

The Brief History of Dark Matter

or

“Newton’s Error”

(He finally rejected the effect of dark matter)

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Introduction

This book clearly sets out the reasons why Newton's gravitation and Einstein's theories are incorrect. The book is written to be easily understood by the average reader. The history of humanity's search to explain the universe is clearly set out, and the development over the ages of theories from the ancient Greeks onwards shows just who was right and who was wrong. The book develops the ideas of past philosophers and physicists to present a clear and rational explanation of the world in its surroundings.

On Sunday 12th September 1999, the "Sunday Times" published an article in which Isaac Newton was voted their "Man Of The Millennium". There had been some dissent, inevitably, between various experts on the judging panel. One writer and historian, Brian Moynahan, proposed Roger Bacon. Professor Colin Jones of Warwick University proposed Rousseau. Other candidates for the title "Man of the Millennium" included Napoleon, Darwin, Karl Marx, Edison, and Freud. The judges' consensus was that Newton's laws of motion and of gravitation, his development of calculus, and his use of mathematics had had the most influence upon the changing world in this millennium. (By comparison the previous two millennia had produced Jesus Christ; Plato and Aristotle)

How would they have voted if Newton's theory of gravitation - attraction at a distance- is untrue?

Newton¹ was famously described as observing an apple to fall to the ground in his orchard. He reasoned that there must be force acting upon it. He discarded the ideas of the earlier scientist philosophers Descartes and Huygens. He proposed a force of attraction between all objects, proportional to their mass, acting at a distance. There was a straight choice as to whether the apple was pulled by the Earth or pushed from space by the dark matter (then called the "ether"). For three hundred years Newton's ideas held sway. They no longer hold up to scrutiny in the modern world of cell phones and spacecraft. There are now a multitude of reasons why his theory represents the wrong choice.

Newton was extraordinarily concerned with his own importance. He was so concerned that his ideas might be stolen, that he kept them secret for

years. Nowadays, ideas must be publicised so that they can be tested and verified. If they do not stand up to scrutiny then they must be rejected.

Newton's basic idea - that of an invisible attractive force, acting upon the planets, was not his own. Robert Hooke proposed it², but Newton took the idea further and applied it to all objects, large and small. His ideas gained credibility because he described the forces mathematically. Mathematics is invaluable, needed to this day when calculating the planetary orbits. Mathematics is a tool not a perfect science. Even the best computers are only as good as their programming. When tracking spacecraft and planets, continuous corrections must be made from observation. No one could ever programme a spacecraft and not have to adjust its flight path. Robert Hooke had propounded before Newton, the idea of Universal Gravitation. He so disliked Newton that he probably put him deliberately on the wrong track. Newton stole the spotlight. As related in later pages, Hooke's works (some only published after his death) were valid, but so far have been largely overlooked. He may yet have the last laugh.

The Paradox

A theory involving dark matter (ether of the ancients) is the only way forward in the face of many new findings that cannot be explained by action at a distance or the attraction of matter. Dark matter has now been shown to exist throughout space, and distributed throughout all molecular matter.

Zero Gravity in space

If "gravity" were to exist so as to hold the Earth in orbit around the Sun, then weightlessness could not exist in the void of space. There would be a gravitational gradient from the Earth to the Sun, and bodies in space would move towards one or the other with unflinching speed. We now know for certain that zero gravity exists only five miles above the Earth's surface. Therefore gravity in space as an attractive force between masses does not exist. We must examine the alternative force upon that famous apple.

Cometary Orbits

Comets and planets do not travel in circular orbits as would have to be the case if they were constrained by a balanced attractive force. They move in irregular elliptical orbits, which wobble. Comets that deviate wildly from a smooth balanced circular orbit could be expected to be attracted into the nearest planet, or the Sun. Many comets have crashed, but seemingly due to chance. If a comet is going to narrowly miss then it simply carries on. It is not attracted despite the erratic course. Similarly, any movement of the Earth nearer to the Sun from a position of perfect balance would lead to the Earth and Sun coming together very quickly indeed.

