the school. ‘Civic Biology’ by George William Hunter was being used in schools for long time. That book contained an exposition of Darwinism. The book was in circulation for 15 years. It was not considered dangerous. But the Tennessee law became operative. In defiance of the said law, Scopes taught that subject and was, therefore, prosecuted. The prosecution contended that evolution contradicted The Bible and, therefore, should not be taught. In any case, it was contrary to Tennessee law. This was in 1927.

The prosecution was led by one William Jennings Bryan who had thrice failed to win Presidential election. He was for some time Secretary of State. Apart from these political facts, Bryan was religious in the sense that he unquestionably believed in every word of the Bible. In response to a question by Darrow, Bryan said: “I do not think about things I do not think about”. This was a funny answer. He disclosed total ignorance of Biblical facts and sites. Darrow had kept ready scientists who would prove that evolution was a scientific subject and that Bible was a fable. But the Judge did not allow that evidence. The question before him was not whether evolution was a scientific subject. Was teaching that subject a breach of law? Scopes admitted that he was ‘guilty’ of teaching that subject. Scopes was held to be guilty. The Judge awarded him “sentence of fine of \$ 100 which was technically wrong because the jury alone could have decided upon and given damages. On this technical point, the judgment was set aside. I do not know why the appeal Court did not set aside only the award of damages and ask the jury to fix the damages.

In the meantime, the administrators of the school had retired and new administrators had come in power. They did not pursue the new trial. The constitutional validity was not challenged. Only it was held that the law had been breached – a fact Scopes did not dispute. Fortunately, Darwinism was not taken to Court again, in U.S.A. or elsewhere. By this time all scientists had accepted evolution as an indisputable theory despite creationist or Independent Design.

## Charles Darwin

When Charles was compelled to enroll himself in school and was there for some time, his father, Dr. Robert Darwin, decided that “he was no good at school”. Charles himself confessed later: “I learned absolutely nothing except amusing myself reading and experimenting with chemistry”. In his adult life, he frankly admitted that in his younger days his friends and his father had considered him “a very ordinary boy, rather below the common standard of intellect.” No school syllabus could hold Charles, who had an assurance that without even education he could live comfortably because of the family’s affluence.

Charles’s father, Dr. Robert Darwin, was a successful doctor earning considerable amount by the standards of the day. He was a medical doctor like his father, Erasmus. The family was well-to-do and if Charles had followed the family line, he would have been the third generation doctor.

But that was not to be. Few even in those days appreciated the habit of a boy who was bent on studying nature. He was studying big animals and collecting small ones. His favourite was “beetles” of which he had a big collection. He was also a bird watcher.

Charles Darwin never lost his boyhood fascination with nature. He grew up in a town surrounded by wood and wild life. Often he dredged up sea creatures and dissected them to see their anatomy. Love of nature to some extent ran through the family. His mother kept fancy pigeons and his father raised exotic fruit. His grandfather, Erasmus, also a doctor, was also nature-lover and propounded a theory of the world which was akin to evolution which later was developed by his grandson. Erasmus was a man of curiosity. He divided much of his writings (he was not an active medical practitioner) into two major questions: While all living things are related through common ancestor and by what means one species might develop into another. He was a formal believer but his son Dr. Robert was practically a non-believer and free-thinker. He did not believe in the Bible. It was not the next world in which he was interested. How to get along in this world, that was his concern.

Despite his disbelief, he wanted to be a priest – a man of church – so that he would indulge in outdoor activities such as watching nature and collecting insects. Dr. Robert desired that Charles should



follow some settled life and need not earn much money. In his opinion, a person must be a respected person in the society and have enough opportunity for outdoor life. Charles did not take to it. Earlier he was not successful in school life in Cambridge. Nor did he make any mark in the medical college in the University of Edinburgh where his father fondly sent him. The elder brother was also pursuing medical studies. That did not inspire Charles. Charles studied for two years to please his father of whom he was fond. What finally made it impossible for him to continue were shockingly brutal surgical procedures of the time (without anesthesia).

