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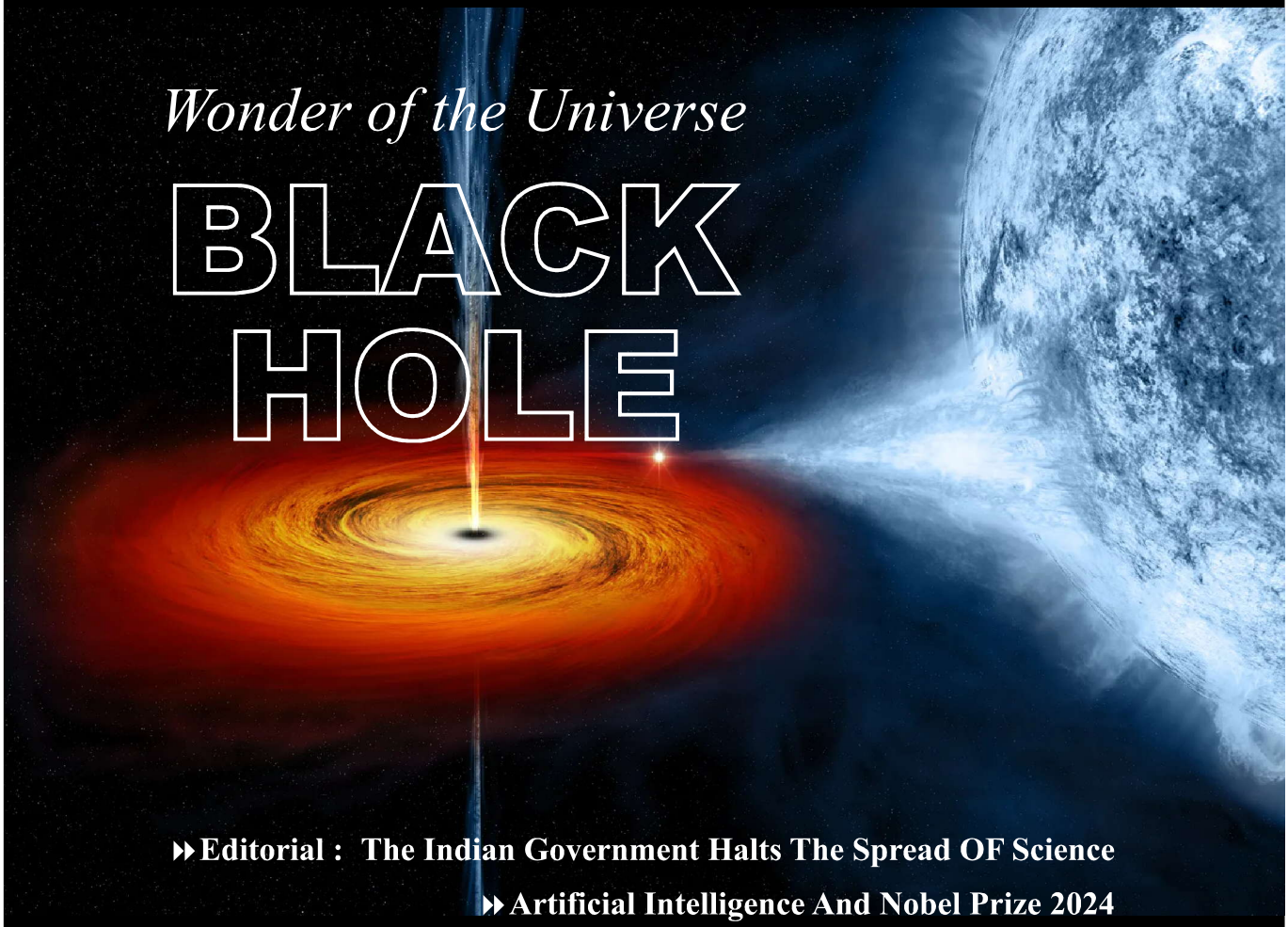
IS DARWINISM DEAD?
– J B S Haldane

Interview with Prof. Krzizhanovsky
– Dr. Meghnad Saha



Content

Editorial : ✍

The Indian Government Halts The Spread Of Science

TO KEEP SOCIETY TRAPPED IN THE PRISON OF SUPERSTITION

On October 12, 1989, the independent organisation "Vigyan Prasar" was founded under the Indian government's Department of Science and Technology.

This organization's stated goals were to popularise rational thinking among the general public and to spread knowledge of science and technology among women, people with disabilities, tribal communities, and remote areas.

According to earlier reports from the authorities, this organisation focused on women, youth, and students in more than 700 districts across the nation. Even though there have been questions regarding the government initiative's actual effects on rural working-class residents, at least the institutions were in place.

But the Indian government passed a resolution on November 12, 2014, to end it on September 6, 2023. Since November 2024, the organisation has been fully shut down, and the Vigyan Prasar website has also been shut down, according to PTI news.

The Indian government's closure of "Vigyan Prasar" is not a novel occurrence; the century-old Science Congress has previously been closed. Additionally, the "Children's Science Congress" is no longer in operation. This is a serious warning to science lovers.

It is obvious that there is a persistent attempt to return society to a dark and gloomy past from a cultural standpoint; rather than encouraging materialistic thinking and scientific reasoning,

there is a persistent attempt to drown the public in an idealistic cultural muck. Prior to this, IIT Mandi required all students to take a six-month course covering subjects like "rebirth", "near-death experiences", and the "concept of subtle bodies".

The Indian Knowledge System (IKS) is the name given to these subjects in the National Education Policy 2020. Since 2020, there has been a significant push to teach these subjects to students; government funds are being used extensively to create and advertise these IKS centres throughout the nation. Vast sums of money are being spent to promote astrology, yoga, Vedic mathematics, ancient economics, meditation in medical courses, and 'scientific' research that says the Ram Setu is man-made (constructed by Lord Ram's army of monkeys) rather than natural.

This is an ongoing, vile attempt to pass off non-scientific topics that have nothing to do with science as science. We have seen government science organizations offering prayers at temples before rocket launches, and the renowned Banaras Hindu University starting a six-month certificate course in 'ghost studies' this year. Students studying Ayurveda and modern medical science, or BAMS and MBBS, are the target audience for this course.

Future doctors are supposedly going to apply this knowledge in psychotherapy. Even ailments with unknown causes are to be treated using knowledge of ghost studies. This is supposedly a democratic decision for the people's welfare!

The dissemination of science through knowledge cultivation requires a democratic mindset, freedom of speech, debate, and dissent. But does the country have a setting like that for scientific research? Does the government really care about encouraging the development of scientific minds? Today, there are serious threats to the democratic environment in terms of social security, healthcare, education, citizen services, and women's protection and respect.

The right to free speech is seriously endangered. The general public's need to cultivate a scientific temperament and evidence-based, logical thinking is being denied. The Indian government has made a farce of Article 51A (h) of the Constitution, which enshrines the obligation to foster scientific temper, inquiry, and humanism.

Various superstitions and irrational beliefs are deeply embedded in society here. Science is currently losing ground to state-sponsored promotion of pseudoscientific and unscientific ideas. No reasonable person could support the decision to close an institution founded 35 years ago for the popularisation of science, when more should be done to promote scientific inquiry and popularise science to eradicate superstition and irrational beliefs in society. No, it cannot be supported.

As a matter of fact, the state thinks that if people are more interested in science, they will become more aware, choose to follow reason and science over faith, and become aware of their rights. Rather than accepting things at face value, they will challenge everything. The current exploitative state and society do not want this. This is the reason behind the permanent closure of Vigyan Prasar and the promotion of idealistic and supernatural ideas.

Therefore, verbal protests should not be the only way to counteract the government's anti-science actions. Discovering the real nature of these actions and bolstering the science movement are the responsibilities of those with a scientific mindset. ■

Wonder of the Universe : BLACK HOLE

People who study space encounter many strange phenomena. When we hear from them, we also get excited. A black hole is such a subject that amazes and intrigues us to the utmost.

A black hole's gravitational pull is so strong that anything passing its vicinity will be sucked into it, never to return to the outside world, even light cannot escape it. This is why it appears to be completely black, it cannot be seen.

A black hole has a dramatic impact on time also. The closer you get to it, the slower the time moves. Eventually time stops in the black hole. The fundamental laws of science as we know them break down there. Who isn't curious about such things? People are becoming increasingly interested in learning more about black holes.

Where are Black Holes found?

The beautiful blue-planet Earth is our home. There are also seven other planets orbiting the Sun. The Sun is a medium-sized star. There are about 100 billion (1 billion = 100 crore) stars in our galaxy 'Milky Way'. All of them are constantly revolving around the center of our galaxy. The question now arises - 'What is so powerful in the centre that makes the billions of stars revolve around it?'. The answer was found to be a super massive black hole named "Sagittarius 'A' Star". And like the Milky Way galaxy, there are about 100 billion galaxies in the universe. They are moving away from each other due to expansion of the universe. But scientists speculate that many of them have one or more (usually two) supermassive black holes at their cores. Many black holes have already been discovered. Apart from super massive black holes, there are also super tiny black holes. There are different types of black holes in our universe. We shall learn more about them later.

Origin of the Concept of Black Hole

Now let's see how the idea of black hole first came up to people's minds. We can discuss the matter with the help of Newtonian physics.

It is our common experience that if we throw any object, for example, a tennis ball vertically upward from the surface of the earth, the ball will eventually come back and fall into our hands. Even if the ball is thrown harder, that is, at a higher speed, it will still come back to our hands. But is it possible to launch the ball at such a speed that it never returns to the surface of the earth? Yes, it is possible. In this case this minimum velocity will be around 11.2 km/s. Then the ball will be out of reach of earth's gravitational field and will never return back to our hands. One thing to keep in mind in this case is that friction due to air is not taken into consideration. This is called the Escape Velocity of the object on earth. And any object irrespective of whether it has more or less mass, when thrown at escape velocity, will overcome the gravitational field of that planet and go out of reach.

The greater the mass, the stronger is the gravity and the greater its escape velocity. With reference to our solar system, Jupiter is the largest planet and its escape velocity is about 60 km/s, 5 times more than the escape velocity of the earth. The escape velocity of the sun is about 618 km/s. There are more massive stars than the Sun. And with this, people started to wonder if there was a star whose escape velocity is

greater than the velocity of light. In this case, light entering such a star will not be able to escape the star's gravity and even its own light will return back to its surface just like the tennis ball, so no light reflecting from such stars will fall on our retina. As a result we will not have a sense of vision. Hence, the star will not be visible (that is, dark).

It goes without saying that since the escape velocity of any object in a dark star is greater than the speed of light, and as it is not possible for any object to attain the speed of light, no object in a dark star will be able to achieve escape velocity and will be confined within the gravitational field of that star.

This ancient concept of black holes was explained by Newtonian physics. In Fact if we squeeze any object having mass to an insanely small volume, the gravitational field can be so strong that the escape velocity will beat the speed of light. That is, it will behave like a dark star. Earth can also be a dark star if you can shrink the Earth down to the size of a marble. This can be calculated by referring to Newtonian physics.

Limitation of the Concept of Black Hole in Newtonian Physics

Newton's corpuscular theory of light state that light is a flow of massless particles. If you think about it, how can something without mass be influenced by the gravitational force, causing its path to bend and return to the surface of a dark star? In other words, the whole concept of the bending of massless light was not possible to explain with the help of Newtonian Physics.

Development of Concepts Related to Black Holes

As time moved on, the curiosity about light continued to increase day by day amongst the scientists. Then the wave nature of light was discovered scientifically. It was said that light is an electromagnatic wave that requires no medium to propagate. The speed of light was determined to be about 3 lakh km/s, which is the maximum in vacuum. But in some cases, light also behave like a flow of massless photon particles. As a result dual nature of light was recognized. But the bending of massless light due to the gravitational force of attraction made no sense and hence the 'Dark Star' concept become questionable.

In 1905, Einstein proposed the special Theory of Relativity and in 1915, the General Theory of Relativity claimed that gravity is not a force, quite contradictory to what Newton proposed. If the fabric of space-time gets warped, any object will follow that curved path. Mass or energy bends this space-time and the bending of light occurs as a result.

To understand this clearly, one has to go a little deeper. A handful of questions need to be answered first. What is 'space'? What do you mean by 'time'? What is the relation between space and time? What are the impacts of the warping of the space-time fabric? There will be many more questions like this. Let us now learn them one by one.

Space is something which has no color, no smell, no means of touching it and we can not even see it. We can only imagine its existence with intellect. But we see the presence of various objects in space and we ourelves are a part of these objects.

Suppose you are walking along a straight road. Hence, you are covering a distance in space. Although the path seems straight, since the surface of the earth is curved, you are actually walking on a curved path. If the path is from your place to Washington in America, you will see the path as straight line in a map. But in a globe, you will see it as a curved path.

Let us take another example. Draw a straight line on a flat sheet of paper. Now, if you bend this paper, you will notice how that line bends with the paper. Think of the opposite now. Will it be possible, if you want to draw a straight line on a bent/curved sheet of paper? You will realize that it's not possible. The line will automatically bend as the sheet is curve. That is, the straight line will follow the curvature of the curved surface and thus the straight line bends. [Fig. 1 & Fig. 2]

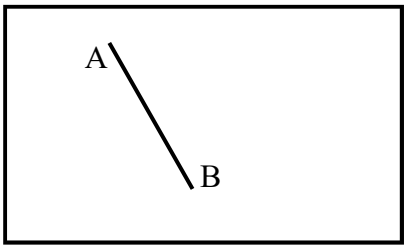


Fig. 1 : Line AB drawn on a flat sheet of paper which is straight.

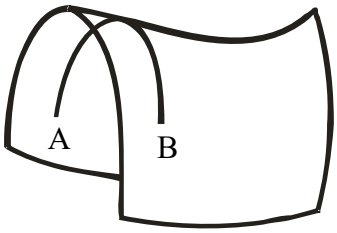


Fig. 2 : Line AB bending the flat sheet of paper.

When you draw a triangle on plane, you get the sum of the three angles to be 180 degrees.[Fig. 3] But if you draw it on a globe (convex surface), you will find that the sum of the three angles of the triangle in greater than 180 degrees. [Fig. 4] For a triangle with a latitude and two longitudes 90 degrees apart, you get 270 degrees. [Fig. 5] Again in the case of a triangle on a horse-saddle (concave surface) you will get less than 150 degrees. [Fig. 6] So the measurment of the geometry of the curved

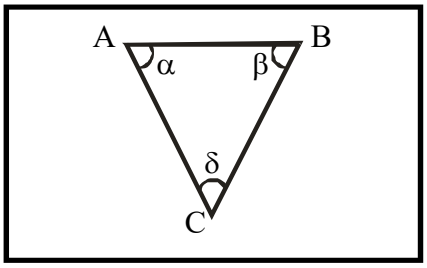


Fig. 3 : $\alpha + \beta + \delta = 180^0$
(*plain surface*)

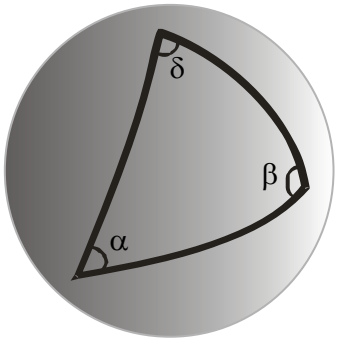


Fig. 4 : $\alpha + \beta + \delta > 180^0$
(*convex surface*)

surface is also different.

The surface we talked about is a two-dimensional surface (2D for short) in space. This is because on this surface, we can only move in two dimensions (or directions) i.e. left-right and back-forth. Any moving object follows the curvature and the geometric measurments also change.

Even on three dimentional surfaces, natural or easier movement of objects is by following curved paths. Earlier, in the Washington example, if you fly to Washington by air, the flight roughly follows the curve of the earth. In three dimentional surfaces (3D for short), there is

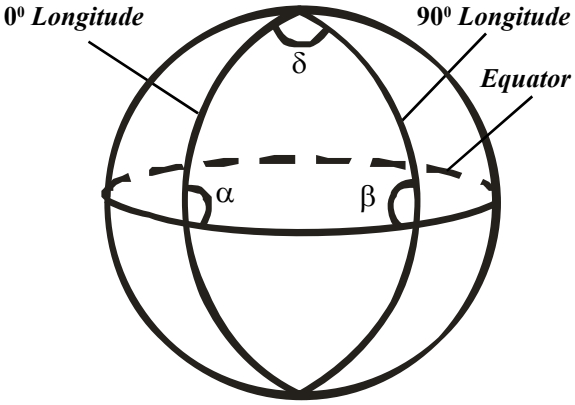


Fig. 5 : $\alpha + \beta + \delta = 270^0$
(*Globe*)

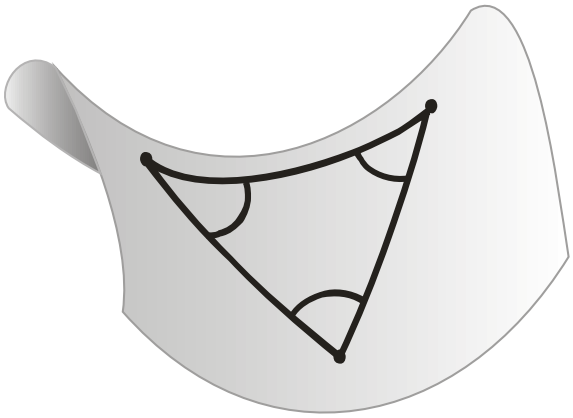


Fig. 6 : $\alpha + \beta + \delta < 180^0$
(*Concave surface*)

another dimension, that is hight. In 3D space we can more left-right, back-forth and up-down.