In the 18th century, the Frenchmen Laplace and Lagrange showed how planetary orbits varied over long periods, yet they returned to their previous orbital paths. Comets often travel quite close to the Sun, yet pass by without being sucked in. The lightest particles, in their tails, are not attracted by the Sun, they are directed *away* from the Sun (as observed by in 17th century by Hooke). An object circling the Sun, thought to be a new comet was reported in 1996ⁱ. If gravity existed, the comet's tail would be pointing at the Sun. Instead the pressure gradient is away from the Sun, and the comet is swimming in a sea of dark matter where it is suspended. In a semi-solid sea of almost massless particles, it is able to maintain its individual elongated elliptical path apparently indefinitely. That the elliptical path can be computed (mathematically expressed) does not explain the forces that would be required to maintain such an elongated course. Plato first thought mathematics an end in itself, but mathematics is a descriptive tool, not a scienceⁱⁱ.

ⁱ Sunday Times, 25th August 1996, reported an object, about 10 miles wide, designated 1996PW. Inert and acting like an asteroid, this was tracked by NASA. It was described as taking 5,000 years to complete an orbit of the sun, and had a tail of ice and gases.

ⁱⁱ Science (physics, chemistry biology etc.) is the study of naturally occurring events by careful observation and analysis.

Microwaves

The dark matter is composed of a dense mix of a myriad of different particles, unimaginably small, of differing sizes and weights that are almost but not quite zero³. These also exist as a cohesive structure, since they transmit waveforms without interruption (see below). Part of the spectrum of wave motion that can be detected, is the cosmic microwave background (CMB). This has been seen to vary and not be even. To do this there must exist a structure (a whole world) within it. Contemporary scientists suggest that this microwave background has not changed since the beginning of time. Such an idea seems nonsensical, yet if it were true, then the invisible subatomic world must be much more durable than the atomic world we see⁴.

Tides

The tides of the sea, circle the Earth not once a day, as they would surely do if attracted by a gravitational force from the Moon and Sun, but twice a day. That tides flow twice daily can only be explained by an alternative hypothesis. The reason that there are two tides is that there is a pressure wave in the ether (dark matter) caused by the displacement of the Moon whilst the Earth rotates with the invisible dark matter around it. The pressure is equally high at two points around the Moons orbit. There is a pressure wave in front of the Moon, and a pressure wave behind the Moon. The pressure wave causes the low tides. The high tides arise not by attraction, but by the flow back of the water from the low state. If there were forces directly attracting the water toward the Moon, there would only be one tide, and that tide facing the Moon. It is the Earth that rotates once a day, whilst the Moon only circles the Earth once a (lunar) month. There could never be a second tide on the other side of the Earth from the Moon. Instead, the Moon displaces dark matter, and there is a pressure wave both ahead of the Moon and behind the Moon. There are two tides during each revolution of the Earth. It is the Earth's rotation that drives the tides against the pressure in the dark matter.

Weight

Objects fall to earth at the same speed, irrespective of their mass. This is because of the downward pressure of the dark matter. The pressure increases toward the centre of the Earth, where it is maximal. The density of the dark matter causes the pressure gradient. The dark matter exerts the same force on the displaced object irrespective of mass. The weight of an object is proportional to the displacement of the dark matter. By this means, the weight of an object is greater on the surface of the Earth than in space, where the dark matter is evenly distributed, pushing on the object from all directions equally. At the surface of the Earth, the dark matter is displaced both by the earth and the atmosphere. A pressure gradient exists increasing from zero in space, towards the centre of the Earth where the displacement is maximal.

Inertia

In much the same way, the force of inertia is not explained by Newton's universal gravitation. Inertia is the name for the increased effort that is required to move any object from rest. The dark matter has to get out of the way when a molecular object is moved. An additional starting force is required because the dark matter is very lightly bonded together. As the dark matter is effectively massless, then once the body is in motion, the dark matter continues to move around it without extra effort. This is one reason to believe that the dark matter has a structure of its own. The initial movement through that structure requires an inertial force, as the infinitely small bonds are broken.