To be sure, Charles never lost his boyhood fascination for nature. He would observe birds; he collected beetles; he analyzed the fossils. Now an opportunity knocked at his door. One Captain Robert FitzRoy was the captain of a surveying ship and he wanted a good assistant to accompany him to America. Charles was not the first choice. The ship H.M.S. Beagle was to go along the shoreline of America and Capt. FitzRoy wanted, not a mere “collector” but also a gentleman who would be a companion to the Captain. For some reasons, two candidates failed and Charles was chosen – not with enthusiasm by his family. In those days, such ships going around the world were nicknamed “floating coffins”.

Anyway Charles set sail. As luck would have it, Capt. FitzRoy, a strong believer in the literal interpretation of the Bible could not have imagined that his ship would become the birthplace of an evolutionary biology, Charles, as other members of the crew came in contact with different tribes, a fact which did not interest him. He went on observing and collecting specimens which interested him. The trip was an endless parade of wonders and it lasted five years.

Before that they arrived at a group of islands called Galapagos Islands in September, 1831. Five main islands formed Galapagos Archipelago. Large tortoises and lizards abounded. There were plenty of sea animals but there were no land animals. Charles spent nearly five weeks on the islands and studied the Galapagos carefully and intensely. Galapagos in Spanish means “pony saddle”.

Are all tortoises the same, all over the world? An unusual reply to Charles in an unusual way. The Governor of an island mentioned to Charles that he could identify any of the giant tortoise shells that Darwin had collected according to the island from which it came,

which meant that each island has been inhabited by a different set of species.

In the meantime, Darwin had sent home “Volume of the Beagle”, detailing his experiences on the ship. Published as a book, it was devoured by the English because of its exotic experience. Sir Arthur Conan Doyle, creator of Sherlock Holmes, liked it and admired Darwin’s “gentle and noble firmness of mind.”

On 2nd October, 1836, nearly five years after it left England, the Beagle returned loaded with Darwin’s specimens. He did not study and analyse them immediately. He was now 39 years old and it was time to get married, which he did. It was his cousin Emma who gave him 10 children, 7 only survived. Darwin found a palatial house and settled down.

He was now a family man, sitting over what he himself called a “chaos delight”. He had a mass of evidence which at that time led to nothing. His grandfather, Erasmus, had in his own time his theoretically developed, what was then called, “development” or “transmutation”. It was in fact evolution without a solid base which could only be provided by the mass of data over which Charles Darwin was sitting. It was long on speculation and short on facts. Charles was a scientist and would not write anything without facts.

Around this time he came across the Malthusian theory of population which showed, among other things, how the population is controlled by the “survival of the fittest”. That phrase set Darwin thinking and drawing inferences from the data he had accumulated. The conclusion at which he arrived at was called natural selection which led to variation of the species. It was the survival of the fittest and not the strongest. A species that adapts itself to the conditions of environment that will survive, though a stronger species will fail. This is in sum, the survival of the fittest. In due course, a species “evolved”. The theory of evolution has been modified and sharpened, since Darwin’s time, though the mechanism of genetics of Mendel and, to some extent, by “chance and necessity” of Jacques Monod.

Darwin published “Origin of Species” in 1859 so that today we observe 150th anniversary of the theory of evolution and bicentenary of Darwin’s birth. It should be mentioned that one Alfred Wallace, who was working in scientific exploration in Malaya, had come to the same conclusion. Both were scientists.

There was no rivalry between Darwin and Wallace. The latter, interestingly, was a firm believer in the Bible. Even today there are in America believers in creation or intelligent design. Isaac Asimov, in his *Guide to Science*, has mentioned that the earliest reasonable event recorded in the Bible can be referred as the reign of soul, the first King of Jews, who is believed to have become the king about 1025 B.C. James Ussher, an Irish Bishop of 17th Century, calculated that the world was born on 23rd October, 4004 B.C. All scientific research today shows that the earth is billions of years old.