We have just made an attempt to understand the curvature of space with the help of the curvature of an object (i.e., paper sheet or earth surface) in space. It is definitely an oversimplification.

One thing to keep in mind that the curvature of space and that of the object in space are not the same thing, or the curvature of space does not depend on following the curvature of the object. If you draw a curved line on a flat sheet of paper, of course the flat sheet does not turn into curved one. Space can only be curved under the influence of mass or energy as mentioned earlier.

Now let's talk about time. The ancient concept of time was that the flow of time was perpetual, eternal and equal everywhere. Newtonian physics supports this view. But where does the confusion lie - let's see.

Suppose two friends, one on a train, the other on a motorbike. The speed of the train is 100 m/s and that of the bike is 40 m/s. They started moving from the same place side by side in parallel paths. Then the bike friend will see the train moving at a speed of 100 m/s - 40 m/s = 60 m/s. Since the bike is moving towards the train, the bike's speed has to be subtracted from the train's speed. [As the train is moving in the same direction to the bike, the Relative Speed of the train = Speed of the train – Speed of the bike (Fig.7). If the train is moving in the opposite direction to the bike, the Relative Speed of the train = Speed of the train + Speed of the bike. [Fig. 8] In this case 100 m/s + 40 m/s = 140 m/s.]

The friend with the bike will see this variation in the train's speed, but you being at rest will not see any change in the train's speed.

This time we will take a torch light instead of a train. If the bike starts moving at the moment of turning on the torch light, in the same direction as the light, then the bike friend will see, Relative Speed of Light = Speed of Light - Speed of the Bike = (C-80) m/s [Here the speed of light is taken as C m/s](Figure-9). When moving in the opposite direction, Relative Speed of Light = Speed of Light + Speed of the Bike = (C+80) m/s (Figure-10).

Let's say in this case, you will see the speed of light to be C m/s. The friend riding the bike will see the change in the speed of light. But it has been seen in all experiments that the speed

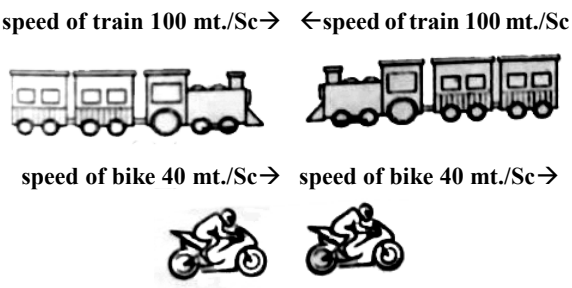


Fig.7 & Fig. 8

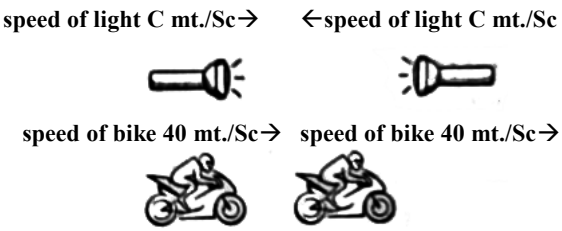


Fig.9 & Fig. 10

of light does not change in relation to the observer, whether he is stationary or moving. In 1905, Einstein called the speed of light absolute or constant, accepting the experimental results in the special theory of relativity. That is, light moves at a constant speed relative to all observers.

This doesn't fit with our daily life experience. How can this puzzle be solved?

Here Einstein overturned our traditional understanding of time. He said that the flow of time is not irreversible. That is, time can move slowly, and it can also move quickly. It does not mean that the flow of time will be the same for everyone. Some people's clocks are slow and some people's clocks are fast. So if it is, the time of the bike friend moving towards the light will run slower, the clock will show less running time. The relative distance traveled by light in one second is C-80 meters, which is adjusted so the speed of light will be C m/s (Speed = Distance/Time). If the clock shows less time due to the clock slowing down, the speed deficit will make up for C.

Time will run faster for the bike friend moving against the light. As a result, the additional speed of light will be adjusted.

Thus, the speed of light will be constant in both cases. ***It is as if nature is slowing or fastening the clock to keep the speed of light the same.***

Here it is understood that the speed of the moving bike is very small compared to the speed of light. So this change is not noticeable. The speeds we observe in everyday life, whether on a bus, train, or plane, are all negligible compared to the speed of light. So we don't understand this change. But at speeds close to light, this change is noticeable and must be accounted for. It is reality.

We saw that in a moving observer or reference frame, time can move slowly. Can time slow down because of gravity? Yes, it can. Let's imagine a multi-story building. Here there will be a difference in gravity between the 1st floor and 100th floor. Time will run slow on the 1st floor and run fast on the 100th floor. As a result, the people living on the 1st floor will be relatively young. It sounds surprising but it is true. But the difference in time flow will be so insignificant that we cannot predict it. But if there was a supermassive body in place of the Earth, the difference would be noticeable.

Now, the question naturally comes to mind, why does the flow of time change in the presence of mass? Einstein showed in his general theory of relativity that space bends in the presence of mass. For simplicity we can say, it takes longer to follow this carved path. As a result, time moves slowly. So the more curved the space, the slower the time. The greater the mass, the more it will bend space. Energy also bends

space. From the special theory of relativity, we know that the mass and energy of matter are interchangeable ($E = mc^2$). That is, energy is equivalent to mass.

So the speed of the object due to which we found the flow of time moving slowly, is the reason for the bending of space? Yes, I can say that. As the speed of the object increases, the kinetic energy increases. The relative mass of objects increases at speeds close to that of light. That is, energy is converted into mass; space is bent. If you can travel near the speed of light, you will see the trees around you, the tall buildings, everything bends like a tunnel, and you run through it. You might have seen such scenes used in high speed video games.

As we found - ***time slows down or fastens as space bends more or less. That is, there is an inseparable relationship between space and time. This is how our traditional concept of space-time breaks down.*** Therefore space and time must run simultaneously, it is called the space-time continuum.

We have already learned about three dimensions in space. Now we add one more dimension. That is, four-dimensional space-time. We can easily understand three dimensions in space. Basically we are used to a three dimensional world. But we do not understand the fourth dimension in space. So the idea of a four-dimensional space-time world is also not perceptible. We can only try to understand it with the help of intellect.

What we used to say about the change in speed of time to bend three-dimensional space, we can now call four-dimensional space-time instead of three-dimensional space and also say that space-time in a four-dimensional world bends in the presence of mass and energy or due to momentum.

We can take a simple approach to understand space-time bending. Instead of three dimensions of space, we take one dimension and the dimension of time, then we get a two-dimensional surface. We can compare the bending of this plane with the bending of space-time. We can do it. Because when we wander in one direction (right-left); Then we keep the values (coordinates) of the other two dimensions unchanged. That is, here we keep an invariant relationship with the other two dimensions. So we can ignore these two dimensions for simplicity, but it means they are not imaginary, but real.

Now we return back to the original question that Newtonian physics can't explain, the bending of light in dark stars. Now we can say that all objects with or without mass in four-dimensional space-time can bend. Light will also bend following the curvature of space-time. We can infer this from simplified two-dimensional space-time curvature.

From the general theory of relativity, we know that if there is an object of great mass in a very small space, the curvature of space-time will be very high. If any object falls there, the question of what happens to the object remains unanswered.

Soon after the publication of general theory of relativity, Carl Schwarzschild came up with a solution. He mathematically showed that if an object of great mass could be brought to a point, the curvature of space-time would be infinite. When this space-time curvature crosses a certain boundary, any object cannot return, will disappear completely, and time will stop there. He determined the distance from that center to the boundary. This distance is called the Schwarzschild radius after his name. This Schwarzschild radius is the boundary of the black hole. The sphere formed by the Schwarzschild radius is the shape of the black hole.■

Artificial Intelligence And Nobel Prize 2024

Numerous inventions and discoveries aimed at advancing artificial intelligence have been given particular consideration for the 2024 Nobel Prize in Physics and Chemistry.

A brief explanation of artificial intelligence and its current state of development is required before learning which contributions have earned the scientists involved the Nobel Prize.

It would not be incorrect to refer to the current period as the development and use of artificial intelligence. Its use in nearly every sphere of life has become essential to the functioning of society under the current socioeconomic structure.

Scientists began mimicking the human brain in 1950 in an attempt to comprehend how the brain functions and incorporate it into computers, ushering in the era of artificial intelligence. The aim was to train computers to gradually develop machine intelligence and to get more and more work done from them accurately.

Previously confined to exciting science fiction tales, the concept of "super computers" and robots has now become a sobering reality. This outstanding achievement of science has been possible through a thorough understanding of the workings of the human brain. The brain collects information (experience) from the environment through the five sense organs (eyes, nose, ears, tongue and skin) i.e. sight, smell, hearing, taste and touch.

This collected information is stored in different layers of the brain. When required, the brain retrieves and analyses that information to make a decision and solve a specific task. For instance, a database of information about a cat is gathered and stored in a particular cell of the child's brain when they are first introduced to it by someone touching, hearing, or seeing the cat's appearance.

The trainer is the one who first introduces the cat to the child. Later, when the child sees a cat again, he can use his previous experience to recognize the cat. The child's brain at this point only uses previously stored information to trigger the memory of cats, enabling him to identify the animal without the assistance of a trainer.

When exposed to cats of different colours or sizes or different species, the concept of cats expands and becomes more specialized. By simply hearing a cat's call, a child can learn to recognise cats and eventually learn to differentiate them from other animals.

If the information base is enriched, he would learn to identify similar-looking members of the cat family, such as tigers, leopards, jaguars, puma, etc., separately. The more objects a person is surrounded by or comes into contact with, the greater the volume of information in his brain.

Scientists refer to someone as talented if their brain can accurately retrieve and analyse that stored information and make decisions quickly. A person must receive the right training in order to become proficient at a particular task. This approach has been used by scientists, and they have also been successful with machines.

It is translated into machine (mathematical) terms and installed in the computer after the fundamental mechanism of the biochemical processes that persist in the brain has been learnt. It is referred to as an artificial neural network in science. When a machine trained in this method is given any command, the machine follows that command.

The main difference between the neural network of the brain and the artificial neural network installed in the machine is that, various in-

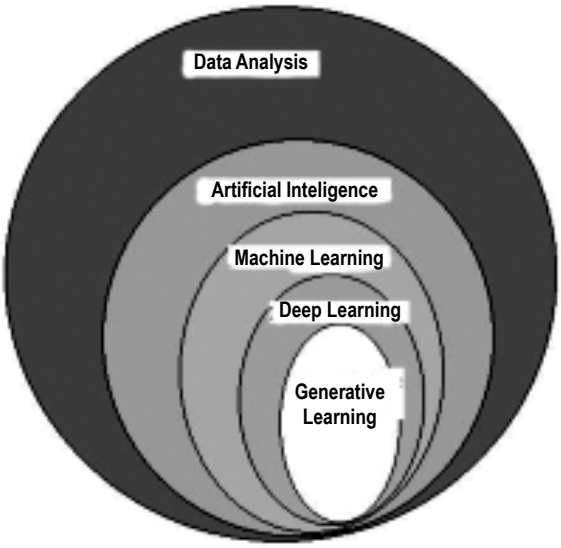
organic ions e.g, Na+, K+, Cl- and some organic molecules known as neurotransmitters play an effective role in the exchange of nervous stimuli inside the brain.

However, the exchange of information through the artificial neural network is solely dependent on electron flow. The evolution of human knowledge regarding the brain's functioning and the evolution of human machine intelligence are roughly parallel. The same principles that govern the development of the human brain are applied by scientists to the study of machine intelligence. This method of training a machine begins with data analysis, especially by creating the ability to perform mathematical calculations.

At a certain point in it's evolution, machines move into the realm of artificial intelligence. "Machine learning" represents one phase of the development of artificial intelligence at the level where statistical techniques are used to train people to meet their needs. These days, for instance, if you type a few words about a topic or say it aloud, a search engine will instantly display detailed information about that topic on the computer screen. Machine learning is what makes all of this possible.

Furthermore, machine learning has been incorporated into many aspects of human life, including language recognition, economic forecasting, disease diagnosis, online fraud detection, weather forecasting, and more. Since the creation of artificial neural networks for use in machines, artificial intelligence has progressed from machine learning to generative learning, surpassing the deep learning phase. In mathematical terms, generative learning is a subset of deep learning, machine learning is a subset of artificial intelligence, and deep learning is a subset of machine learning.

The power of generative learning has allowed machines to reach a very high level of maturity. They are learning to understand human linguistic cues and meet more subtle needs. Today's chatgpt, chatbots, among other applications, are the outcome of the development of artificial intelligence in machines and are used in a variety of industries, such as research, education, customer service, three-dimensional image creation, transportation, the pharmaceutical industry and in many more.



The ongoing use of artificial intelligence has decreased the need for human labour. In the modern world, there is a stark contrast between the unparalleled advancements in science and the widespread poverty brought on by the unemployment of the vast majority of people.

Of course, this raises the question of what effect this scientific advancement is currently having, or may have in the future, on the social field. Are humans slaves, co-workers, or competitors of machines? Will the human race be in grave danger as a result of this growing reliance on machines? Will human ingenuity be destroyed? Where does it stop? Is there no remedy for it? Today, humanity as a whole must deal with hundreds of such questions. Finding the right answers to these questions is the demand of the hour. It

must, however, be in a different realm.

We will now learn which inventions or discoveries have won the 2024 Nobel Prize in Science.

Physics – This year, two scientists shared the Nobel Prize in Physics for establishing the groundwork for artificial neural networks, which are a powerful tool for machine learning. They are John J. Geoffrey E. Hinton, a physicist at the University of Toronto in Canada, and Hopfield, a physicist at Princeton University in the United States. The two scientists have created a structure (hidden unit) of an artificial neural network that, on the one hand, can store and retrieve information and, on the other, train computers to analyse that information store and make critical decisions by using the nervous system's operations in the brain.

Without adequate understanding of the fundamental ideas of a subject, this task can be completed solely with the aid of some knowledge regarding its usefulness. Over the past four decades, the discoveries and innovations of these two scientists have led to tremendous improvements in artificial intelligence or machine intelligence.

Chemistry - This year, the Royal Swedish Academy of Sciences has awarded the Nobel Prize in Chemistry to three American scientists. They are David Baker, Demis Hassabis and John Jumper. Scientist David Baker has invented a method for knowing the structure of proteins using computational protein designing or computational methods. On the other hand, scientists Demis Hassabis and John Jumper have invented a method for predicting the structure of protein molecules using machine artificial intelligence.

The human body is a reservoir of about four hundred thousand proteins. Protein molecules play a huge role in the proper biological supervision of the living body. Proteins are simultaneously oxygen carriers, enzymes, hormones, and disease inhibitors, and are the structural units of cells and cell protectors. That is why determining the structure of proteins is very important to scientists.

As a result of these discoveries and innovations, many fields such as genetics, medical science, biochemistry, drug preparation, etc. will progress in the future.

Physiology and Medicine – Two American biologists, Victor Ambrose and Gary Ruvkun, have won this year's Nobel Prize for the discovery of microRNA and its role in gene regulation. It is necessary to briefly discuss the process of protein synthesis that occurs inside the cell in order to clarify this discovery. Every cell in a multicellular organism has the same DNA in its chromosome. In other words, the DNA found in nerve cells is identical to that found in muscle cells. These DNA molecules contain numerous genes at specific locations.

The codes for particular proteins are found in genes. A gene produces mRNA, a copy of itself, during protein synthesis. This process is called transcription. The ribosome converts the coded language of mRNA created in this process into the language of proteins. That is, the ribosome acts as a translator and synthesizes different proteins according to the instructions of different mRNAs. Muscle cells only produce the proteins needed for muscle cells. The same thing happens in nerve cells, intestinal cells or other cells. But the question is how do different types of proteins get produced from the same gene instead of synthesizing the same type of protein in different parts of the body? The answer lies in the mechanism of gene regulation.