The sea and the Atmosphere

Satellite mapping has shown that Oceans are depressed in the central parts. This shows that something is pressing on the water from above. The pressure in the ocean increases toward the bottom. If the Sun and Moon were attracting the water, an ocean's surface would be higher in the centre, not lower. If the sun attracts water, the pressure at the bottom should paradoxically be less. The molecules in the shallower parts of the ocean, as well as the Sun and planets would be attracting the deep water upwards and away from the bottom. With the huge force required to balance the Earth in orbit around the Sun, water would not exist on the surface of the planet. It would be sucked off (especially as it constantly evaporates) together with the atmosphere, and fly off to the Sun.

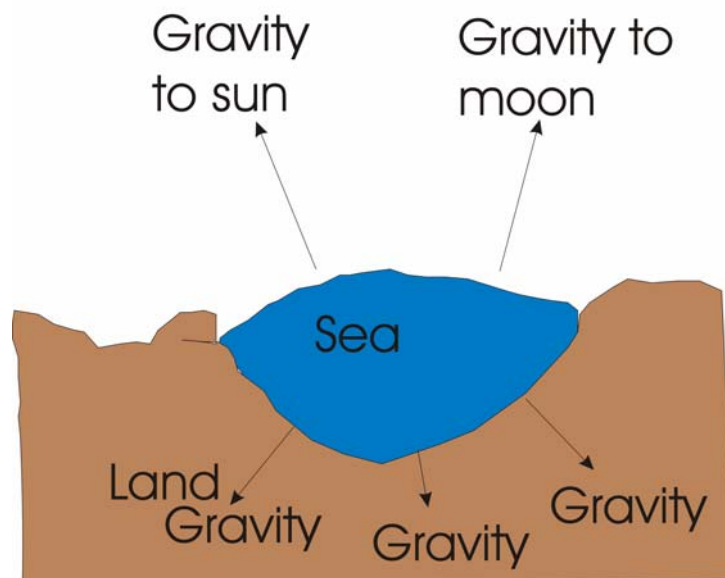
Diagrams of the action of pressure upon the sea

In a Newtonian gravity field there could only be one tide a day. The sea in the centre of an ocean would be dragged up by the gravitation pull of the Sun. If gravity is strong enough to hold the Earth in orbit, then it is strong enough to bulge the sea outward.

Diagram 1 - Newton's incorrect model.

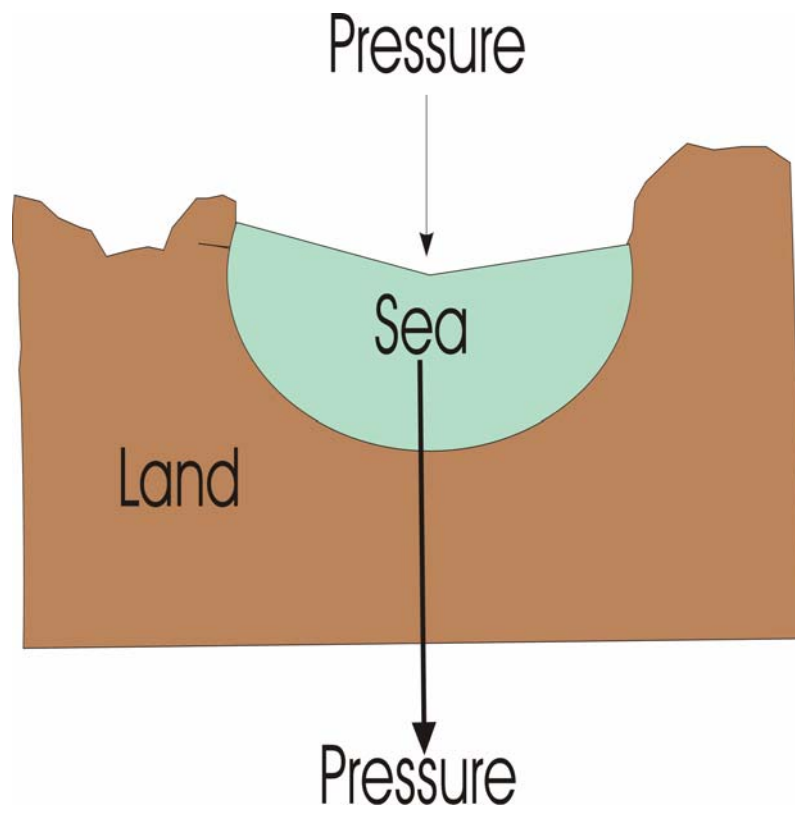
In Newtonian gravity there would only be one tide a day, and the sea in the centre of an ocean would be dragged up by the gravitation pull of the sun, since if it existed and was strong enough to hold the earth in orbit, then it would certainly be strong enough to bulge the sea outward.