Darwin had not said that man has evolved from ape, though many people mistook that his hypothesis suggested so. On June 30, 1860, a meeting of the British Association of Advancement of Science took place in Oxford. Samuel Wilberforce, the powerful bishop of Oxford, who was innocent of science, spoke. Turning to Thomas H. Huxley, he snidely asked whether he would be descended from an ape on the side of his grandfather or his grandmother. Huxley was a great, recognised scientist of the time. He replied in subdued words: "When we talk of descent, we are speaking of thousands of generations, not one's immediate family. I have listened carefully to My Lord the Bishop's critique of Darwin's theory, but have not heard him advance any new facts or arguments that have already been advanced."

Proceeding further he said:

"If a question is put to me: Would I rather have a miserable ape for a grandfather or a man of great gifts and intellect, who uses his exalted position and tremendous influence for the mere purpose of ridiculing those engaged in serious scientific investigations, I unhesitatingly affirm my preference for the ape."

Huxley was a great defender of Darwin's theory, so much so that he came to be known as "Darwin's Bulldog".

Forces of creationism and of anti-Darwinism were active in the nineteenth century. They were not inactive in the twentieth century either. The Tennessee legislature had passed a law prohibiting the teaching of evolution. To test the legal and constitutional validity of this law, one John Thomas Scopes was persuaded by some to teach the subject which he did. He was duly prosecuted. That was in 1927. The local population and William Jennings Bryan, a person who had lost three presidential elections, was the Judge. Jurors and the Judge was anti-evolutionists and hence prejudicial against

Scopes. Clarence Darrow, the famous criminal lawyer, appeared for the defence. Darrow wanted to call witnesses to prove that the theory of evolution was scientific. He was not allowed to do so. The only question the Judge thought important was whether Scopes had disrespected the law which he has admittedly done. Scopes was held guilty. But in appeal the conviction was set aside and the matter was not proceeded with later.

“Creationism” and “Intelligent Design” are popular in the United States even today. Such active anti-scientific attitude is not perceptibly prevalent in other countries. Darwin has remained popular and many cities in many countries have been named after him. No other theory based upon data has been canvassed to dislodge Darwinism. Fortunately, Darwinism was not dragged to the Court again.

The theory of evolution became well-settled in the scientific field. In 1996 even the Roman Catholic Church has accepted it. Believers have conceded that the story in the Book of Genesis is not literal but allegorical. Today there is no doubt about the theory of evolution.

The Royal Society (of Science) is the world’s most respectable scientific institution. It counts Darwin among its previous members. Today it boasts of several Nobel Laureates as its members. It wants creationism to be taught in schools. It is one thing to study; another to learn. There is nothing to be learnt about creationism. God created the world in six days and enjoyed a holiday on the seventh. One Prof. Michael Reiss, a biologist and Director of Education in the Society, has mooted this idea. Though Prof. Reiss has now been expelled from the Society, the idea has not been buried. The London Times described as turnaround the Society which had only in 2007 issued an open letter declaring that creationism had no place in science classes. Prof. Reiss now says that because something lacks scientific basis is not good enough to exclude it from science classes. Strange logic, indeed. Reports tell that entire scientific community is alarmed.

It is the view of Prof. Reiss that one should know what is creationism it might be studied, not learnt or taught. It is too late in the day to talk of creationism, when even the Church has conceded that creationism is no longer true.

## The Inquisition of Galileo

Four hundred years in the history of mankind is too small a period to make any progress, but the last 400 years have seen more progress than could have happened in four thousand years. For nearly 1500 years the world, even the world of science, lived with the idea that the earth was the centre of the universe and the sun revolved around the earth. After all it was the God-ordained geocentric world. The planet moved around the earth in circles. The Aris to Teliam world was in circles. The circle was a perfect manner in which things moved. Everything to be perfect must be in circles. The egg was not perfect because it was not circular. But things otherwise were perfect. The sun moved around the earth as circles. "Genesis" tells us that God created the universe and God could not have created anything less than perfect. What is more perfect than a circle? This was the basis of Aristotelian logic.