Thousands of biological molecules are involved in this process. MicroRNA is one of them. Therefore, the discovery of microRNA is very important in the field of cell biology. This discovery will play an effective role in understanding the complex processes of gene regulation in the body of multicellular organisms more easily.■

Another disastrous landslide in Wayanad, Kerala

View of Chooralmala in Wayanad which was cut off after the massive landslide.

On the night of July 30, 2024, a series of landslides occurred in several villages in the Wayanad district of Kerala, India. Official reports indicate that 442 people died (though unofficial reports suggest the number could be over a thousand), 397 were seriously injured, and 129 people (or over 500 according to unofficial sources) went missing. The disaster left at least ten thousand people homeless and caused property damage estimated at around ?1200 crore. The Chief Minister of Kerala reported that 1592 people were rescued. Rescue operations were hindered in some areas due to a destroyed bridge and the force of water, mud, and boulders. According to ISRO satellite data the landslide originated at a height of 1550 metres above the sea level and it devastated an area extending to 86000 square kilometres in the Mundakai region which is roughly equivalent to twelve football fields. In the wake of the landslide boulders,sand and clayey water were carried 8 kilometres away along the Iruvanjippuzha river,altering its course in innumerable places, causing uncountable breaches in the banks, and destroying buildings and homes along the riverbanks. (Source: the hindu)

Were there warnings?

It had been raining in Wayanad continuously since 22nd June. On the days before the incident, Mundakkai had received 572mm of rainfall in 48 hours - 200mm of rainfall in the first 24 hours and a massive 372 mm in the next 24 hours. This rainfall was 5 times more than normal.

Did the scientist keep their mouths shut as the crisis developed? Was the government warned of the impending disaster?

Facts reveal it was.The Hume Centre for ecology and wildlife biology had warned the district administration a day earlier.The director of the institute,C.K.Vishnudas had informed, "Since June 1, several locations in Wayanad, including Puthumala, Lakkidi, Thondernad, and Manikkunnu Mala, have experienced over 3,000 mm of rainfall. “In the span of 50 days, these areas have become highly rainfall saturated. To make things worse, the regions are extremely vulnerable to landslides when

exposed to severe rainfall." [Source: Indian express 1.8.2024].

"After the incident, Mr Vishnudas said that if efforts had been taken people sheltering in Chooramala school and the residence of the villages situated in the higher slopes could have been evacuated "and there wouldn't have been so many instances of death and disappearance. [Source - same as above]

Is this the first landslide in this region?

The Civil Engineering Department of the Government of India and other agencies together with IIT Delhi have published the 'India Landslide Susceptibility Map' (ILSM). This map shows that Kerala, apart from the Himalayan mountainous region, is the most dangerous state in India for landslides. According to this map, 3,300 square kilometers of Kerala are highly susceptible to landslides, and 288 square kilometers are moderately susceptible. Most of the Wayanad district in Kerala was already identified as highly and moderately landslide-prone. From January 2015 to January 2022, a total of 3,722 landslides have occurred in India. Of these, 2,239 (about sixty percent) occurred in Kerala." [Source: how two villages vanished overnight, the Hindu 16/8/20 24]

"In August 2018, a catastrophic landslide and subsequent flooding in the Wayanad district resulted in the death of over 500 people.

Therefore, this incident is not new and has been occurring despite continuous warnings.

Geological formation of Wayanad : The Wayanad district in Kerala, South India, is geologically composed of the Western Dharwar Craton and the Peninsular Gneiss and Wayanad Schist Belt in between. These formations are from the very ancient Archaean era and are geologically not as unstable as the Himalayan mountain range. The rocks here, mainly ancient metamorphic rocks such as Schist and Gneiss, are distributed from east-west to east-southeast-west-northwest. The rock strata are very steep (almost vertically positioned) and show numerous faults or joint planes, among other lineaments. The activity of these lineaments is

slightly visible during the collision of the Indian Plate with the Tibetan Plate. However, the hilly regions have excessively steep slopes, with more than 50% of the region having slopes greater than 20 degrees. Weathering over millions of years in these ancient rock strata has led to the formation of a lateritic soil layer on top, which is loose. Due to natural reasons, there is excessive rainfall here. The cracks in the soil and rocks (foliation plane, fault plane, or joint plane) retain some of this water. When the continuous and heavy rainfall exceeds the water retention capacity of the rocks, the pressure of the water causes landslides."

The Wayanad district of Kerala is rich in economically important minerals such as gold steatite (a gold-rich soft stone) and molybdenite (an ore of molybdenum). Various mining activities are carried out in the hills and valleys to extract these resources.

Why do landslides occur repeatedly?

Environmental organizations consistently propagate that due to human activities, the Western Ghats mountain range now receives 10% more rainfall compared to earlier. This is the main reason for the recent severe landslides.

However, geologists and environmental scientists have countered this propaganda with scientific explanations. A team of geologists from the Geological Survey of India, Kerala University, and environmental scientists from the Kerala State Landslide Advisory Committee gave an interview to journalists, stating otherwise, "Wayanad tragedy:

Landslides natural ... can't prevent them but impact can be minimized." In this interview, the scientists explained that landslides in the Wayanad region occur due to natural causes. While it is not possible to control them, their harmful impact can be reduced. In the interview, the Deputy Director General of the Geological Survey of India, Mr. Ambili, commented : "Weather is a major factor in determining landslides in a susceptible area. Other factors are slope, type of soil, structure of rocks, aspect etc. When there is a geological change, all such factors get reactivated. Water has ways to seep out of rocks as springs. But when the rain is heavy and continuous, it goes beyond the capacity of rocks to withhold water. When it crosses the threshold limit, these burst with disastrous effect.

In the aforementioned interview Mr Ambili commented, "Human intervention is not the reason behind this landslide. The rocks couldn't hold the water due to torrential rain in a place with a high slope.(We need to remember that Kerala including the Wayanad district is rich in mineral resources, especially the highly precious gold and Molybdenum - Insight) Quarries are a major contributor. We operate quarries without studying the geology of the area. There are many fractured quarries. The blasting that takes place in quarries will result in rock-fall in other locations." Plantation also contributes to landslides. It should be suited to the location. Plants should be chosen according to the soil and rock types. People have the habit of obstructing first-order streams to prevent them from entering their property. If we block the flow, the water seeps down and exerts pressure, resulting in smaller landslides. The landslides at Erattupetta were due to such human interventions. In Thrissur, we have seen people converting streams into pathways and roads." These endeavours enhance landslide susceptibility. The township was developed to facilitate plantations. The valley marked by such mono-crop cultivation dilutes the biodiversity required to prevent a landslide. There are large-scale human interventions in the name of promoting tourism. A lineament map gives a picture of rock-fractures beneath the soil. Calamities happen at places with maximum lineaments, the impact of which increases through human interventions.Any place with a slope greater than 20 degrees is landslide-prone. In Kerala, more than 50% of places are like that. When we construct multi-storey buildings atop hills, they exert greater pressure because of their weight, and landslides happen. Similarly, cutting the toe-end of the slope to build houses or canals also causes landslides."

"However, approximately 4.75% of the total area of India, including Kerala, is naturally prone to large and medium-scale landslides. Besides the entire Himalayan mountain range - Himachal Pradesh, Uttarakhand, Darjeeling-Kalimpong in West Bengal, Sikkim, Assam, Meghalaya, Manipur, Arunachal, Tripura, and Mizoram, Kerala in India is naturally landslide-prone. Scientists are repeatedly warning that in all these regions, the construction of roads, bridges, railway lines, urban expansion, buildings, monocrop plantations for profit, and mining activities should be done following clear scientific rules or not done at all. Despite knowing this, government administration and municipal bodies are ignoring these prohibitions and carrying on with their work. As a result, landslides are continuously bringing disaster to daily life. Hundreds of lives are lost every year, and property worth millions is destroyed. Driven by profit and the pursuit of quick and excessive profits, the current society, state owners, and directors are not paying attention to this. After the disaster, public funds are looted in the name of relief, and there is competition over who will get new allocations for reconstruction. In this unequal and discriminatory society, thinking about nature and people does not happen.

Environmental organizations are not mobilizing any movement with this scientific perspective. They are merely making noise over isolated issues. Therefore, scientifically minded people need to hit the streets to raise awareness among the public and work towards scientific solutions to the problems. ■

On World Environment Day

let's march for food ,shelter, health care, education, employment and unpolluted environment for all

Friends,

We know that every year 5th June is celebrated as World environment day.

'Rid your homes and immediate environs of garbage, plant trees without felling any,use solar energy instead of coal, petrol, or diesel, avoid plastic, use organic fertilizers instead of synthetic ones in agriculture, refrain from using pesticides, and conserve water by not wasting it unnecessarily are solutions that are being peddled day in and day out.

Failing to do so would increase the temperature of the earth to such an extent that all the stored ice will melt:inundating coastal areas, devastating cities and villages- thus leading to unimaginable destruction and mass extinction of numerous species.

From a tender age, we are taught these remedies through school education. Throughout the year, these cautionary messages are hammered into the ears of the masses. It's made to appear that ordinary people themselves are the enemies of the environment.

The United Nations initiated the World Human Environment Day in Sweden on June 5, 1972, as the first global environmental conference. Since then, every year on this day, the world observes World Environment Day. Significantly the United Nations and the heads of the states have deleted the word 'human' from the title.

It highlights the fact that ensuring food, clothing,shelter, education, healthcare and a conducive cultural environment for the wholesome development of the human potential do not figure in their agenda.

This is so despite the fact that humans are an inextricable and the most crucial part of the environment. And among humans the numbers of the working people far exceed any other category.Today's world stands on the foundation built by them. Whether it's agriculture, industry, or service, the toiling masses create all social wealth with their physical and intellectual labour. They create and build ceaselessly.However, the toiling masses have literally no right over this abundant wealth.

For those who constitute the majority, the real condition of their immediate environment is for everyone to see. They toil relentlessly, earning meager incomes that are hardly enough to quench the hunger of their family members.They starve periodically or are reduced to a semi starvation diet and suffer from malnutrition induced diseases, they face various risks due to living in polluted, toxic, and unhealthy environments.

Data shows that 20% of children aged 6 to 23 months in India suffer from malnutrition, either due to lack of food or inadequate nutrition. They live like animals in habitations filled with and surrounded by filth, contaminated water and foul atmosphere.Workers working in mines,tanneries,steel plants, railway, power generation plants, chemical plants, construction workers,jute and tea workers - all have to work in conditions that are fraught with danger and health hazards.

Despite spectacular scientific advancements, modern medical facilities remain inaccessible to most of this population. So far as public healthcare is concerned, the availability of doctors, nurses, medicines, and medical equipment in the government health system is grossly inadequate. Access to advanced medical treatment is a matter of 'luck.' Advanced medical care is beyond the reach of most toiling people, leaving them vulnerable.

Similarly, the field of education has turned into a hunting ground where super and hyper profits are raked. Commercialization has thoroughly infiltrated education. As a result, even though toiling class parents may desire to send their children to schools

and colleges, most of them cannot scale the high walls of educational expenses.For the few who can, there are hardly any jobs to be found after completing education .

'To ease the pain' of these hapless toilers uninterrupted supplies of alcohol, cannabis, dendrite and other addictive substances are ensured!Meanwhile endless exposure to indecent content continues through mobile internet.

From this, It's quite evident that there is no concerted effort or desire by the state to clean up the physical environment in which the masses struggle and survive.

On the other hand, the wealthy capitalist owners and the government have seized control over the entire country's water, forests, and land resources, as well as the assets of factories and mines.They rampantly deforest the jungle, fill wetlands relentlessly, extract groundwater unscrupulously, indiscriminately waste water and release hazardous wastes and effluents into the environment by deliberately not installing pollutant treatment devices in their bid to reap super profits.

They flout their own laws in places where earthquakes and land subsidence are likely to occur, such as Uttarakhand, Darjeeling, Sikkim, and Manipur.In these places roads, mines, tunnels, railways, and dams are being constructed in an environmentally harmful manner. As a result, workers face death every day. The country's authorities and capitalist owners continue to engage in environmentally destructive activities with impunity and blame the masses for it.The capitalist owners are immune to the environmental laws; it's ordinary people who have to bear the brunt of them . So, even though large forests are being cleared by them, the so called long arm of the law does not touch the powerful business interests.It's the poor indigenous people who suffer when they stray into forests to collect firewood.

We have seen that despite the Bhopal gas tragedy in 1984, where thousands of people lost their lives, the Union Carbide owners were not punished. Similarly, in Gaza, Ukraine, Syria, and Iraq, despite the devastation caused by bombings, those responsible for this carnage remain unscathed. Even after dropping the Napalm bomb in Vietnam, causing death and environmental destruction, no penalty was imposed on the U.S. government. In Hiroshima and Nagasaki, Japan, where atomic bombs were detonated, resulting in the deaths of countless humans and animals, no punishment was meted out. Weapons that kill people en masse are being manufactured and used worldwide. No national or international authority has taken any action against these perpetrators.

In reality, the responsibility for environmental pollution is thrust on ordinary people, while the wealthy class escapes accountability. They want to perpetuate an environment of inequality and injustice.

And this brings to the fore a handful of questions:

*Why do most working-class people struggle with malnutrition and hunger while some overeat?

*Why do toiling people not have access to modern scientific healthcare?

*Why are the working masses living in an environment devoid of education and culture?

*Why are working people forced to live in hazardous and unhealthy conditions?

*Why do toilers reside in areas filled with foul odours and toxic substances?

*Why do landowners who clear forests, exploit water resources, and create industrial waste in the environment allowed to go scot free?

*Why are toiling people being made cannon fodder in predatory wars?

Let's raise our voices :

Let the common people unite to put an end to this environment that perpetuates inequality and discrimination.

Let's hit the road to ensure food, shelter,health education, employment, and pollution -free environment for all.

June 2024

Bigyan Manaska, West Bengal

Environmentalism vs. Environmental Science

Is Global Warming Man-Made?

Is this the highest concentration of carbon dioxide in the Earth's atmosphere ever recorded in geological time?

Influenced by persistent and coordinated propaganda from the IPCC, the UN, various environmentalists, and states, a sizable segment of the educated population thinks that the unusual rate of fossil fuel combustion since the Industrial Revolution—particularly in the last 150 years—has resulted in the highest concentration of carbon dioxide in the Earth's atmosphere ever.

This has supposedly resulted in the warmest atmosphere ever. As a result, in a short period of time, the melting of high mountains and polar ice will cause sea levels to rise, submerging low-lying areas on most continents and resulting in the sixth mass extinction of numerous species caused by human activity.

If we judge everything one-sidedly based on partial scientific understanding, we will undoubtedly arrive at the wrong conclusions. Considering the Earth as a static, immobile, unchanging object can lead to such outcomes.

It is a fact that the unprecedented increase in fossil fuel use for industry, electricity generation, transportation, and civilization development, especially in the last 150 years since the Industrial Revolution, has increased the emission of carbon dioxide into the atmosphere by about 100 times compared to the past.

The burning of fuels has increased pollution levels in the environment. This is absolutely true and requires urgent attention. But that is a different question altogether. No one is saying that this has led to a proportionate rise in the amount of carbon dioxide in the atmosphere.

It is essential to understand the natural scientific processes that regulate carbon dioxide levels in the air. Three main processes are involved in this:

1. Due to its solubility in water, a sizable amount of carbon dioxide dissolves in the oceans and other large bodies of water on Earth, forming a variety of compounds, including carbonates. These carbonates, bicarbonates, and other compounds precipitate down the ocean, depending on the variation in the ocean's acid-base balance, forming compounds like limestone or the exoskeletons of invertebrates like snails, oysters, and corals.

2. A significant amount of atmospheric carbon dioxide is dissolved in water to form carbonic acid, which weathers the rocks on the Earth's surface chemically. This process creates various carbon compounds and limestone.

3. A portion of the atmospheric carbon dioxide plays a vital role in the photosynthesis process of plants, storing carbon compounds in plants.

Furthermore, carbon compounds from plants and animals that decompose in sediments before rotting and are shielded from oxidation are preserved as fossils in sedimentary rocks.

Let us get to the primary query now: Is the present atmospheric concentration of carbon dioxide the highest in Earth's history?

Indeed, the instruments and technology used to measure atmospheric carbon dioxide levels were developed many years after the Earth was formed, or even after life first appeared on the planet and several hundred thousand years after modern humans were created. Therefore, past

data will not be available directly as it is in the present age.