This is Newton's
Incorrect model



In reality we find that the actual situation is as shown below. Newtonian gravity does not exist. Descartes' model needs re-examination.

Diagram 2, the reality of cosmic pressure upon the sea.



The Lift of a Wing

Increasing the curvature of the upper surface increases the lift of a wing in air. This has not been satisfactorily explained. If we suppose that the dense dark matter is everywhere between the air molecules, then when a wing is curved upwards, the motion of it through air displaces the dark matter upwards. Because dark matter is effectively massless, it can be easily displaced upwards by the wing. Movement of the dark matter away from the top of the wing will reduce the downward pressure of the dark matter, and yet the pressure below remains the same. The shape of the moving wing has reversed the cosmic pressure gradient, causing lift. If this were not so, an aeroplane as heavy as the airbus A380ⁱⁱⁱ, could never get off the ground.

ⁱⁱⁱ The world's heaviest passenger plane. Launched in December 2000, the airbus A380 could weigh 620 tons loaded, supported by a 262 foot wingspan. It is expected to be in service by 2007, and is designed to carry 555 passengers in comfort.

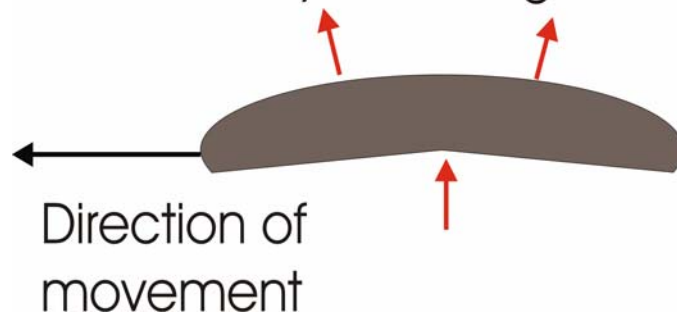
Wing diagram

Diagram 3 - wing diagram

Air passing over a wing.

The ether or dark matter is forced up causing lift

Massless dark matter is pushed away., Causing lift



Other Moons and the Sun

Whereas our own moon orbits the earth, and the Earth orbits the Sun, Pluto and its moon both circle each other as well as the Sun. These and many other irregular orbits are not explained by gravity. However, as in Descartes' model there is a vortex within the dense fluid of dark matter. A vortex is a whirlpool as seen in a basin, when the plug is pulled. In the Northern hemisphere this water vortex is seen to be clockwise, and in the southern hemisphere it is anticlockwise. This amazing effect is seen only a foot or two from the equatorial line. This phenomenon is called the "Coriolis Effect", caused by the rotation of the dark matter around the Earth. If the dark matter were not there, there would be no vortex. In space though, there are no attractive forces between the sun and the planets whatsoever. Some moons are seen to orbit far too close to their planets for that orbit to be sustainable within any force of gravity. Since gravity does not exist, and the dark matter holds the moon in its orbit, the moon can remain indefinitely at any distance from a planet. Likewise, binary (paired) stars rotate closely around each other and should have come together like a magnet years ago, had gravity ever have existed. The sun also has a vortex. All the planets and comets orbit around it in the vortex of dark matter, in the same direction.

The Sun's corona is formed of the lightest particles, and these are thrown thousands of miles into space, from within a body of apparently massive gravity. Gravity does not exist, so the particles can readily escape and fall back slowly in the pressure gradient of the dark matter.