The planets, which were the creation of a perfect God, moved in circles around the earth. Man was after all the creature of God who wanted him to be in the centre of the world. Man was an inhabitant of the earth and, therefore, the earth had to be in the centre of the universe and around it moved the planets. That is how the geocentric world was visualized. Circle, round, was the basis of everything that was perfect. That was Aristotle's logic which was perfect deduction of the time. Evidence was not collected; it was assumed. Given this major premise, minor premise was provided and the conclusion was inevitable. Aristotelian logic ruled science as it was then understood. It suited the Church which was happy with that sort of logic because the earth was presumed to be round and at the centre of the universe. No one dared to challenge this view.

It was even Ptolemy, the Egyptian who was one of the earliest sky watchers, who insisted that the earth was round and the centre of universe, consistent with the Aristotelian view. This despite that the planets moved in a peculiar manner and could not render to a reasonable calculation. It was still the insistence on the deductive methods. Search for knowledge outside one's mind was not even thought of. All knowledge, according to this method, was confined to one's mind and the logical method dictated by the religious scriptures. For nearly four hundred years, this method dominated the world of knowledge as a result of which practically no progress was made in knowledge. May be the conclusions drawn were

logically correct. Knowledge was the result of internal cogitation. It gave rise to mysticism or metaphysics but not the substance of knowledge. Thinkers rejoiced in their ability at hair-splitting. Did it add to the stock of human knowledge?

For the first time, it was Roger Bacon (1213-1292 A.D.), an English Franciscan, who canvassed the view that experimentation – not just revelation or the classical wisdom of Thomas Aquinas – is a path to truth. It is not known whether he possessed the gadgets ascribed to him. For his heretical views he was put in prison for fourteen years. The clock was put back.

It was another Bacon who gave a thrust to the progress of knowledge. Frances Bacon, who had been earlier impeached for corruption, devoted the latter period of life for explaining the steps necessary for the advancement of learning. As Will Durant has put it, “Science now began to liberate itself from the placenta of its mother philosophy. It shrugged Aristotle from its back, turned its face from metaphysics to Nature, developed its own distinctive methods and looked to improve the life of man on the earth.” (Age of Reason Begins, p.586).

Bacon’s major contribution of inductive logic – the process from the specific to the general – be used for academic and scientific discovery, an approach embraced by modern science. Once this approach was accepted, there were inquiries, there were investigations, observations were resorted to, experiments were conducted – what one can call positivism was adopted – these are the things which made science possible and progress after nearly 1400 years the world had followed the deductive method of deduction.

In astronomy, data never changes. Stars and planets have been in the same position since at least known history of mankind. Even from the time of Ptolemy of Egypt, earth had a stationary place. The sun went round the earth. For a true astronomer with an active mind this gave several difficulties.

A Polish bishop, though believed in God, through observation and calculations, came to the conclusion that the sun was stationary and the earth and other planets moved round the sun which was not a planet but a star. He was Nicolas Copernicus.

It was thought otherwise in those days. One Mr. Jean Bodin, a sixteenth century religious priest, said:

“No one in his senses will ever think that the earth, heavy and unwieldy from its own weight and mass, staggers up and down around its own centre and that of the sun.”

Copernicus was in his senses. His studies of the sky and ancient texts forced him to finally reject the then existing theory. His theory overthrew the fifteen hundred old theory of Ptolemaic system and opened the crater of true astronomy. Arthur Koestler who has made a deep study of astronomy and has written a book on the subject has called Copernicus “a conservative cleric who started the revolution against his will.” This is the Copernicus revolution which changed the movement of sun, earth and other planets.

Before I comment on Galileo’s contribution, I must mention some of the contributions Galileo made to other branches of knowledge. Galileo, no doubt, upheld Copernicus’ theory. He spread it, in one sense popularized it. The Church was not amused. Apart from the Inquisition to which Galileo was subjected, the book in which Copernicus has propounded his theory was put in the Index. “Index” is a list of books which the Catholics were forbidden to read. “Lady Chatterley’s Lover” had been put in the Index.