However, paleoclimatologists in particular have found ways to learn about the past climate in an indirect manner. Significant advancements have been made in this scientific field recently. Paleoclimatologists use a variety of techniques, such as microscopic analysis of tree rings, corals, ancient pollen, the properties of different sedimentary rocks, ice cores (samples taken from deep soil using instruments), and more, to determine the past temperature of the atmosphere, the levels of carbon dioxide, oxygen, etc., the sea level, etc.

Based on these natural evidences, scientists measure the past atmosphere's temperature, carbon dioxide and other compounds, sea levels, etc. Furthermore, this study sheds light on how fundamental shifts in the Earth's climate and environment have led to the emergence and extinction of numerous species.

Here is a quick summary of the temperature, sea levels, carbon dioxide concentrations, and other aspects of the Earth's atmosphere in the past, as well as the times and circumstances of mass extinctions of species, based on the work of paleoclimatologists.

Before studying this history, knowledge of the current Earth is necessary. Today's Earth has an average temperature of 15°C and an atmospheric concentration of 418 parts per million of carbon dioxide.

Since many species began to emerge in large numbers during the Phanerozoic era, we have discussed its history.

What can we infer from the Phanerozoic era's geological history—that is, from 540 million years ago to the present?

First of all, the average temperature of the atmosphere, the amount of carbon dioxide in the atmosphere, and the sea levels are not at their highest points in Earth's geological history during the era of modern humans and following the Industrial Revolution.

2. There has not been a linear increase or decrease in sea levels, carbon dioxide levels, or the average temperature of the atmosphere throughout Earth's geological history. Many natural processes have combined to cause their changes. The main cause of temperature changes is shifts in the positions of the Earth, our sun, and the universe. However, variations in Earth's temperature are also brought on by solar flares, the greenhouse effect, plate tectonics, unusual volcanic eruptions, and other natural processes. The primary drivers of variations in sea levels and atmospheric carbon dioxide concentrations are plate tectonics and volcanic eruptions.

3. A study of geological history reveals that, even before humans evolved, the amount of carbon dioxide in the atmosphere was significantly higher than what is now produced by human activity-induced fuel combustion. Natural processes have also caused these levels to drop.

4. Higher atmospheric carbon dioxide concentrations are not always correlated with a higher rate of carbon dioxide emissions. Despite a 100-fold increase in the rate of carbon dioxide emissions over the last 150 years, atmospheric carbon dioxide levels have only marginally increased (from 350 parts per million to 418 parts per million). This is due to the fact that carbon dioxide is absorbed by many natural processes.

5. There is no direct correlation between temperature and carbon dioxide levels, and higher atmospheric concentrations do not always translate into warmer Earth. Plate tectonics and volcanism are the two main processes that regulate the amount of carbon dioxide in the Earth's atmosphere.

6. Sea level fluctuations have occurred frequently throughout Earth's history, but they have never been the main factor in mass extinction; instead, they have aided in the evolution of the majority of species.

7. Two of Earth's five mass extinctions—the

first and the last—took place during ice ages. Numerous underwater volcanic eruptions, meteor impacts from space, and perhaps warming were the main causes of one mass extinction. As a result, mass extinction is not always indicated by global warming.

Therefore, the model of man-made global warming that is currently widely propagated and the global fear of rising sea levels and temperature changes based on carbon dioxide emission rates should be evaluated scientifically and objectively rather than being influenced by propaganda.

What are the findings of scientific studies regarding the rate of sea level rise and the melting of high mountain ice and glaciers?

According to British meteorologists, the IPCC, the UN, world climate conferences, and other NGOs:

1. Millions of people will be displaced by the sea's submersion of one-fifth of Bangladesh and the low-lying parts of the world, including West Bengal's coastline, by 2050.

2. The Ghormara Islands and other West Bengal Sundarbans islands will vanish.

3. By 2035, India's glaciers will have melted away. Initially, this will raise the water levels in Himalayan rivers, which will subsequently dry up prior to the arrival of the monsoon season.

4. As continents and oceans warm, there will be more El Niños, tornadoes, and sea cyclones.

5. According to the New Scientist magazine, which mainly cites the IPCC and NGOs, if action is not taken by 2100, the melting of Antarctic and Greenland ice will cause global sea levels to rise by 20 to 40 meters.

Reality , however, demonstrates:

1. In the past three decades, satellite images have shown that the coastal areas of Bangladesh have expanded by a thousand square kilometers due to sediment brought by the Padma, Meghna, and Brahmaputra rivers. According to the Bangladesh government, if embankments are built in the coastal areas, another five thousand square kilometers of land can be obtained.

2. River experts, after researching the erosion of Ghoramara Island on the West Bengal coast, have reported that this erosion is caused by changes in the river's own course and subsidence due to faults beneath the land. Rising sea levels in the Bay of Bengal are in conflict with the growth of neighbouring Nayachar Island.

3. The Indian Space Research Organisation (ISRO) has determined that the Indian Himalayas currently contain 16,627 glaciers. Of these, only 25 glaciers are regularly monitored due to the lack of government initiative and financial support.

It is easily inferred that the former director of the IPCC, Rajendra Pachauri, spread exaggerated stories about glacier melting without any factual basis. In a 2012 research paper by the National Academy of Science titled 'Himalayan glacier climate change water resources and water security,' it was stated that there is some melting of lower (low-altitude) glaciers in the Himalayas.

However, the estimated rise in water levels of the rivers descending from the Himalayas does not match the amount of melting predicted by climate change. In actuality, it has been noted that the water levels in rivers that flow down from the Himalayas have dropped in some locations but have not risen prior to the monsoon. What, then, is the IPCC's assertion based on?

In contrast, A.K. Dubey, the director of the Wadia Institute of Himalayan Geology at the time, told Hindustan Times in July 2013 that the Himalayan high-altitude glaciers are safe and have not melted abnormally. British Weather Observatory studies in 2013 reported that the temperature at the Mukteshwar Research Centre near Almora in Uttarakhand has decreased by 4° Celsius from the average temperature of that region over the past 143 years.

In other words, environmentalists are spreading false propaganda against scientific analysis in the absence of any significant research on the

Himalayan glaciers and without conducting a scientific analysis of the scant research findings that are currently available.

4. There are currently no studies that demonstrate that global warming is the cause of the rise in sea cyclones, tornadoes, and El Niño. But it is clear that the climate in various regions of the world is changing all the time. Scientific research is insufficient on how much of this change is due to natural causes and how much is due to human activities.

Historical data of the past six centuries indicate that the intensity or number of these cyclones has increased or decreased over time. The same conclusion is drawn from the comprehensive statistics of the previous 54 years (Tropical Cyclones by Year, Wikipedia, en.m.wikipedia.org). However, many scientists believe that the unscientific disposal of nuclear waste into the sea could be a human-induced cause.

5. For the past four decades, environmentalists worldwide have been widely publicizing that the rise in sea levels will surpass all previous historical records, and the only cause is the melting of ice and glaciers due to human-induced global warming.

If the Earth is considered a static and unchanging object, and all continents, mountains, ocean floors are considered fixed and immovable, then "melting a specific volume of ice evenly will add that volume of water to the fixed ocean basin" (the way environmentalists view the sea) is the environmentalist's environmental study! This unfounded, deceptive, and unscientific notion is making billions of people around the world panic. There is not a shred of science in this propaganda by environmentalists.

Science, however, says otherwise. With the use of contemporary technology, geologists have demonstrated time and again that the Earth is a dynamic, ever-changing entity rather than a static one. Everything in space, both inorganic and organic, is dynamic. The environment of Earth is in a state of dynamic equilibrium. The Earth's crust and the upper part of the mantle are divided into several large, cold, solid rock slabs called lithospheric plates.

These plates move relative to each other due to the thermal convection currents of the semi-liquid hot material below. This is an example of angular displacement. This process is explained by the plate tectonic theory. These plates can now be precisely measured for shape, size, mass, displacement rate, and direction. Ocean floors descend and mountains form in other locations as a result of plate tectonics, which creates new plates from fractures in continental plates and creates new oceans in between. Horizontal forces act parallel to the Earth's surface. Basins sink and continents rise due to vertical forces.

All types of movements are constantly taking place, including earthquakes, volcanic eruptions, fault formation, the formation of mountains, the expansion and creation of seas, sediment deposition, and shifts in the Earth's magnetic poles. Marine transgression and regression typically occur continuously as a result of the Earth's internal movements. When the sea moves closer to the continent, it is called marine transgression; when it moves farther away, it is called marine regression.

Let's first consider the Bay of Bengal. In her research paper "New transgression and regression prospect of Bangladesh from past to future," Noshin Sharmili of Dhaka University claimed that peninsular India split off from the southern continents following the Cretaceous period's breakup of Gondwanaland.

Since then, the sea in the current Bengal Basin has made significant progress towards the continent (marine transgression). The sea has moved away from the continent here since the Oligocene (marine regression). Marine transgression returned when the Bengal Basin re-fractured during the Miocene era as the Himalayas started to rise. Marine regression returned to the Bengal

Basin in the mid-Miocene as sea levels rose once more. In the Pliocene era, significant geological upheavals and faults occurred in the northeastern part of the basin, south of the Himalayas, leading to marine transgression.

Sea levels varied starting in the Quaternary period, during the major ice age's glacial-interglacial periods. At the end of the last ice age, 12,000 years ago, the sea level was 100 meters lower than it is now. Now, we can observe that since the end of the Pleistocene, the Indian Plate has been progressively moving southeast beneath the Burma Plate. Along with this, the process of creating the Indo-Burma mountain range is ongoing in southeastern Bangladesh. As a result, the sea is currently retreating from the continent in the Bay of Bengal, a phenomenon known as marine regression.

In "Long Term Sea Level Fluctuations Driven By Ocean Basin Dynamics," RD Muller et al. (2008) state that the sea level was 550 feet (170 meters) higher 80 million years ago than it is today. In the next 80 million years, the sea level will drop by 70 meters instead of rising, even if the ice and glaciers of the Earth's poles and high mountains melt completely due to global warming, according to computer models of marine crust formation, marine sediment deposition, plate boundaries, and the location and shape of ancient seas.

According to geologist Bernhard Steinberger and other Geological Survey of Norway scientists, the sea level has decreased by 170 meters (560 feet) in the last 80 million years. On March 7, Steinberger told Reuters that this process is ongoing and that the sea level will decrease by an additional 120 meters over the next 80 million years rather than rising. The Earth's map will alter if this takes place. Russia will be connected to Alaska by land.

In conclusion, internal tectonic movements cause the oceanic crust of Earth to move vertically in relation to the continents and mountain ranges, which is the main scientific explanation for the rise and fall of sea levels. The effect of global warming and cooling on sea levels is negligible compared to tectonic activity. Why, then, do scientists remain silent despite knowing this truth?

Why is there so much pseudoscientific propaganda about rising sea levels and global warming caused by rising atmospheric carbon dioxide levels?

Carbon dioxide is a harmless gas that has no colour or smell. It was released into the environment naturally long before humans did, as a result of biological processes. Carbon dioxide is the main raw material used in photosynthesis, which turns the inorganic elements of the Earth into food for all living things. It is impossible to imagine life without this gas. So why is innocent carbon dioxide being put on trial?

There is a deep economic and political agenda behind the theory that only humans cause global warming, which goes against the general interests of science and human society. In this ever-changing material world, human society is also changing. While science is class-neutral, philosophy is not. In this monopolistic era, the capitalist economy that powers the entire world is currently experiencing a severe crisis. This crisis is now irreversible. This is an overproduction crisis, which occurs when more goods are manufactured and sold than the market, which is based on consumer purchasing power, will demand.

The current capitalist economy can survive for a while, temporarily escaping the crisis, by curbing production development, shifting the burden of the crisis onto the working class, or developing new production sectors. Currently, these three methods are being adopted. While efforts are being made to develop new markets for renewable and "green energy" (which does not emit carbon dioxide into the air), there is also a desire to curb industrial development by bringing environmental pollution and global warming theories to the

forefront in order to avoid public outrage. There are initiatives underway to develop markets for energy production, including solar power and battery-powered vehicles. The leading capitalists in the world have been busy dividing up the market with new investments, including fossil fuels, at every climate conference since the Paris Climate Agreement.

However, there is currently no viable industrial production alternative to nuclear energy or fossil fuels. The majority of environmentalists, however, say nothing about the serious harm that lithium batteries cause to the environment. Nowhere is it made clear that charging or recharging battery-powered vehicles requires electricity. These major efforts to temporarily maintain capitalism under the pretence of green energy are already in motion. In addition, every state and significant industrial corporation is developing carbon budgets and launching a new market known as carbon trading at environmental conferences.

Carbon Trading: What Is It? Has it started in this country?

World Environment Conferences have been asserting for the past thirty years that human activities, especially the increased use of fossil fuels, are to blame for the alarming rate of global warming. Since the Industrial Revolution, there has been a steady increase in the average annual global temperature, with 14°C being the baseline. The temperature increase must not exceed 1.5°C (later stated as 2°C). It has been stated that there are five main processes that lead to carbon dioxide emissions into the atmosphere. As of 2020, the carbon dioxide emission scenario in the United States, an industrially advanced nation, is as follows:

- Domestic and general commercial use - 12%
- Non-fossil fuel energy usage - 1%
- Industrial production (from fossil fuels) - 16%
- Electricity production (from fossil fuels) - 31%
- Transportation (from fossil fuels) - 33%

Put another way, 80% of all carbon dioxide emissions in industrialised nations are caused by transportation, electricity generation, and industrial production. To address this, national commissions are established in every nation and a number of international agreements are made. There are plans to impose carbon taxes on businesses that emit too much carbon dioxide.

Limiting carbon dioxide emissions is opposed by a large number of operating industries, power providers, and automobile manufacturers. Thus, carbon trading offers a global solution to the problem.

By purchasing carbon credit certificates, also known as carbon allowances, from any carbon-sequestering organisation globally, such as the California carbon allowances or the European Union allowances, the carbon-emitting organisation can increase the amount of carbon dioxide it emits in its industrial initiatives. These certificates are bought and sold like other commodities, either directly or through brokers.

Recently, carbon trading has begun in the tea gardens of North Bengal and Assam. On July 12, 2022, the Tea Board, TRA, and carbon trading experts met with several representatives of the leading tea trade association. Following the meeting, Tea Board Chairman Saurav Pahari told the Uttarbanga Sangbad newspaper, "The tea industry has very bright prospects for carbon trading. The plan is both environmentally friendly and intricately linked with alternative income opportunities."

Uttarbanga Sangbad quoted TRA Secretary Jagdish Phukan as saying, "International carbon trading has enormous potential right now. Work has not yet begun in the tea industry. Therefore, the Tea Board's initiative will open new horizons for the tea gardens."

It is common knowledge that plants take up carbon dioxide from the atmosphere through a process called carbon assimilation. A tree stores

carbon in the soil through its roots, leaves, branches, and trunk. Nowadays, there are scientific ways to quantify this sequestered carbon. The main method for measuring the sequestered carbon is to look at the tree's trunk or branches. Several criteria determine how much carbon can be stored by planting a specific number of trees per acre of land.

There are still very few organisations in this country that measure this carbon that has been sequestered. The work is primarily done through international organizations, and the sequestered carbon is sold "on paper" through them. The first carbon trading company in India started in the Araku Valley (Andhra Pradesh) coffee plantations, and it is now beginning in a few protected forests.““It has already been explained how carbon trading works. In this case, the trees or the sequestered carbon are not physically bought or sold. Following the 2015 Paris Climate Agreement, industries in developed nations with high carbon emissions were subject to restrictions to keep their emissions below a certain threshold.

The agreement allows carbon-sequestering organisations to sell carbon credit certificates to carbon-emitting organisations. The more carbon credits an industrial organization purchases from a carbon-sequestering organization, the greater the amount of carbon emissions it can release in exchange for money.

Recession-affected garden and forest owners have jumped into this lucrative new industry. They have been revitalised by this 'green business' that goes by the name of carbon trading. "Carbon trading certificates are required for doing business with organisations in developed European countries," Vaibhav Ray, a businessman in the carbon trading industry, told the Uttarbanga Sangbad newspaper. They face pressure from relevant countries' laws, governments, and NGOs."

Planting new trees over time is crucial to carbon trading. These trees have to be three years old or older. As trees age, their ability to sequester carbon decreases. Plans are underway to systematically plant trees in the large areas of fallow land in the tea gardens of North Bengal in order to grow the carbon trading industry. Two renowned organizations in this business, GIZ of Germany and VNV of Bengaluru, will play a leading role in carbon trading in tea gardens. Rainforest Alliance, an international NGO, is also participating in this project.

The Tea Board's decision has, however, excited the Jalpaiguri District Small Tea Growers Association about this new venture. The association has begun the process of reforesting the 4,000 acres of land that make up their gardens.