If gravity existed in the mass of a planet, then the light molecules of gas in that planet's atmosphere would either be attracted onto the surface, or to the sun. Gas could not remain in the atmosphere. Instead the dark matter is suffused throughout the atmosphere, causing a pressure gradient, transmitting the light, radio and microwaves. It may be that individual or certain types of dark matter particles, mainly or solely transmit different types of radiation, and magnetism. It is likely that neutrinos for instance are as densely populous as any other particles, but that they do not normally transmit light. The detectors that have been constructed for neutrinos, are simply seeing an occasional light wave after some sort of insult to their structure.⁵

This Diagram shows the pressure of dark matter upon the molecular matter of the Earth and atmosphere, with the pressure density being maximal at the centre of the Earth. In space there is an even density of dark matter, and no attractive force. Around a planet is a pressure gradient, and the circulation of the planet and the dark matter with it allows any moon or satellite to orbit. The dark matter acting as a dense fluid, allows close or distant orbits, and even eccentric orbits that could not survive if there were attractive forces between the bodies.

Diagram 4 - cosmic pressure gradient.

This shows schematically how dark matter is everywhere arranged in vortices that cause the planets to orbit, yet transmits all waveforms evenly for eternity in all directions, and yet when out in space away from a planet has no pressure gradient at all.

"Gravity" as a force at a distance between objects does not exist. The dark matter continues to infinity, therefore "black holes" cannot exist.