Librorum Prohibitorum was the name when it was enacted by the Church. It was drawn up in 1557 and from time to time revised. Now the list is abolished.

Galileo was actually a physicist. He was born on 18th February, 1564 in which year Shakespeare was also born. Clear signs of science could be seen in his knowledge and behaviour. His ambition was originally to become an artist. Michelangelo died when Galileo was born. However, his father in Florence who was reasonably a rich man, sent him to University to study medicine. But physics attracted him like a magnet. He made his scientific discovery – that the swings of pendulum, regardless of width, take equal times. He also found that lengthening or shortening the arm of a pendulum he could retard or quicken his pulse. By adjustment of the length of the arm of pendulum it could make the movement of the pendulum to synchronize with his pulse. This ‘pulsigola’ he could measure even the heart beats. A pupil of Galileo, Torricello, constructed the first barometer in 1643.

In the period in which Galileo lived, his name was great. Governments valued his knowledge. In military matter he was regularly consulted. He could give the distance of a ship in the sea. His famous experiment in the tower of Pisa is doubted, but much talked about. He threw two spears of unequal weight from the top of the tower of Pisa and demonstrated that when two objects of unequal weight are dropped from a height, they reach the ground at the same time. This was contrary to the prevalent belief; it was also contrary to imagination.

Galileo was not the one who invented telescope, but the principle and use of a telescope were his. Lenses were invented in Holland. Astronomers used lenses to magnify. Galileo found that when a concave lens is used with a convex on top, magnification is multiplied. With the help of such a telescope he would study the movements and confirm the findings of Copernicus. Copernicus revolution was, according to Galileo, confirmed. He also spotted four moons of Jupiter. They are called Io, Europa, Ganymede and Callisto. In astronomy they are called Galilean Satellites.

The discovery of four moons of Jupiter was a great blow to religion. God had created the universe. Neither in the Bible nor in any scripture a mention had been made of these planets. According to the people, all heavenly bodies must go round the earth. For the first time stellar objects were seen to go around another planet. This was another blow to Ptolemaic theory.

Nebula then was nebulous. Consisting of stars, though, the stars did not show any features. Galileo showed that Nebula was a group when viewed through a telescope. It was because of the immense distance that the stars were nebulous to the naked eye.

In 1609, Galileo confirmed Copernicus revolution with the help of a telescope, thus attracting the wrath of the Catholics. However, as long as the Copernican proposition was viewed as a hypothesis, the Church did not deem it necessary to persecute Galileo. Galileo, however, could not be silenced. He wrote a slender book giving a story of three persons. Of them, one was a simpleton who acted as were asked by the then Pope. Galileo invited inquisition, but did not abandon the earth's revolution. He proclaimed that he was obliged to believe the same God who has endowed with sense, reason and



intellect; has intended us to forgo their use. He said that philosophy (then natural philosophy):

“is written in this grand book of universe, which stands continually open to our gaze cannot be understood unless we first tried to comprehend the language and read the letters in which it is composed. It is written in the language of mathematics.”

The ground is laid for Inquisition. After Martin Luther, the Church was uneasy with heresies which might weaken the Church. It was very important that heresies should be suppressed. The Bible was important and was regarded as the repository of all knowledge. How can a man upset divine knowledge, especially knowledge guarded by an Institution like Roman Catholic Church? To say anything contrary to what is said in the Bible is heresy and heresy must be suppressed.

A belief or practice contrary to the orthodox doctrine of the Church is/ was heresy. An opinion contrary to what is accepted is heresy. How can there be two opinions on what the Church regards as its doctrine? It is clear from the Bible and from what has been officially followed that earth is the centre of the universe, that it was inhabited by man who was created in God's own image, that the sun and other planets orbit the earth. Everything that followed from Copernicus was heresy which was held and supported by Galileo was heresy.