No one should have difficulty understanding from the entire issue of carbon trading how deeply concerned the United Nations, the World Environment Conferences, the IPCC, or their associated environmental organizations are about reducing carbon dioxide emissions into the air! The extent to which the growth of carbon trading will lower airborne carbon dioxide emissions is not worth discussing. The growth of green energy and carbon trading, two green businesses, will eventually demonstrate how much the "human-induced global warming" that environmentalists advocate will decline.

Finally, it must be said that the current model of global warming promoted by the United Nations and institutions like the IPCC in the interests of the large and very large monopolistic capitalist class will give way to a new environmental model for new business interests when the warming phase ends and a cooling phase begins on Earth. The reason behind this is that environmentalism urges us to see cause as effect and effect as cause. ■

Our body is not made of soul or energy, but of matter

– Panchanan Mandal

Many people think that Ramakrishna, Vivekananda, Anukulchandra, Balak Brahmachari, Lokenathbaba, all of them were spiritual mans. They had spiritual energy in their bodies'! Swami Vivenanda said that "the soul is eternal, unchanging, and above all thoughts: The soul is not subject to birth or death. It is the true Self of man, the Âtman, which is permanent and ever free. The soul is not limited by the individual identity of the body and the mind. It is one with the cosmic Self or the ultimate reality. The soul is deathless, blissful, peaceful, and divine. It shines out and makes itself felt in spite of the thickest layers of ignorance." He also said that each soul is potentially divine and that the goal is to manifest this divinity within. He believed that this can be done through work, worship, psychic control, or philosophy.

Some people believed that after death the energy of the body becomes the soul. The soul again dissolves into the Supreme Soul! Even some people who have studied science also believe in this soul. When asked what the soul is, they said - vital energy. In combination with the principle of the permanence of energy and mass, it is said that the soul is a kind of energy, meaning life force - it cannot be created or destroyed, only transformation is possible. Therefore, there is reincarnation, it takes on a new body! Is that true?

The concept of soul

The concept of soul is very old. Based on information, it can be said that this concept of soul came in the era of the Neanderthals, about 250,000 years ago. Before the Neanderthals, no signs of soul or religious practices were found in the Pithecanthropus or Sinanthropus era. The concept of soul in the era of the Neanderthals has changed due to social changes. We must remember that the concept of soul in the Neanderthal era has nothing to do with today's concept of soul. In general, many people think that this thing called soul is in the soul. That is, as long as someone has a soul in their body, they are alive, and with death, the soul leaves the body or it can be said that death occurs only when the soul leaves the body, that is, when the soul leaves the cage of the soul. Although it was not accepted that there is a soul in any animal or anything in the living world except humans. There are different views on the soul in different religions. There are all kinds of stories. Without explaining it in detail, we try to understand it in a simple way, only then will we understand the futility of this soul. Although there are differences in the views of the soul in different religions, the main theme is the same. That is, this soul is the main link of our life. By which we are guided. One thing needs to be said here. According to religion, the whole world is guided by one Almighty. Who is called the Supreme Soul. Our soul is guided by this Supreme Soul. In a verse of the Gita, it is said-

'N jayate mriyate ba kadachin nayang bhutwa bhavita ba na bhuya

ajo nityah saswatohayang purano n hanyate hanyamane shara.'

'Which means, the soul does not die. The soul is immortal. Only the body changes. The soul is never born and the soul does not die. The existence of the soul is not subject to origin, because the soul is birthless. The soul is eternal. The soul is old. The body dies but the soul does not perish. That is, just as a person changes clothes, the soul changes the body. It has been said that the soul is eternal and always remains in the same form. It is not destroyed by the destruction of the

body.' That means the soul is invincible, immortal, indestructible, free!

When the existence of soul is questionable!

Now the question is, can this liberated soul know, in which Ghusuriram's godown! The one who is taking birth is the result of suicide in his body, where does that soul come from? Again, when the soul leaves the body after the change;iIs that soul that leaves the body being observed?

We all know that after the sexual intercourse between an woman and a man, an egg and a sperm fertilised to form a zygote. Then that zygote turns into a foetus in the mother's womb through cell division, development and growth. That foetus is born as a baby. My simple question is here, when does the soul enter in this body? At the time of the fertilisation of germ cells or the time of birth of the baby?

Some people say, soul take a new body, it support the transformation of energy!

If self-revelation is assumed in the same way, then self-revelation is being done in the same way - only in the body - the question of transformation?

After someone dies, when is it a transformation after the soul leaves his body? When does it happen again to become a soul from birth in a new body?

Does the soul take on a new body support true energy transformation?

If after the soul leaves the body, the whole body dies then no any organ is alive anymore. So see, it is not possible to help the patient by donating organs like kidney, liver, spleen etc. and transplanting them into a patient's body.

Hindus believe that the soul is reincarnated and Muslims believe that the soul goes to hell or heaven from the grave after three days. So what is the process of soul's transmigration?

Sometime it also say that soul is the energy over which we have no control. But you will see many stories where the will has gained willpower. In that, the soul is under its control! So you can think that there is no such thing as soul.

What is our body made of –

About our life and body, what does science say? Science say that humans are not made of energy, but made up of matter. In language of science the ability to doing work is energy. So the question of where the energy of a person's body goes after death is illogical. Science discovered advanced electron microscopes, ECG, USG, ammeter, galvanometer etc. Also made various innovations measuring energy. No machine has read the soul. In various religions, the creator is being talked about using the power of the human body to create the soul, reincarnation, etc. In order to create a human being, a unique thing called soul is being called energy. For this pseudoscience is being propagated by using words like 'energy, eternity' and quantum in the name of science.

Our body, like all other living beings, is made up of several types of molecules. Among them are carbohydrates or sugars, proteins, lipids or fats, vitamins, minerals, some metallic compounds and water. And also two nucleic acids - DNA and RNA, responsible for the existence and development of life. Al those chemical components made up of oxygen, carbon, nitrogen, hydrogen, iron, phosphorus, calcium, sodium, potassium, zinc, molybdenum, cobalt etc.

Excepts minerals if we break organic molecules in our body, we will find elements such as hydrogen, oxygen, nitrogen etc. Chemical analysis has shown that the human body is made up of 65% oxygen, 18% carbon, 10% hydrogen, 3% nitrogen, the remaining 4% phosphorus, iron, calcium, potassium, etc. Human body contain about 70% water. This water again produces hydrogen and oxygen. So we can say; our living body is formed by the interaction between the elements and minerals such as carbon, hydrogen, oxygen, nitrogen, etc. This interaction is necessary for all the biochemical reactions that occur in human body.

Source of energy in the human body

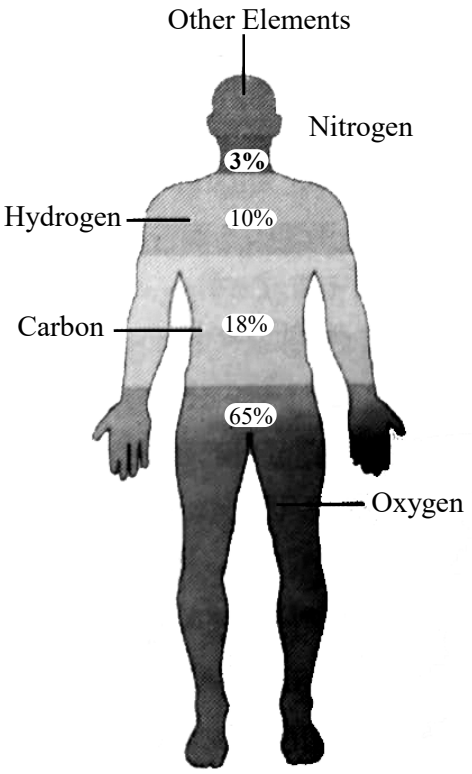
Energy is required to carry out any interaction or chemical reaction. This energy is active in the body of an organism. After digestion and absorption, the food we eat reaches the cells through the blood and lymph. During the process of respiration within the cells, the static energy in the food is converted into kinetic energy and heat energy. This energy is sometimes stored in the form of ATP or GTP. Energy is released when this ATP or GTP is broken down. This energy is the driving force of all biochemical processes in the organism. Moreover, this heat energy keeps our body warm. In addition, the stored energy comes to the environment in the form of heat energy. This energy is not only in the body of the organism. It is spread throughout the universe. According to the principle of conservation of energy, the total amount of energy in the world is constant. Energy cannot be created or destroyed. Energy can only be converted from one form to another.

What is life?

Any organism is an entity that is produced as a result of the interaction of various biochemical processes that occur constantly in its body. Anything that has life has signs of life. As an organism, it has life characteristics. Some organisms have emotions and creativity (baboons, birds, bees, humans, etc.). The biochemical reactions of life are highly dependent on each other, and life flows in a well-coordinated combination of them.

Where does life reside in humans or other multicellular organisms?

We know that unicellular organisms came to earth first in the course of evolution. These unicellular organisms have combined themselves to create multicellular organisms. Our body is made up of billions of cells. These cells are capable of surviving alone in a suitable culture medium in a germ-free environment in a test tube or glass petri dish! So what is a human being if not a single



animal! So the question is where does the real life of a human reside? Many lives in cells and yet one life as a human being!

Look again, what an amazing thing, cells or eggs-sperms are being frozen in very cold ova or sperm banks for years and used later! That is giving birth to humans again! Then think about what life is! Think again, some cells of multicellular organisms sometimes rebel and do not want to do their job properly! These are cancer cells. A study has shown that human cancer cells have been surviving and multiplying in culture medium for 73 years. To make various vaccines and antibodies, cells from different parts of the human body are cultivated outside the body. So, has the idea of what life is been created or has the idea changed?

What is death really?

Today, there is no mystery about the concept of death, there is no question of 'something' or

'soul' leaving the body. Biology has scientifically explained death with current knowledge. Death occurs when the coordination of biochemical processes occurring in the living body stops. But it does not mean that when an organism dies, all its cells or tissues or organs die immediately. Otherwise, a patient's life could not have been saved by a kidney from a deceased donor.

Natural death due to old age occurs over 24-48 hours or even a few days. One by one, the kidneys, liver, and lungs stop working. As a result of kidney failure, a lot of unnecessary acids and toxic waste products accumulate in the body. Due to lack of nutrition and oxygen, the heart stops, blood flow to the head stops, and all nervous activity stops, resulting in complete death. Then no more electrical signals are received from the brain. If the head is hit very hard as a result of an accident, death can occur within a few minutes, because the respiratory control centre of the brain is destroyed and the lungs and heart stop working in a short time. What we call the 'last breath' or think of 'something coming out' is actually the last and strongest attempt by the lungs to continue breathing; the result of a feedback. As the rate of contraction and expansion of the lungs decreases, the oxygen level in the blood decreases and the carbon dioxide level increases, making the blood acidic, as a result of which the brain sends a signal to breathe harder, the diaphragm tries to breathe harder.

The consequences of death

Now, after the death of a person or any living being, his body cannot stop the microbes, now if the body is left in an open place without cremation, the microbes or decomposers will break down all the compounds in his body and increase their number, as a result of which the complex compounds will become simple compounds, such as amino acids, fatty acids, carbon dioxide, methane, nitrogen dioxide, hydrogen sulphide, phosphide or any simpler compound or element. These will mix with the soil and increase fertility, fungi or plants will grow in this soil, the compounds in the human body will be used by the plants. Some flies and insects will lay eggs in the rotten flesh of the corpse and their larvae will grow and mature by eating the flesh, as a result, the substances in the human body will be transferred to the bodies of flies and insects. This is a cyclical process. All these are part of the biogeochemical cycle.

Does the cause of death is the departure of the soul?

Due to aging or senescence in the body of an organism, its various organs slow down after reaching adulthood. The interaction and coordination of various biochemical reactions in the body declines, resulting in its death.

In addition, if poison enters the body in any way, the work of an enzyme that helps in this chemical reaction is hindered, as a result of which the chemical reactions of life, which are highly dependent on each other, stop continuously. The organism dies.

If one or more organs are damaged due to an accident and coordination stops, the organism also dies.

Or, if the oxygen supply to the cells of one or more organs is stopped or if food does not reach them, those organs or organs stop working due to lack of food and energy, the organism dies.

The life of complex multicellular organisms like humans actually stops due to lack of oxygen and adenosine triphosphate (ATP) supply.

That, death is not a matter of the soul leaving. As I said earlier, death is the permanent and irreversible end of all those biochemical activities of an organism, which has caused the aggregate of matter in an organism to cease to manifest the signs of life. That is, the body of all organisms, including humans, is made of matter, not energy. There is a soul in the human body and that soul leaves it after death, or enters someone else's body or merges with the Supreme Soul or goes to heaven or wanders around as a ghost; this is not true at all. At least science does not say so. ■

Unveiling the Speed of Light

– Saroj Nag

Light travels very fast indeed, so fast that it is very difficult to determine the speed of light. Before the seventeenth century it was generally believed that light transmitted instantaneously. But the great scientist Galileo was able to think that the speed of light could be finite and he devised a test plan to measure that speed. Although we don't know if he ever actually attempted that experiment.

How did Galileo try to measure the speed of light?

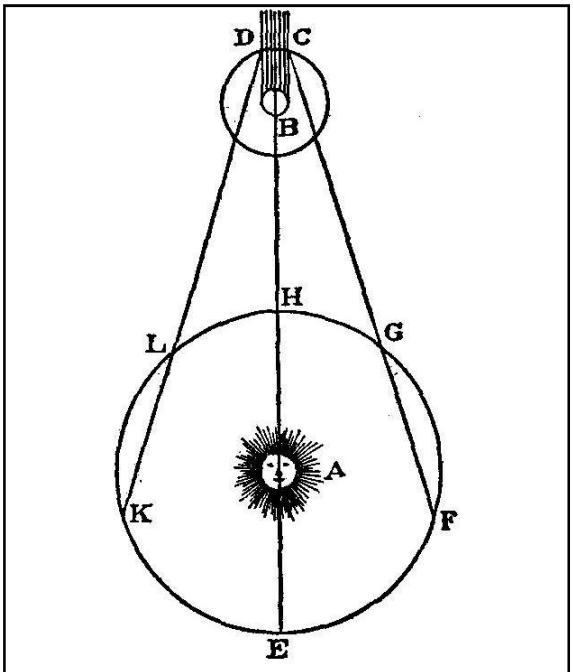
What was Galileo's method for measuring the speed of light? On a dark night take two lanterns and place them a great distance apart (but not so far that you cannot see them). The two lanterns are held by two different people and have a shutter to turn them on and off. Now suppose you take a lantern to a hill a kilometre or two away from the observer. The conditions should be such that the lanterns can be seen by both. Then you can calculate the speed of light by timing them on and off. Of course this is not the correct method for measuring the speed of light. This method may work for measuring the speed of sound, but not for light. Ultimately Galileo's standard for the speed of light was "truly at least as fast"

Jupiter's Moons

In a clear night sky you can clearly see at least four of Jupiter's moons with good binoculars. They are Io, Europa, Ganymede and Callisto. Among these four satellites, Io is the closest to Jupiter, Incidentally, Galileo discovered this satellite in 1610 AD.

How did other scientists try to measure the speed of light?

Danish astronomer Ole Roemer was the first to measure the speed of light in 1676. He used Io's orbit around Jupiter as a navigational clock (accurate clocks were not so easy to make). Along with this he used eclipses and occultations of Jupiter and Io. Here eclipse means Jupiter's shadowing of Io and occultation means that io moves behind Jupiter relative to Earth.



Roemer's diagram of Jupiter eclipsing its moon Io as viewed from different points in earth's orbit

This image was scanned from a copy of Roemer's paper in William Francis Magie, A Source Book in Physics, 1st ed (New York, London: McGraw-Hill, 1935).

Let us briefly discuss Roemer's experiments and observations. Note the accompanying picture(Figure-1). In this picture, A is the Sun, B is Jupiter, C and D are the beginning of Jupiter's shadow on Io and Io's rise from behind Jupiter with respect to Earth, respectively. And the circle around the sun is the earth's orbit. Different dots on it indicate the relative position of the Earth at different times of the year.

H is when Earth is closest to Jupiter and E is Earth's position six months later, opposite the Sun

from Jupiter (Jupiter cannot be seen from E). The orbital period of Io was known to be about 42.5 hours. As seen from Earth, the moon disappears behind Jupiter once every orbit. The time this shadow falls over the Io is measured at various relative positions on Earth.

When the Earth is slightly nearer to E (from where visible to Jupiter), then light from Io has to travel an additional distance roughly equal to the diameter of Earth's orbit. This results in a delay in eclipse. Roemer measured this late period. This time the diameter of the earth's orbit was already known. So measuring only the apparent time change and distance change at different locations on Earth gives an estimate of the speed of light. From there he calculated the value of the speed of light. Roemer determined that speed to be about 212,000 kilometres per second. Currently, the speed of light in vacuum is found to be 299,792,458 kilometres per second. According to Roemer's hypothesis, the distances of the planets were not accurately known in those days and there was a lack of perfect clocks. Yet he was the first to measure the speed of light in vacuum.