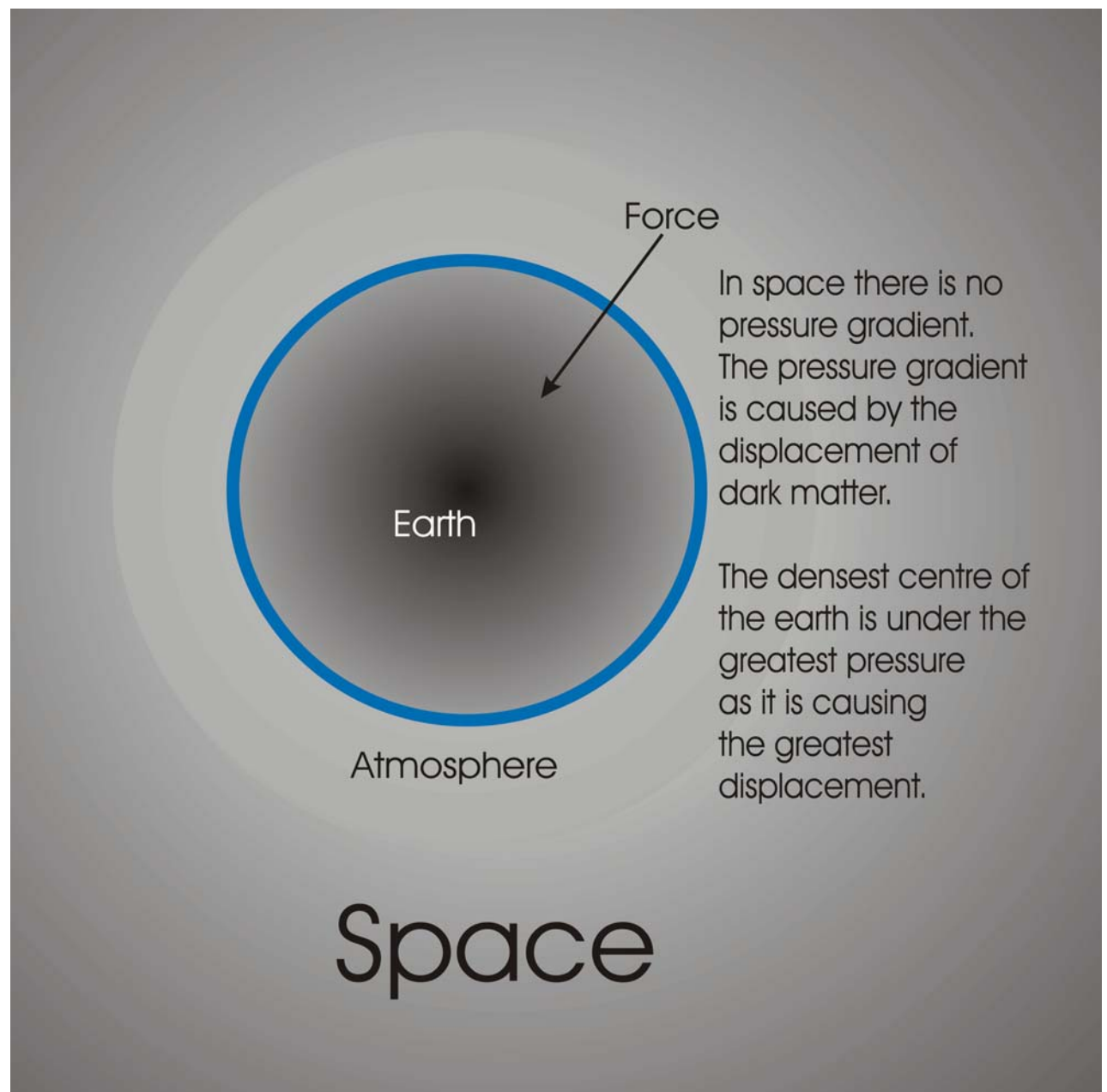
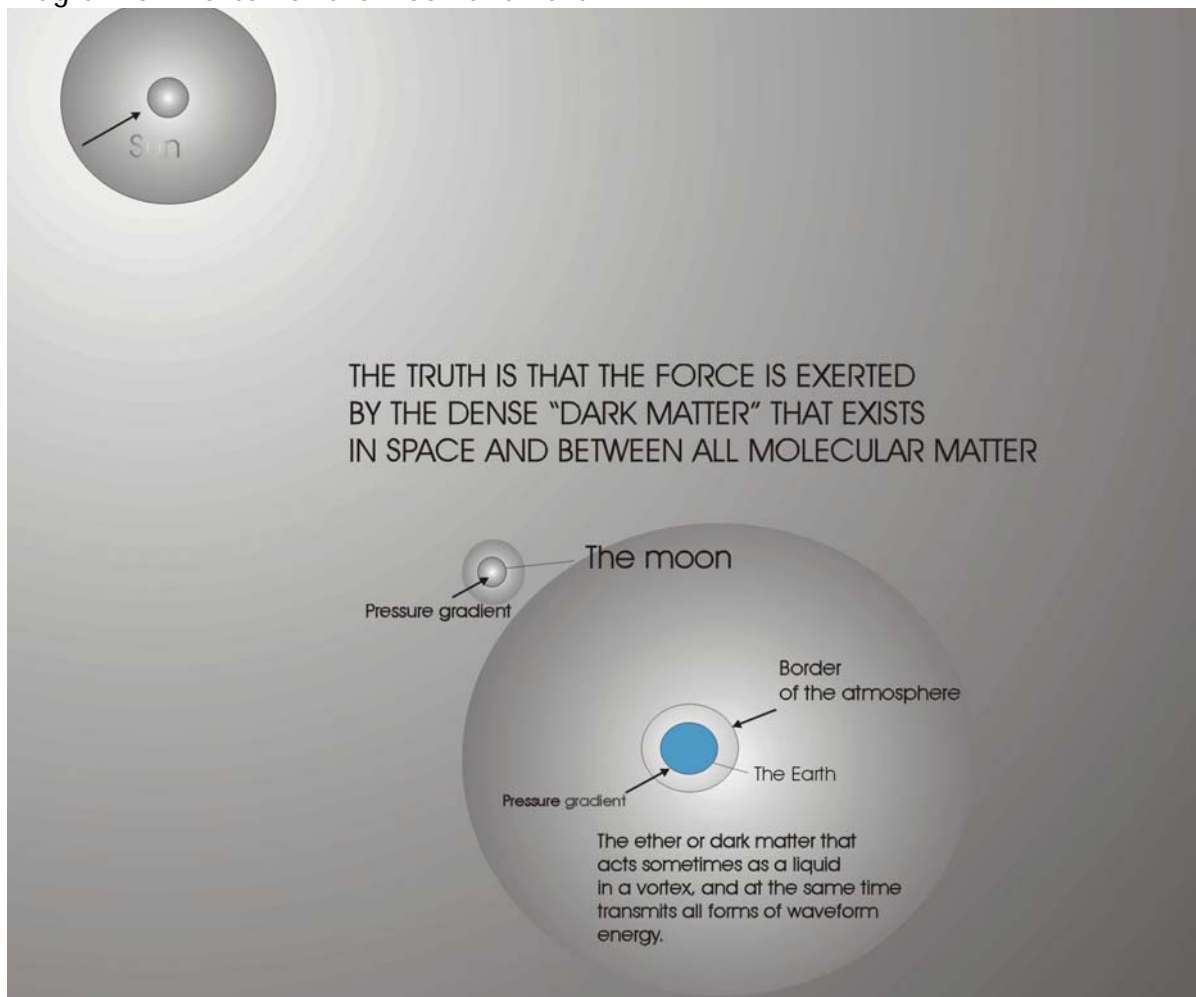