Originally, Inquisition started a procedure for inquiry. The attempt was to know the truth and possibility. Later it was realized that it was necessary to put down heresy. Inquisition became an institution. Holy office was established. It conducted Inquisition. Whether right or wrong, “heresy” had to be crushed. A heretic was made to confess to the contrary to what view he held. Sometimes, like Bruno, heretics were adamant, obstinate and strong. Weapons were added to Inquisition. Third degree methods made the heretics confess to their errors. Some refused to admit that they were wrong and were burnt at the stake.

Because of his pre-eminence in the society and also because of his knowledge, Galileo was never tortured; though the instruments of torture were shown to intimidate him. Galileo met many ecclesial persons who could influence. He moved to and fro from Florence to Rome. Once he had a long conversation with the Pope, but failed to convince the latter. The Pope, though refusing to lift the Inquisition which had been started in 1616, was sufficiently impressed by

Galileo's learning to say "For a long time we have extended our fatherly love to this great man, whose fame shines in heaven and marches on earth".

A news Pope who was formerly a pupil of Galileo was appointed. The latter's hope soared but hopes were soon belied. The Inquisition continued.

It was the practice of the Inquisition to question the Accused intensely to bring upon him the pressure of the Church. Torture was not applied immediately. The Accused was allowed to think, to mediate for years. That is how the Inquisition in the case of Galileo, started in 1616, ended in 1622, with his retraction.

Actually the Inquisition started in 1632. One may recall the Inquisition as an institution was created by Pope Paul III in 1542 to stem the spread of Reformation doctrines. It was even given the power to Judge competing doctrines. So it could hold Copernicus wrong.

On 16th April, 1616 Galileo was brought into the room which is now the Post Office of Rome. Rules of procedure were simple, through they were not the rules of a Court. The questioning, in the case of Galileo, was soft and not threatening. The Court did not meet again; the trial ended there. On 22nd June, 1616, the Inquisition pronounced him guilty. But it offered him absolution on the condition of full abjuration; it sentenced him to the prison of the Holy Office for a period which the Holy Office was to decide. He was made to renounce the Copernicus Theory. A penance was also imposed upon him. That was that he would recite penitential Psalms to 3 years. On 22nd June, 1633, Galileo, then 70 years old, retracted and gave a long confession, part of which is as follows:-

"With a sincere heart and unfeigned faith, I abjure, curse, and detest the errors and heresies and generally every other error and heresy contrary to ... Holy Church and I swear that I will never more in future say or assert anything which may give rise to similar suspicion of me and that if I know any heretic or anyone suspected of heresy, I will denounce him to this Holy Office."

When he came out of the hall, he is reported to have said "Yet he does move". This is doubtful as there is no reference to it in his biography.

He spent three years in the prison of the Inquisition. Later he was moved to a couple of private houses. At last was allowed to stay in his own. He was alone and almost blind. He had an illegitimate daughter who was a nun and she took care of him. Technically he was still a prisoner. He was forbidden to travel outside the grounds of his own house. In 1638, John Milton, the famous English poet, came to see him.

On January 8, 1642, aged 78, he died. It was in 1835 the Church realized that he was right and withdrew his works from the Index. Will Durant says: "The broken and defeated man had triumphed over the most powerful institution in history."

## Huxleys

Humanists everywhere will remember Huxleys with admiration and affection because Huxleys have been conspicuous for intellectualism and humanism for three generations, spreading over two centuries. The family of Huxleys show a remarkable combination of intellect and emotion. That they were humanists too is well known. Thomas H. Huxley, the grandfather of Julian and Aldus Huxleys, was already a famous scientist when Darwinism was being debated.

T.H. Huxley was described as Darwin's bulldog because he defended the theory of evolution both in speeches and writings in the 19th Century. He was not afraid or ashamed to say that he had descended from an animal (as all men are descended). Evolution, with certain modifications, had stood the test of rational and scientific inquiry. Even the Church has rehabilitated Darwin. Men of religion and the Church have raised their views of evolution, though creationism has made its arrival in U.S.A. T.H. Huxley coined the word "agnosticism".