Stellar Aberration

In 1728, James Bradley made another hypothesis by observing the aberration of stars for the apparent displacement of the position of distant stars due to the rotation of the Earth around the Sun. He observed a star in the Draco constellation and found that its apparent position changed throughout the year. All star positions are thus equally affected. Bradley measured this angle of deviation of starlight. He knew the motion of the earth around the sun. By calculating from there, he was able to determine the value of the speed of light. His value for the speed of light is 301,000 km/s, which is very close to the current value.

Notched Spinning Wheel

Scientists have long looked to space to determine the speed of light. But in 1849 scientist Armand Fizeau conducted a completely different experiment. He used a beam of light reflected from a mirror 4 km away. The beam was sent through the grooves of a rapidly rotating wheel. The speed of the wheel was continuously increased until its speed was such that the two-way path of the light (i.e. from the source and reflected back) coincided with the speed of a groove on the circumference of the wheel. In this experiment, the value of the speed of light was found to be 315,000 km/s. Later scientist Leon Foucault performed this experiment using a rotating mirror. In that test the value of the speed of light is found to be 298,000 kilometres per second. This fact is confirmed by the observation of this experiment, with light travelling slower in water than in air.

In 1879, scientist Michelson performed a final phase experiment on the speed of light in vacuum. His research found the speed of light to be about 299,901 kilometres per second. In that experiment he measured the speed of light with such unprecedented accuracy that he was awarded the Nobel Prize in Physics in 1907.

After Scottish scientist James Clerk Maxwell published the electromagnetic theory it became possible to calculate the speed of light indirectly instead of directly. Many experiments were done on this subject but the most perfect value at that time was found in 1907 AD by scientists Rosa and Dorsey. They determined the speed of light in vacuum to be 299,788 km per second. After that, with the continuous improvement of science and technology, we got the absolute value of the speed of light in vacuum. Then in 1958, scientist Froome determined a more perfect standard. The distance he travels in vacuum in 1/299,792,458th of a second is called a metre. This is how the value of the speed of light in a vacuum is determined today.

Reference :

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2. American Museum of Natural History.

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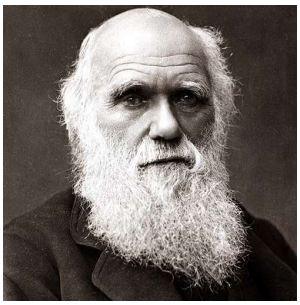


Evolution And Its Products
IS DARWINISM DEAD?

J B S Haldane

We are often told that Darwinism is one of the exploded myths of the nineteenth century. Some people say that evolution is a lie, others that it was determined by a life force or a creative urge, or something vague of this kind, and not in the common-sense manner that Darwin thought.

Now, anyone can find mistakes in Darwin's works. He was not infallible. In the same way Newton's account of gravitation was not quite right, but it is still good enough for the purposes for which it was framed. Dalton's account of atoms has had to be revised, but it is still the basis of chemistry. And although a few of Marx' predictions have not come off, he gave an incomparably better account of future changes in society than any of his contemporaries.

When Darwin wrote we knew much less about animals and plants of the past than we do now. He said that the complicated forms living to day were descended from simpler forms in the past, and that intermediates would be found. If they had not been found, he would have been proved wrong.

But they have been found. The bones of at least six different kinds of animal intermediate between men and apes have been discovered. Some of them used fire, so they are best thought of as men; though if they were alive to day they would probably be shot as big game by sportsmen. Others probably had no industry, and were apes rather more man-like than the gorilla.

Many other links have been found. For example, there were lizards with teeth like those of mammals, and birds with teeth and long, bony tails. Intermediate between fish and newts were creatures with stumpy leg and nostrils, like those of many fish, on the undersides of their heads. And between ferns and flowering plants there were ferns carrying seeds. Only in 1937 creatures intermediate between lampreys and other fish were first described.

And these creatures occur in the rocks at the depth where they were expected. Darwinism would be exploded tomorrow if the skeleton of a man or a horse were found embedded in a coal seam, where only the bones of animals like newts and liards are known. In the same way, Marxism would be disproved if a fascist state raised real wages all round, abolished unemployment and reduced its armed forces. But neither of these things has happened.

The real test of the evolution theory is practice. The date of a rock can be determined from the fossils in it. And on the basis of this dating predictions are made about the minerals to be found in it. Indeed, the details concerning Foraminifera, microscopic sea animals whose skeletons are found in limestone, are among the jealously guarded secrets of the great oil trusts. They are of such value in predicting where oil will be found that they have to be kept from rivals.

Men and women who do not believe in medi-

cal science have the courage of their convictions, and go in for Nature cures, osteopathy, Christian Science and so on. Rich people who say that they disbelieve in evolution do not invest their money in mining ventures undertaken contrary to the teachings of geology, which is based on the theory of evulutin. When a company of ant-Darwinians start looking for gold in Kent or coal in Cornwall I shall take their doubts more seriously.

Besides giving an account of evolution, Darwin proposed a theory of why it had occurred. The main trend had been determined by natural selection. Animals and plants varied, the variations were partly inherited, and since some variations allowed their possessors to leave more descendants, they spread through the population, and thus the population changed, and a new species was formed. For example, some animals have thicker hair than others of the same species, and the differences are inherited, as anyone can see by comparing fox terriers and collies. The hairier animals will do better in the Artic, and the less hairy in the tropics. And thus two races will be formed which will later develop into two species.

This theory was criticised from many angles. Some people think that habits acquired during life are handed down to the descendants. This was believed by Lamarck, a French scientist who had anticipated many of Darwin's views on the historical side of evolution. But no one has been able to prove it experimentally, and many facts of natural history speak against it. No animals have more complicated instincts than worker bees. They do not reproduce, and are not descended from other workers, but from queens and drones. So if habits are inherited, they should long ago have lost their instincts, which enable them to build honeycombs and to do other remarkable feats. They should have come to behave like queens or drones.

Lamarckism is now being used to support reaction. A British biologist who holds this view thinks that it is no good offering self-government to peoples whose ancestors have long been oppressed, or education to the descendants of many generations of illiterates. He has, however, to explain why even the children of orators must still be taught to speak, though men have been speaking for hundreds of generations.

Darwin's theory of natural selection by the survival of the fittest has also been used to defend human injustice. The facts, however, are against this attempt. Throughout history ruling classes have exterminated themselves. At present the rich in England leave fewer children than the poor, even when allowance is made for the lower infantile death rate of the rich. So, from a Darwinian point of view, the poor are fitter than the rich. The capitalist may win in the struggle for cash, but the workers are winning the struggle for life.

In the same way the most successful species have not usually been the meat-eaters. Rabbits are commoner than foxes, and the huge armoured reptiles of the past were replaced by smaller and more intelligent mammals and birds. Above all, co-operation, has been a great factor in fitness.

Anti-Darwinians still say that species are quite different from varieties, because varieties – for example, greyhounds and bulldogs – although they look different, can be crossed together, whereas species – such as the horse and donkey – usually cannot be crossed, or give sterile hybrids like the mule. However, artificial species, which cannot be crossed, have lately been made from a single original species. This was first done about twenty years ago with tomatoes in London, and more recently with flies in Moscow.

Darwin's views on variation and heredity have had to be greatly modified, and his account of natural selection was a good deal too simple. Nevertheless, modern biology is built on foundations, which Darwin laid.

SOME MISSING LINKS FOUND

The phrase "missing link" was coined about fifty years ago for a fossil form which enthusiastic Darwinians hoped would convince everyone that men were descended from apes. Since then different workers have found at least six different types of skull, and sometimes complete skeletons, which are more human than those of any living ape, and more ape-like than those of any living man.

Whether they should be called bones of apes or men depends not so much on their anatomy as their habits. If they had started real production, as opposed to mere collection of food, they were definitely on the path, which leads, through increasing improvements in technique, up to civilisation. Making a fire must certainly be regarded as a form of production, and one of these extinct forms, *Sinanthropus pekinensis*, of which a number of skeletons have been found near Pekin, used fire.

Some of the others, though no more ape-like in build, may have been apes in behaviour. I confess that I am not much excited by the anatomical details of these early men. We learn much more about them by studying their tools than their bones. Certainly men chipped stones for an immense time before they began to paint on cave walls or scratch on bones, unless we have been singularly unlucky in missing all traces of early art.

And I am more interested in some of the other links in the evolutionary story, bridging far greater gaps than that between apes and men. All ordinary fish have a pair of jaws. A few have no jaws, but a round mouth like that of some worms. The best known in England is the lamprey, which lives in river mud. These primitive fish also differ from all modern ones in having no paired fins, such as have developed into our legs and arms; and those that live in the sea have blood which is very like sea-water, whereas in modern fish the blood has been greatly modified.

Skeletons of these fish are found in rocks such as the lower Silurian of Wales where there are no fish with jaws. Quite recently Professor Watson of London has described another group of fossil fish which bridge the gap between them and the modern fish, having a very simple lower jaw and the beginnings of paired fins.

Another gap, which is being filled by the study of fossils, is that between fish and amphibians such as the newt. If anyone doubts the possibility of fish coming out of the water and developing legs out of fins, he had better look at the mudskippers in the farthest section of the aquarium of the London Zoo. They spend most of their time on land, and have developed a sort of elbow in their front fins with which they hop.

Unfortunately, they are about 250 million years late in their attempt to colonise the land from the water. Our own ancestors did it at the time when the Old Red Sanstone was laid down, and we can trace the stages of the formation of limbs from fins, and see how the nostrils, which were originally underneath the head, moved up to the top, where they are required in animals such as frogs or crocodiles which breathe air, but spend much time in shallow water.

All these links were unknown in Darwin's time, though, if evolution was a true theory, they must have existed. Another wonderful set of connecting forms has been found in South Africa, whose rocks contain not only gold and diamonds, but the bones of hundreds of different

animal species which link reptiles with mammals. For example, some are like lizards of crocodiles, but have their bodies lifted off the ground, and teeth specialised into cutters, dog-teeth, and grinders, whereas reptiles generally have all their teeth alike.

In the same way, intermediate stages in the evolution of society have been discovered among primitive peoples. In *The Origin of the Family*, Marx' colleague, Engels, described a stage where property was held in common by a clan, and a woman always married outside her own clan. So a man's bow and arrow, or garden did not pass to his own children, who belonged to his wife's clan, but to his sisters' children who belonged to his own.

If property was to be passed down from father to son, the primitive communism of this system had to be broken up. Anthropologists have recently described a stage in the break-up of primitive communism, which Engels had not suspected. In order to keep property in the family, cousin marriage is made compulsory, or at least usual, so that a man's property can be handed down to his children, not because they are his, but because they have married his sister's children.

Naturally critics say that Engels was wrong because he did not describe all the stages between primitive communism and private property. This is as if one blamed Darwin for not describing fossils connecting the great groups, which were unknown in his time. Research has certainly modified the conclusions of Darwin and Engels in detail, but it has confirmed the general accounts, which they gave of the evolution of animals and of societies.

LIVING FOSSILS

A Few weeks ago* a most peculiar fish was caught off Port Elizabeth in South Africa. It looked no odder than many other deep sea fish, though any observant person would have noticed that it had a small extra tail sticking out of the middle of its ordinary tail, and that its paired fins, instead of consisting of a fan of spines, had something resembling a stumpy limb in their centre. You can see rather similar fins in the living-fish at the Zoo in London.

Its peculiarity was of another sort. It belonged to an order of fish called the Crossopterygii, which were common enough in the swamps where the coal seams were formed, but of which no fossils had been found in strata later than the chalk. In fact, they were supposed to be extinct as the great reptiles, which once lived in most parts of the world.

This particular group of fish is much closer than any other group to those which are believed to have come out of the water during the Devonian or Old Red Sandstone period, and to have been the ancestors of four-footed land animals, birds and men. Their bones were known already, but a study of their soft parts, and particularly their heart, brain and swim bladder, will be of great interest to students of evolution.**

And this particular discovery will be welcome for another reason. The ancestry of some animals – for example, the horse – is very well known from a study of fossil skeletons. But there are some serious gaps in other lines. For example, there is little doubt that birds were descended from reptiles. And a few primitive birds have been found, with long bony tails, claws on their wings and numbers of teeth. But they already had feathers, and nothing is known of how they originated from reptiles.

Darwin and his followers always stressed the imperfection of the geological record. That is to say, they said that only a very few of the millions of animal species that have lived in the past have left a record which has so far been

discovered. Their opponents tried to make out that this was not so, and that there were therefore gaps in evolution which could only be explained by new creations – for example, of birds.

Here is a case of an animal whose ancestors must have lived in the sea for about 50 million years since the Chalk Age, but none of their bones have yet been found. So in its case there was a 50-million-year gap in the record. Another reason for rejoicing among palaeontologists is this. The bones and scales of fossil fish are generally found somewhat crushed, and a reconstruction demands some imagination. Besides which, on the basis of evolutionary theories, palaeontologists had said what their hearts and other soft organs must have been like.

Now here is a wonderful chance of checking these theories by actual dissection. A scientific theory is a mere string of words unless one can check it in some such way as this. So is a political theory. For example, Marxist theory predicted that Mr. Chamberlain would back Hitler at Munich, while non-Marxist theory predicted that he would back Britain. *The Daily Worker*, being the only Marxist daily paper, was the only one, which forecast the result correctly.

Many people ask how it is that, if the evolution theory is true, a fish remains almost unchanged for so many millions of years. One reason is this. Many of the very primitive animals, which are alive to-day, mature very slowly. For example, the Australian lungfish is very close indeed to some ancient fossils. But it takes at least twenty years to mature, and perhaps an average generation is fifly years. So a fish which breeds when a year old has had fifty times as many generations to evolve.

The newly discovered fish must be a slow grower, for it is about 6 feet long, and lives in the middle depths of the sea, where food is scarcer than at the surface or on the bottom. In just the same way trees are generally more primitive than small plants, becaruse they have not had so many generations to evolve. The most highly evolved plant orders, such as composites like the daisy, grasses, and labiates like the dead-nettle, are almost all quite small; while most trees have cones like the pine, or flowers of a simple type like those in catkins.

There is a law of uneven development in animal and plant evolution as in the social evolution of capitalism, and plenty of animals and plants have not changed very much for an enormous time. There is no general law, which makes either animals or societies improve in all cases. According to Darwin, animals improve through a struggle, and according to Marx societies do so through a different kind of struggle.

While it is unlikely that many large land animals, which were thought to be extinct, will be found, there is one interesting possibility. The *Chalicolheria* were a very odd group related to horses, tapirs and rhinoceroses. They had a head rather like a horse, but claws instead of hooves. Their fossils are known up to the time of the Ice Age, and they are generally thought to be extinct. But in the forests of northern Kenya the natives report and animal about the size of a bear, which answers fairly well to this description. No European has ever seen one close, but pieces of skin belonging to no known living species have been seen.

However, perhaps the most interesting "living fossils" are invertebrates, quite small animals which survive in out-of-the-way corners. Some of them are geographically isolated, like *Anaspides,* a primitive kind of lobster with joints all the way down its back, instead of having a carepace like a life Guardsman. This is

only found in a few lakes in Tasmania.

But in case you think you must go abroad for such creatures, it is worth remembering that in 1866 Sir John Lubbock (the originator of bank holidays) discovered *Pauropus* in his own kitchen garden. It is a lively little white beast I millimetre long with seven pairs of legs, and something like the ancestors of insects. So any keen naturalist may make as big a discovery tomorrow as the South Afircan fish.

* In February, 1939.

** Unfortunately the workers in the local museum who prepared the skin and skeleton of this fish threw away the soft parts without proper study, probably because they were "high". However, other workers are now busily fishing for more specimens.

BEYOND DARWIN

DARWIN taught that the direction of evolution was determined mainly by the survival of the fittest. Animals of the same species differ among themselves. One mouse can run faster than the average. Another has better hearing. Still another has sharper teeth. These differences are at least partly inherited. And as there is not room in the world for all the mice born, the fittest on the whole survive, and thus the species gradually changes.

A character, which is useful in one environment, may be harmful in another. Thus thick fur is useful in the Arctic and harmful in the tropics. Wings are generally useful to an insect in the middle of a continent, but dangerous on small islands in the ocean, where winged insects are blown out to sea, but wingless ones survive. This is one of the ways in which a species divides into two or more new species.