The Huxley family was an excellent intellectual family. T.H. Huxley was a contemporary of Darwin, Spencer and Tennyson. The nineteenth century England made and was making great strides in science. From the autobiography and biographies of Huxleys it can be seen that even the sons-in-law of T.H. Huxley were distinguished in their fields. They were doctors, archeologists, biologists, etc. As can be seen by later developments, Huxleys showed that literature and science were not in a sense separate. Huxleys were scientists, but they were also good authors.

Right from childhood, T.H. Huxley had shown remarkable qualities of mind. He had studied not only logic but also German language. Probably on the basis of an essay he had written, he got a job in the navy. He made use of this position to study biology, especially botany. For some time he made research in medical science. In those days you could acquire knowledge in many branches. T.H. Huxley was versatile.

His son, Leonard, did not become famous. He was a professor and wrote the biography of his father. Leonard's two sons, Julian and Aldus, became world famous. Born in 1894 C., Aldus was educated in Eton and Baikal College. He became the author of several books. The most famous of them are: "The Brave New World" and "The

Perennial Philosophy”. It must be admitted that he had a mystical mind. I do not think Humanists will like the above-mentioned publications.

Sir Julian Huxley, born in 1887 CE, was older to Aldus Huxley. It is invidious to compare, but it can be said that though Aldus has more publications to his credit, Sir Julian was more brilliant, though not more intellectual. He was, like Aldus, educated at Eton and Baikal College. He was professor of Zoology in King’s College, London. His publications include “The Stream of Life”, “Watching and Bird Behaviour”, “At the Zoo” and Action”.

Right from childhood, Sir Julian had interest in both literature and science. After going to Oxford University, he made a study of Botany, and later, on his own, conducted research in the subject. He was fond of brave things. He developed the hobby of watching birds and he classified them. He attracted the attention of the people by his writing on the peculiarities of birds and trees. His writings were in simple language so that the common man could understand. He could explain even complicated things. For example, he could and did explain how a cobweb is woven. He was a good speaker that people listened to him in rapt attention. In popularizing knowledge of Ornithology, Julian Huxley played a big part.

After graduation he went to U.S.A. as head of an institute engaged in rice research. Julian was not content with the job. In order to equip himself to head that institution, he migrated to Germany. He did research there for a full year. Julian’s work was useful in improving the quality of rice. Simultaneously he started contributions to “Science and Life” series of a scientific journal. This journal was devoted to spread knowledge of man and plants and the relationship between the two. He was particularly interested in the evolution of plant life. In 1955 Julian was appointed as the Curator of London Zoo. During the time he was in this post, he brought about several improvements and made the zoo popular among the general public.

He went to Africa in search of knowledge. He was a member of a committee in England headed by Hailey. Julian’s interest lay not merely in science. He took great part in the formulation of welfare measures during war time. The field of his activities went on increasing. He started exhibiting interest in finding ways and means

of reducing man's work and increasing his leisure hours so that he can work in constructive fields. There are few people who foresee the future and Julian was one of them.

The Lysenko's doctrine which was popularized by Stalin in order to show that communist regime could improve the quality of man was in vogue after the Second World War. It was Jacques Monod of France who demonstrated that human personality, as the personality of any animal, can change only by genetic change, and not by externally acquiring properties. The Lysenko thesis was in line with Lamarck who had held, among other things, that giraffe had long neck because it sought its food from a long distance. Julian had a meeting with Lysenko whom he convinced about the unscientific nature of Lysenko's thesis. After the death of Stalin there were no takers for Lysenko's view which died a natural death.

Sir Julian was a very sensitive man and constantly reacted to contemporary events and anticipated future developments. He was a strong believer in family planning and theory of evolution. By artificial means you cannot improve the quality of man. He pointed out in his autobiography that our earth is like a pebble on the beach of sea – so insignificant. And man was one creature in the world of pebble. There are billions and billions of creatures on the earth.

As the first Director-General of UNESCO, he was instrumental in bringing out "History of the Scientific and Cultural Developments of Mankind" – a book which would make any one proud. Even after Huxley retired, work on this book went on and Huxley bore the responsibility for its production.