Marx and Engels accepted this theory of the struggle for life "as the first, temporary, incomplete expression of a recently discovered fact." They pointed out that :

"Darwin discovers among plants and animals his English society" based on unrestricted competition. And, of course, since Darwin's time many theorists have tried to justify cut-throat competition and the oppression of the weak in the name of Darwinism.

But Marx and Engels did not deny the struggle for life in Nature because they thought that men could and should behave better than animals. Kropotkin wrote of co-operation in Nature even between different species. This occurs, but it is exceptional.

The dialectical method in science is to push a theory to its logical conclusion, and show that it negates itself. For example, we know that the so-called atoms of chemical elements are not really indivisible. But this would never have been discovered if chemists had not believed in the existence of atoms, and investigated their properties with great care. Dalton's atomic theory is still the basis of chemistry. But it is such a good theory that it disproves itself, and makes way for a nearer approach to absolute truth.

It is the same with Darwinism. Animals and plants are not quite such ruthlessly efficient strugglers as they would be if Darwinism were the whole truth. It is true that a lot of what at first seems useless beauty is part of the struggle.

Thus flowers are useful to plants because they attract insects. And they are beautiful to us because we share the aesthetic preferences of insects to some extent.

However, it has recently been shown that the struggle for life defeats itself if it is pushed too far. So long as a species is mainly struggling against other species or external nature, it usually becomes fitter. But when the struggle occurs within a species this is not so. Thus if male animals fight for females, the most successful fighters will have most children. So the species may develop weapons and instincts, which are only useful in fighting their own kind.

In particular, mere size is an advantage in such struggles. Animals where the male is much larger than the female, such as the domestic fowl, the sea elephant, and many species of deer, are generally polygamous. Whereas in animals with monogamous families, such as most birds, the sexes are generally of the same size. And the study of fossils shows that a steady increase in size generally ends in extinction. Large animals are usually less fit than small ones for flying, burrowing, making their way through thick vegetation, walking on boggy ground, and in many other situations.

The Soviet biologist, Gause, has studied the struggle for existence anong small animals and plants in aquarium tanks. If we put in two species one of which eats the other, the eaters increase until their prey diminishes in numbers, and then begin to die of starvation. The numbers fluctuate periodically, like the numbers of men employed under capitalism.

And a crisis may become so acute that first the eaten and then the eaters die out. To prevent this, it may be necessary that the prey should have some kind of shelter where the eaters cannot find them. In fact, too great efficiency may lead to extinction. It is very unusual for a herbivorous animal to eat up its food plants completely. But this sometimes happens, as when a plague of caterpillars completely strip the oak-trees in a region, and the caterpillars then die of starvation.

The Oxford biologist, Elton, has given many examples of this principle. For example, the Red Indians in Labrador used to hunt caribou with spears and other primitive weapons. When they got guns they killed off so many deer that they starved or were compelled to buy imported food and live in settlements, where they caught European diseases.

Elton takes the view that it does not always pay a species to be too well adapted. A variation making for too great efficiency may cause a species to destroy its food and starve itself to death. This very important principle may explain a good deal of the diversity in Nature, and the fact that most species have some characters which cannot be accounted for on orthodox Darwinian lines.

Elton is not, so far as I know, a Marxist. But I am sure that Marx would have approved of his dialectical thinking, and that it is on such lines that the Darwinian theory will develop. I do not think that Darwinism will be disproved. But it will certainly be transformed. ■

Source : *'Science and Every Day Life' by J.B.S Haldane (John Burdon Sanderson Haldane), Published (2002) by `Vigyan Prasar', C-24, Qutab Institutional Area, New Delhi-110016*

Interview with Prof. Krzizhanovsky
– Dr. Meghnad Saha


Dr. Meghnad Saha

Dr. Meghnad Saha during visit in Soviet Russia taken this interview from Prof. Krzizhanovsky. Prof. Krzizhanovsky was then working in Committee of Energetics of USSR. Dr. Saha visited USSR as an Indian delegate to the 220th anniversary of the Russian Academy of Science in 1945.

Russia and India

I found Prof. Krzizhanovsky to be an old man of 74, but quite hale and hearty like Father William in the well-known poem.

After an unsuccessful attempt to exchange thoughts in English and French, we started in German which the Professor spoke fluently. He had apparently undergone German education in his student days, though I did not put that question to him. The Professor wanted information about the productive power of India.

I said :

"We produce about 3500 million units of electircal energy, i.e., about 9 units per head; about 30 million tons of coal, two and a half million tons of iron and steel, and produce on petroleum at all."

"Is that all?" said Krzizhanovsky, "Then you are as bad as Russian was in 1918. We then produce 2000 million units of electrical energy for the whole of Russia, which had fallen to 500 millions in 1920, i.e. only 5 units per head. We produced just half of tiny Switzerland. Our coal production was worse than yours, though having Baku, we produced quite a lot of petroleum, but the industry was dominated by foreign capitalists and only nominally belonged to Russia."

"What is your production now?" I enquired.

"We have not yet been able to collect reliable statistics on account of the War, but in 1939 just before the outbreak of the War we were producing 50,000 million units of electrical energy from fuel and hydro-electric power, i.e., about 300 units per head of our population. We have been producing 150 million tons of coal and peat, 30 million tons of pertroleum, 20 millions of iron and steel. According to the third five-year plan, we would habe produced 75,000 million units of electricity in 1942, i.e., nearly 450 units per head, and coal, petroleum and iron in corresponding proportions. But the War has caused a lot of destruction, though we have developed many new centres. Exact statistics are being compiled."

Russia and America

"But you are then still far behind the United States of America in energy poduction, and hence in productive power", I remarked,

"Yes, that is so at the present moment, but it will not be long before we overtake the USA." Prof. Krzizhanovsky then took me to a room where the energy resources of Russia and other countries are displayed in a graphic way. Pointing to the figures, he said. "Look here, the USA has total resources of 82 million kilowatts of hydro-power. We have 130 million kilowats. We have larger coal deposits than the USA, thanks to discoveries by our geologists in Siberia, and thanks to geophysical and geochemical prospecting work, we have discovered new petroleum resources which are far richer than those of the USA. They have 4,400 million tons, we have 8,800 million tons of known reserves of petroleum. You have heard of the second Baku (Bashikira). I suppose. We have plans for producing two hundred million uints of electrical energy, and larger amounts of petrol and coal than the USA within the next ten years. In the next twenty years we are sure to surpass the USA in energy production and in productive power."

"Provided there is no third world war," I mused,

but did not say so openly.

Conditions in India

Conversation then turned on conditions in India. Krzizhanovsky said : "From all accounts I have and all the information I have collected, I know that India is a country of enormous resources; it should be rich in hydro-electric power resources, minerals, and agricultural resources. Why should then the people continue to be poor?"

"You are quite right. India is a country of enormous potential resources in power, minerals, and in agricultural raw materials, but the paradox is that her people are abominably poor." But I said : "Pre-revolutionary Russia had also great natural resources, but why were the people of Tsarist Russia as poor as those of India? Why, in your country, were 80 percent of the peasants and 90 percent ot them illiterate?"

"That was so, because the Tsar and his advisers were stupid, the chinoviks (civil servants) were corrpt, and had a pathetic belief in foreign scientists and technicians. They would always call for foreign esperts' advice, who would tell them that Russia had no resources, but only peasants and civil servants, and would not listen to the pleas of Russian men of science like Mendeleev and Karpinsky that Russia could be strong like the countries of Western Europe only if her natural resources were fully developed. They would not even spend a few hundred thousand roubles on mineral and hydrological survey."

"We still have our Tsars" I added "They are not stupid but extremely clever, but they have no incentive to develop the resources of India except for their own benefit."

"The first step is to get rid of your Tsars, but that is not all. You must not have a Kerensky, but a Lenin to guide you," said Krzizhanovsky.

"Some say the Tsars have expressed a desire to go into voluntary liquidation, provided they can find out Indians with brains enough to take over the administration from them," said I. "But we have no Lenin in sight, we have a Tolstoy and Pelituras (Ukrainian separatist) who claim to speak for the nation."

"By Tolstoy you probably mean Gandhi and by Pelituras you mean the separationists. But they would not do in a modern world. You must have a Lenin," emphasized Krzizhanovsky.

"Why?" said I. "Your Government appears to be very appreciative of Tolstoy. They have converted Yasnaya Polyana (the family seat of the Tolstoys) to a National Museum and encourage people particularly foreigners, to make a pilgrimage there to pay homage to the saintly virtues of the greatest of Russian writers."

Tolstoy and Gandhi

"Tolstoy was a great writer and a great artist, but Soviet Russia appreciates him chiefly for this *War and Peace* where he describes in vivid language the patriotic war of the Russia of 1812 against the hordes of Napoleon. This work is an epic and has inspired the Russian people in their recent fight against the hordes of Nazi Germany, for you know that in spite of our efforts, we were somewhat behind Germany in production and fighting power. We would not have been saved but for Stalin's leadership and the patriotic rally of the Russian people round him. Tolstoy's *War and Peace* did play a great part. But Tolstoy's 'Sermon on the Mount' theory of Government is regarded as the produet of a crazy brain, due to ~~se??ty~~ and want of acquaintance with the modern world.

Krzizhanovsky told some funny stories about Tolstoy one of which were known to me. He did not believe in railways and thought he had proved their *uselessness* by walking on foot from Leningrad to Moscow. He did not carry any money with him, lest it should spoil his soul, but Countess Tolstoy kept his purse, supervised his large income from books and managed the household. He did not believe in medicine, but Countess Tolstoy put drugs in his drink. Krzizhanovsky said, "We have great and genuine respect for Tolstoy, the writer of Russia's epic struggle against the foreign aggressor. But Russia has never taken his politica and economic theories seriously."

Gandhiji's Contribution

"I have also great respect," said I, "for Gandhiji who was inspired by the Tolstoyan phi-

losophy, but unlike Tolstoy whos resistance against Tsarism was only passive, Gandhi made has philosophy into a militant creed aginst British Imperialism in India. He has succeeded better than our earlier nationalists, for it was he who made the struggle for independence a live issue for the common man of India."

"But what about the spinning wheel and bullockcart economics of Gandhi?" asked Krzizhanovsky. "Clearly when he and his party get power and put these economics into practice, India would never walk out of mediavalism, which would be fail worse than British Imperialism, as far as the lot of the common man is concerned. The spinning wheel uses human labour but you must be knowing that a man working for eight hours (an produce work in the day which can be had only for 20 kopeks (3 pice in Indian money). We in Russia allow men to use either electrical energy of steam energy and every Russian worker does the work of seven or eight men. That is how we have increased our productive power and met Germany on almost equal terms."

National Planning Committee

"Myself and many of my brother scientists have as little regard for Gandhi's economical and social theories, as you have for Tolstoy's," said I, "and we have been putting forth the same arguments. You see that we were able to persuade the COngress High Command to set up a National Planning Committee with Gandhi's second in command, Jawarharlal Nehru, as Chairman. He enlisted the co-operation of India's best scientists, economists, and industrialists, and our line of thought has evidently made some progress."

"I have heard of Jawaharlal Nehru, and his National Planning Committee," he said. He mentioned some pamphlets he had seen. "Nehru is second in command to Gandhi, but does he also share Gandhi's economic ideas?"

This was a difficult question for me to answer, so I tried to bypass the question. *"What impressed me about Nehru and was a decisive factor in my desire to serve the National Planning Committee," I added. "was a little remark in one of his writings. Talking of 'Liberals,' a class of politicians in our country, who want to prusue a middle path, and thus satisfy every party like your Mensheviks and Kerensky, Nehru said, 'If you ask a Liberal whether the earth is round or flat, he will say neither the one nor the other, but after hesitation will say it is probably elliptical. He wants to satisfy both and commits blunders."*

"If he said that", replied Krzizhanovsky, "he is just the right man to give a definite verdict against the spinning wheel and homespun of Gandhi. He may probably play the role of Lenin."

Lenin's Role

"What is the role of Lenin," I asked, "Can you elaborate that point a little?"

"Lenin," said Krzizhanovsky "was not merely a professional plotter and successful revolutionary. He was a great student of history, economics, science and technics. He saw clearly that if Soviet Russia was to survive amidst a hostile world, she must acquire 'strength' like the USA and the countries of Europe by a planned development of the country's resoures, by complete electrification of the country, by the collective ouse of land and water, etc. His ideas have borne fruit and you are seeing he result to-day. Had he not this vision, Russia would have been a German colony in 1924 and the Ukrainian separationists would have perished in German concentration camps."

Prof. Krzizhanovsky then took me to the individual workers of the Institute. They were working on problems of long-distance transmission (for Russia sometimes transmits over 500 kilometers), over surge problems : over Papalexi generators (they were electrical motors and generators discovered by Academician Papalexi on a fundamentally novel principle), experiments on the direct conversion of sunlight to useful work (heliotechnics) and the design of new types of wind motor. But all the time, I was wondering whether India would be able to throw up a Lenin to guide her future, or whether she would be engulfed in the maelstrom of mediaval ideologies. ■

R G Kar Movement :

'ABHAYAR BHOI NAI – RAJPATH CHARI NAI'

Do not despair Abhaya — we have not abandoned the road

Now is the time to discuss the ideas and experiences that the West Bengal junior doctor movement of 2024 has given us. As this movement swept the globe, many people pondered how long this movement would last against such fromidable opponents? Is it possible to achieve justice?

Oppression and exploitation of the 'omnipotent' rulers are common. Everyday, women in our society face oppression. Patriarchal culture affects women from a young age, often even while they are still in the womb. Often they have to compromise under compulsion. Nonetheless, some of them view their workplace as a second home.

But women who work in different sectors especially in unorganised sectors never consider themselves safe. Not only in the work place even in the 'most secure' and cozy family atmosphere violence and atrocities against women are rampant. Therefore male persons be it brother, father or male spouse, etc. are closely involved. Means it is a social issue. As women are "soft targets" they experience every type of oppression and coercion unleased by the ruler. As it is a system, women in powerful positions also practice patriarchy. Since the division of society into classes, the patriarchal system exists.

Yet, as long as women were kept within their own boundaries, the consciousness required to remove this yoke placed on their necks was not developed. Capitalist society has compelled her to leave the home due to the demands of production, drawn her into the educational system.

But capitalism like all previous class based society, did not give women equal rights. After the Otober Socialist Revolution in Russia in 1917 women achived equal rights including right to vote. Only then the womens' liberation movement gained momentum in Europe and America. As a result of this movement in 1918 women were 'granted' the right to vote in Germany. Gradually

other capitalist states allowed the same and women became part of the state machinery. All these developed the consciousness. The women yearn to be freed from patriarchal control and other suppression. Although this aspiration is expressed by a select few, it is the progressive demand of the society as a whole.

The movement of junior doctors should not be seen as being linked to their demand for professional security only it should also be seen as emerging from the unrest that is rife in society as a whole, of which they are an integral part.

At midnight on August 14, 2024, it was evident that a large number of people were joining the agitation. But just as the wick must be prepared before the fire is lit, we also need to consider the circumstances that existed prior to the igniting of this uncontrollable rage.

Junior doctors, senior doctors' associations and health workers had been protesting for a long time. They were aware that refusing to pay bribes causes medical students to fail exams. Women teachers face threats of extortion and further harassment if they do not comply.

Are medical students the only victims? Health professionals themselves were aware of the vicious nexus between the illegal and dangerous trade in biomedical waste and dead bodies. The complaint was submitted in writing a long time ago by the Mortuary assistant (Dom) Manoj Mallik and the then-Deputy Superintendent of RG Kar Akhtar Ali. Viral footage attests to the numerous hunger strikes and dharna protests that students have held in front of the chamber of that notorious Principal Sandip Ghosh. He was tranferred to a lower post in a district hospital due to these allegations. At the Health department headquarters (Swasthya Bhawan). indictments were filed against him as a result of protests against his malpractice. However, once the CBI found documents proving the indictments at the accused's residence, it confirmed that "Swasthya Bhavan and the ex-principal are synonymous," as one of the doctors working at RG Kar, Tapas Pramanik, put it.

But on the orders of the state's top administrator, he was promoted back to the position of principal at RG Kar Medical College in Kolkata within seven days of being demoted. The Chief Minister herself publicly called for his reinstatement despite the numerous offences he had committed.

The junior doctors of RG Kar observed that since the morning of August 9, 2024, the murder was being treated as suicide, and the parents had not been allowed to approach their deceased daughter. At that time the joint platform of senior doctors stood by them.

Initially it was the junior doctors from R G kar and then JDs from all medical colleges organised themselves with the staunch support of a well organised group of senior doctors. They compelled the authorities to carry out a postmortem under a magistrate's supervision. Meanwhile, the authorities of the institution where such an incident took place, did not get time to file an FIR with the police for a whole day.

However, since the morning, unidentified individuals—who are generally thought to be from the 'North Bengal lobby'—have been showing up at the crime scene. Clearly, there was an effort underway to destroy the evidences of rape and murder. The authorities consented to the postmortem under the magistrate's supervision after being pressured. As per the regulations, the Junior Doctors ought to have signed the document authorising the act following the documentation of the postmortem findings in accordance with their requests. The JDs did just that.

Using its state apparatus, the ruling party changed the deceased's clothing three times, erased messages from her cell phone, and removed evidence from CCTV cameras. It is unclear what else was done. Even the crime scene, where the murder occurred, is thought to have been tampered with. The CBI informed the top court that data had been removed from the deceased's mobile phone and CCTV camera, which was then reported in the

media.

In violation of the rules, the post-mortem was conducted after sunset. In order to get rid of the evidence, the cremation was completed quickly after the post-mortem, disregarding the requests of close family members. To silence the family a large sum of money was offered at the home of the deceased.

When these 'activities' were going on the then commissioner of police (CP) assured through media that he had overseen and directed every step of the proceedings.

The JDs began a partial work stoppage on August 10th, the day after this heinous murder, and on August 11th, they completely stopped working. This movement created the ground for the formation of the West Bengal Junior Doctors Front (WBJDF).

Sanjay Rai, a civic volunteer, was taken into custody by Kolkata Police on August 10th, and the arrest of the accused was made public. Interestingly, after being captured, the accused declared right away that he was willing to be hanged. There is a strong opinion among a section of agitators that Sanjoy was a hired, trumped up accused similar to many cases, and most likely he surrendered to police after being assured that he would be released in due course. Sanjay Rai was arrested at the police barracks. He used to wander around the hospital, indicating that he was a regular visitor there. It appears that there were no restrictions on an outsider's entry or exit from the hospital. The voluntary transfer of the investigation to the CBI by the state government was another noteworthy event. According to analysts, the state government entrusted the investigation into the civic volunteer's involvement to the CBI in order to protect its image.

However, this was done after removing data from the CCTV camera and the deceased's mobile phone, changing the scene (most likely), and destroying evidence by breaking down the adjoining bathroom wall the day after the murder. Under these circumstances, the Supreme Court assumed the responsibility of supervising the CBI investigation. The people realised that the Central and State governments were most likely working together. 'It became clear that no matter what the investigators discovered, if it was detrimental to the interests of the ruling class, it would never be made public. The competence of the investigating agency is rendered meaningless in such a situation' – one participant opined.

In this atmosphere of suspicion, on August 12th, various voluntary and civic organisations marched from Calcutta Medical College to RG Kar, while strikes and sit-ins continued in medical colleges.

Amidst the public outcry against an unprecedented institutionalised killing in a public setting, the vulnerable medical community sought safety guarantees due to a persistent sense of insecurity. "Just like fear, courage is contagious," remarked a Junior physician. People were waiting for a well-organised force to lead the protest. On August 14th, a feminist organisation issued a call on social and traditional media to "reclaim the night." At first, they only invited women to three locations in Kolkata. However, men questioned social media activist Rimjhim Sinha about why only women and not men would be allowed to participate in the demonstration. The circumstances required that the decision be reversed.

At the first convention of Junior Doctors, an organiser of 'reclaim the night' call stated that they had planned protests at only three locations, but people turned out in large numbers at over five hundred locations, chanting slogans such as 'There is no room for rapists in the soils of Preetilata'. They also raised a slogan like "Crush Patriarchy, let the state machine shake."

What the people wanted was an outlet for their protest that would not be used to serve the interests of corrupt, self-interested ruling parties, as has been the case so far. People participated on their own. No one sponsored.

At midnight, everyone gathered, either taking the last night train from their respective districts

or renting cars, scooters, and bicycles. People also came walking. Who showed up? In a break with tradition, the streets were flooded not only with young boys and girls but also with parents and their children and elderly women.

The ruling class was rudely shocked. That day, none of their tactics to stop it succeeded. On the other hand, the isolated fires of rage that had been simmering in millions of hearts in response to raging lawlessness and tyranny erupted into a massive collective blaze, creating history by transforming quantity into quality.

Wide strata of urban population including the medical community and health workers, joined the movement in unison. Though doctor's movement began in response to the ghastly incident and naturally hightlighted their safety security and other related issues, these didn't created any obstacle rather encouraged peoples' participation. Essentially 'reclaim the night' campaign on August 14th was the catalyst for the movement's widespread participation. The masses freely infused their spirit into the movement. According to social science, cumulative quantitative change leads to qualitative transformation. As long as the masses did not band together, this consciousness did not emerge. Every day, the newly awakened people closely monitored all pertinent news stories on social media and traditional media.They then spread the word to those who were not as aware.Hitting the streets was no longer considered a "hateful, abhorrent culture" among the middle classes.

It became a daily ritual for the participants to stay informed about the time and location of these rallies, regardless of who organised them.

People realised that the rulers would face pressure if the protest went on.They decided to occupy the streets in solidarity against the ruling classes' unholy alliance. They raised the slogan "Abhaya is not afraid, we have not left the road." The name Abhaya had become a symbol for the entire oppressed women community not only to identity the lady doctor of R G Kar. The masses cherished to punish the oppressor and their god father. The wave of unrest extended beyond the RG Kar Hospital to the state's isolated rural regions. It spread throughout the country and even to 150 countries worldwide. The 'Justice for RG Kar' slogans were heard everywhere, from the city streets to the roads of remote villages.

That being said, on August 13th, the RG Kar Principal received a prize posting at National Medical College. But the junior doctors of National Medical College resisted Sandeep Ghosh from taking charge of their inistitution. The R G Kar Hospital was vandalised on the night of August 14th. Government property was destroyed indiscriminately and crime scenes were vandalised. Doctors and other health workers were unable to resist the organised goons.

Despite the administration's desperate attempts to launch attacks and destroy evidence, the protesting doctors grew more organised. The public became completely disillusioned with the administration.WBJDF issued its first press release on August 15th, sparking a strike across the state and in select locations in other states.

The Derby football game was called off on August 18th as supporter of both Mohan Bagan and East Bengal were adament to set aside their on field rivalry and to raise their voice for justice. The photograph of an East Bengal supporter protesting while standing on the shoulders of a Mohun Bagan supporter went viral in the media. Spontaneously coined slogans declared that the administration was shaken by the unity of East Bengal and Mohun Bagan and Mohammedan sporting supporters. On August 19, overcoming the differences they tied rakhis around each other's wrist and chanted "United we stand and demand justice for R G Kar."

On August 21, people marched from Karunamayi to Swasthya Bhawan, including 5000 junior doctors (the state has approximately 7500 junior doctors).

Meanwhile, the opposition Hindutva party took advantage of the situation, launching the 'Navanna

Campaign' on August 27 to call for the Chief Minister's resignation.

Prior to that a Convention was called on August 26 by the Junior Doctors' Front. In that Convention senior doctor Arnab Sengupta stated, "If we want to save this movement and snatch justice, junior and senior doctors should unite with the agitating common people. Even if we senior physicians support the junior physicians until the end, it will not be enough. A platform has to be built. The programme will be decided at that permanent platform, and the movement will move forward with the doctor community and the protesting masses working together to achieve the goal." Dr. Punyabrata Gun, speaking on behalf of the Joint Platform of Senior Doctors, pledged unconditional support for the junior doctors' movement untill the end. That day, junior doctors made it clear that they would not be drawn into any kind of parliamentary power struggle.

Junior doctors have always described the movement as a non-political civil movement founded on mass unity. The agitating crowd also supported it. Because people have no confidence in parliamentary parties. However, since politics is all about standing up for or against the ruler's policies, opposition to the ruler can never be apolitical. The people's resistance to the ruler should undoubtedly be referred to as politics.

As this criticism came from the masses (from a relatively conscious section among them), the junior doctors interpreted this 'non-political' civil movement as a movement that rises above party political interests. This was a flawed idea, but it was accepted by those in attendance.

The progressive class must lead this movement. This leadership question was later raised by senior doctors.

When this movement peaked, there was the potential to organise a public health-care movement led by doctors, health workers, and the general public.There was a possibility of mobilising a mass movement in defiance of patriarchy.

This qualitative change was desired by a large number of people who actively participated. However, we discovered that junior and senior doctors were unable to reach an agreement on organising programmes on the same date and venue.

It became abundantly evident that the senior doctors were protecting the junior doctors like guardian angels during the strike, as evidenced by the members of the joint platform of senior doctors threatening to resign and by taking on the junior doctors' two- to three-shift responsibilities on their behalf. Cutting back on their own programmes, they have advanced alongside junior physicians. On the one hand, they maintained unity while emphasising throughout the convention that this was a long-term movement.

We must take the people with us, put up a front, and proceed under a joint leadership if we are to succeed in this. However, it is regrettable that no such unified platform for struggle has been established. Since junior doctors represent a variety of organisations, the general public is unaware of the reasons why this crucial goal could not be accomplished. But the agitating progressive masses are looking for the right path.

According to Dr. Arnab Sengupta, who appeared on the show 'Doctors' Dialogue' – "what I witnessed on August 14 was unprecedented. Rimjhim's (the lady who issued the call to "reclaim the night" on August 14th) message reached hundreds of millions of people. Following this, there were daily mass rallies for a month, even at late hours of the night. It took the shape of a campaign that exposed the extreme insecurity that every girl, mother, and father faces. They were horrified that an on-duty woman would be brutally murdered in the `safest haven.' It shook everyone's faith and patience to the core. As a result, a massive gender-related movement erupted at the time. However, since junior doctors were the main leaders of this movement, we senior doctors supported them when they went on strike after their colleague was killed and took other actions. Naturally, doctors — mostly junior doctors — led this move-

ment. They were concerned about safety and protection because the incident took place in their establishment. Demands for the safety of physicians, particularly female physicians working in the medical college-hospital system, eventually took centre stage in the discourse. In my opinion, public health demands, even those of the general public, did not seem to be all that important.This is due to the fact that security was the primary driving force behind the two demands of the health movement: the central referral system and the bed vacancy system. Because patients suffer greatly when there is inadequate information about available beds. The public's anger jeopardises the safety of doctors. Patients suffer greatly as a result of the ineffective referral system. It has an impact on physicians' safety. Therefore, it would be more accurate for me to describe these two public demands as incidental.In other words, the emphasis is on security. However, there are various demands in the field of health, including the basic improvement of people's medical treatment, violations of human rights occur at every turn, and the public is subjected to a great deal of harassment when seeking an outdoor ticket for diagnostic tests. The tests are inexplicably postponed, and patients are forced to visit hospitals on a regular basis, sacrificing their livelihood. If they are lucky enough to be admitted, they must wait 7 to 15 days after being placed on the OT list. Not only are patients' access to medical treatment denied and delayed, but doctors are also subjected to massive human rights violations. The primary demands of our movement, however, do not include all of these demands." Dr. Sengupta concluded that the gender issue was the primary focus of public support. "One cannot say that those demands were truly supported during the last ninety days of the movement, which was led by doctors," he said. "It must be accepted. One thing I regret is that we could have raised awareness of the need for more significant social reforms through this impromptu, possibly leaderless movement.

The social movement, led by the people as a whole, has only recently begun. We must see how far we can take the Abhaya Manch, which was founded on the initiative of our Joint Platform of Doctors and has already brought together approximately a hundred organisations."

This unprecedented mass movement is not just about gender; it is a manifestation of the people's long-suppressed rage against oppression, centuries of rape, murder, and corruption, as well as widespread threat-culture. The struggle Abhaya waged for justice came to represent a revolt against all forms of injustice.

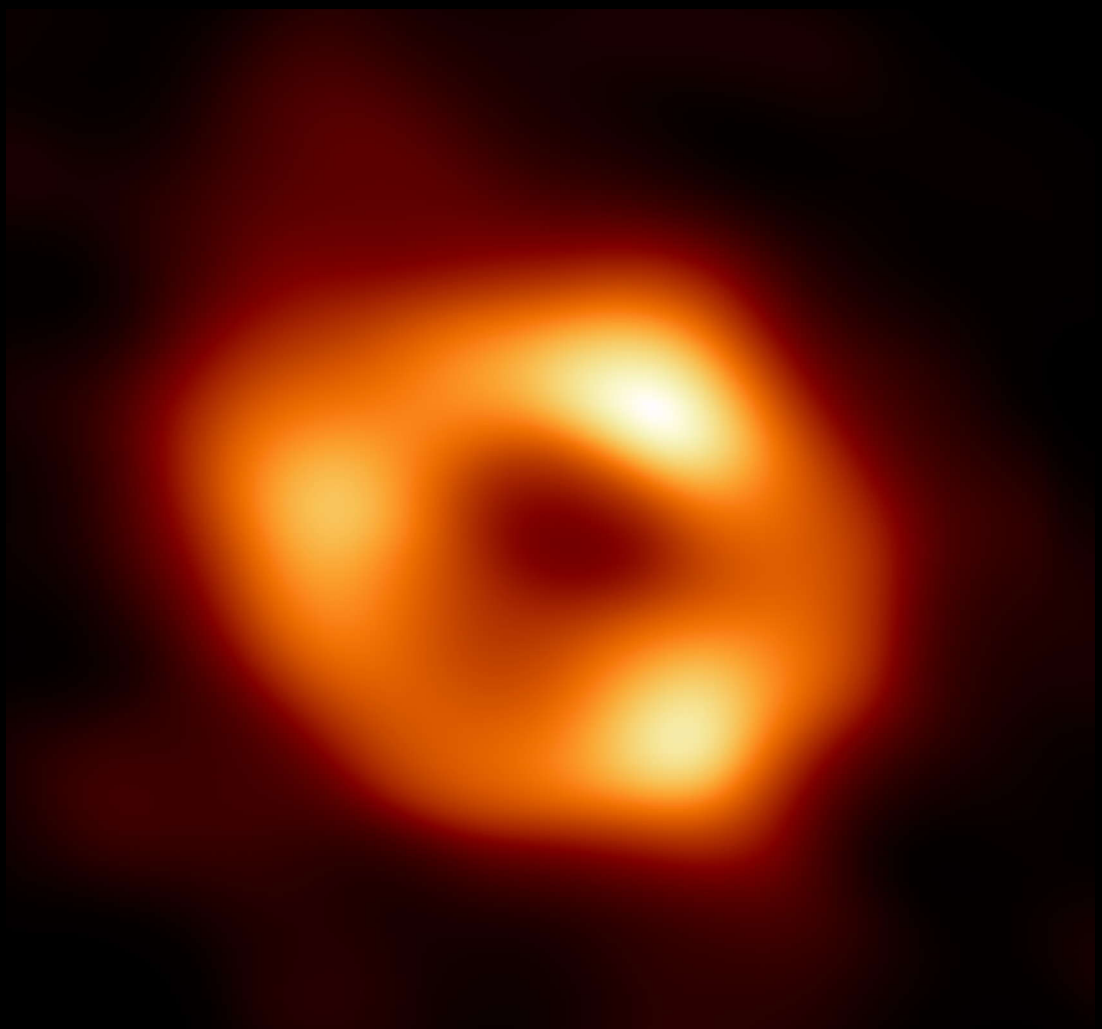
From August 26th to Abhaya Manch, we saw two more large-scale conventions. Dr. Arnab Sengupta and Dr. Punyabrata Gun, senior doctors at both conventions, called for a joint platform, but it did not materialise. With no other option, five associations of senior physicians joined forces with social and civic organisations to form Abhaya Manch.

Despite the formation of the Abhaya Manch, the West Bengal Junior Doctors Front, which led the movement, has yet to become a constituent. However, it has been reported that the vast majority of junior physicians support Abhaya Mancha.

However, if the hammer could be struck while the iron was hot (forging the collective platform) with the spontaneous participation of the masses, greater mass leadership could have pointed in a different direction. The future will reveal how far Abhaya Manch can succeed.

The primary demand is for justice. People's experiences indicate that the never-ending crimes and acts of injustice occurring in society go largely unpunished, and justice is not served.The roles of the CBI, High Court, Police, and Administration have frustrated a section of the agitating public in their pursuit of justice and created distrust in state organs. A segment of the public believes that there is no other option but to seize justice by force by unleashing a storm of mass agitation. We must now focus on how and to what extent the hope-instilling Abhaya Mancha meets the people's expectations.■

First image of the black hole At the centre of the Milky Way



This is the first image of Sagittarius A* (or Sgr A* for short), the supermassive black hole at the centre of our galaxy. It's the first direct visual evidence of the presence of this black hole. It was captured by the Event Horizon Telescope (EHT), an array which linked together eight existing radio observatories across the planet to form a single "Earth-sized" virtual telescope. The telescope is named after the "event horizon", the boundary of the black hole beyond which no light can escape.

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