Julian was interested in archeology and history. He traveled to several countries to study their monuments. When Aswan Dam was to be constructed, it was seen that Pharaoh's temples would be submerged and would be lost to mankind. The UNESCO financed the shifting of the temples. Similarly, several historical moments were saved in other parts of the world. He traveled extensively in India and saw India's historical culture. He was considerably impressed by the Konark Temple. Sir Julian realized the importance of not only family planning but also economic planning for India. India honoured him with Kalinga Prize.

The Huxley family with its intelligence and intellectualism dominated the Western world for three generation. Each member of the Huxley family was prominent in his own field. Sir Julian,

however, was prominent in several fields. He was a scientist, archeologist, bird and plant life expert and above all a practical philosopher. He was interested in man and mankind.

Sir Julian was a great humanist. He presided over a meeting in Amsterdam in 1952 that founded IHEU. His book "Essays of a Humanist" shows a humanist should approach human and other problems. He was a humanist even before humanism was emerging as a philosophy after the Second World War. He mentions at one place that "the idea of evolution has kindled my imagination while I was still in the school". As an undergraduate, he became a firm Darwinian. The first public lecture he gave was on evolution.

Thanks to his visits to East Africa, USSR and other countries, he became interested in human ecology for some time with an organization called "Political and Economic Planning" (PEP) on various projects, including the place of art in national life.

As Director-General of UNESCO, he realized that the world had different views. He wrote the pamphlet "A Philosophy for UNESCO" giving a set of ideas and principles for the working of the organization. He was of enough humility that he realized no single system of ideas could be acceptable to any United Nations Agency in the world's state of ideological chaos. However, he was impressed by the vast knowledge lying abroad in the world. He planned to make it available to mankind. Even after him, the UNESCO has faithfully though not adequately, tried to follow the guidelines of Sir Julian. The book "Humanist Frame" (edited by him) contains articles by eminent thinkers like C.H. Waddington, J. Brownski, H.J. Blackham, Stephen Spender, etc.

Sir Julian passed away in 1975 C.E

## **Justice R.A. Jahagirdar (Retd)**

*Justice RAJahagirdar (Retd) studied economics and politics for his graduation and post graduation. During his college days he took part in dramas, debates, and elocution and Students ' Union activities. He studied Law while in employment and passed Law examinations meritoriously in 1959. Having passed the I.A.S. examination, he chose not to join the Civil Service. He served as Government Pleader, Professor of Labour Law in K.C. College and in the University of Bombay.*

*In 1976 he was appointed Judge in the Bombay High Court and retired from there in 1990. After retirement he was appointed Chairman of Monopolies and Restrictive Trade Practices Commission but did not continue for long for personal reasons. He was also Chairman of the Committee for Fixing the Fee of Higher Education in Maharashtra.*

*In addition to his qualifications in Economics and Law, Justice Jahagirdar is a student of Philosophy, History and Religion. A voracious reader, Jahagirdar is fond of Will Durant and his wife Ariel, the famous philosopher-historian couple and quotes them often. His personal library, containing all the volumes of "The History of Civilization" written by this couple, is huge. Recently he has donated all his books to Academy of Political and Social Studies and SM Joshi Foundation Library, in Pune.*

*He is connected with free thoughtmovement and organisations and has spoken and written extensively on rationalism and secularism. He had been the Chairman of Indian Rationalist Association, President of Maharashtra Rationalist Association and Editor of "The Radical Humanist". As a Founder-Trustee of the Rationalist Foundation he has contributed Rs. 5 lakhs towards its corpus.*

*Dr. (Mrs.) Sharad Jahagirdar, daughter of Late Justice P.B. Gajendragadakar (whom Mharashtrians know very well), is a well known and an extremely successful gynecologist. Together, Dr. Sharad and Justice Jahagirdar have very generously donated to the cause of Rationalism, Secularism, Humanism, Social Justice and Freedom of Expression.*



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