Diagram 5 - Vortex of the Moon and Earth.



The planetary bodies are enveloped in the densest of material imaginable, yet the individual particles that the dark matter is made of have effectively no mass. They act as a dense liquid; at times they even act as though they are solid. Because they are massless they allow the planets and any objects to pass unimpeded, never slowing. Because they do have a small mass nevertheless, they cause a body that starts to move, to be held back until the dark matter flows around it, so creating inertia. The displacement of a body within the dark matter creates a pressure gradient, which is zero out in space, and continues to increase toward the centre of the body, at which point the displacement is maximal. If a body is orbiting in the "fluid" of the dark matter, then it will be carried around indefinitely in a whirlpool. There is no force between bodies at a distance, or else they would rapidly aggregate, since they could never remain in a fixed position. The dense dark matter that exists in any apparent "vacuum" acts for the purpose of transmission of waves of all sorts, as though it is solid. This suggests that there is a structure to the dark matter so that light for instance is vibrated in all directions at enormous speeds, without apparent loss of strength over unimaginable distances. The particles transmit or conduct light, but do not move relative to each other. They are massless, separable by inertia; yet act as though joined in order to propagate light waves, microwaves and magnetic forces.

The planet Uranus has rings of dust that remain suspended permanently, along with⁶ its moon. They are suspended in space at the most massive distance from the Sun. The dust and the moon (Miranda) have the same ability to remain in permanent orbit. Like Saturn, Jupiter has rings of dust thousands of miles across that never coalesce, despite, it is said, all the particles having an attractive gravitational force. Two tiny moons of Saturn called Prometheus and Pandora make irregular orbits. If they were under the influence of gravity, as Newton himself stated, the two moons, not being in a perfect circular orbit, would crash as fast as an errant spacecraft. Similarly, if gravity existed, the rings of Saturn would rapidly coalesce and either be attracted to that planet or to the Sun.

If spacecraft were influenced by gravity from afar, not only would they continuously speed up, they would be dragged toward the centre of any planetary body. It would not be possible to achieve a trajectory or stay in an orbit. As soon as any spacecraft was out in space, that spacecraft being much lighter than the Earth, then once away from Earth's "gravity", it would be dragged inevitably to the Sun, yet this does not happen.

The Alternative Force: Copresumy

If gravity were to exist upon the Earth, then that force must necessarily become less and less toward the centre of the Earth, since at the centre of any body, all the mass is outside of the centre. Therefore gravitational pull will force the body out from the centre toward a point of equilibrium. This does not happen, and the pressure upon a body becomes greater and greater as the centre of the earth is approached. The force that exists presses towards the centre, and is not a pull from outside. Newton and Hooke had two options, either the apple was pulled down, or it was pushed down. The two men were so determined to prove a point against each other that they forgot the other possibility. When going down a mine or to the bottom of the ocean the pressure relentlessly increases. If there were gravity then as soon as one descends there is more and more matter above, that would increasingly pull you back. The pressure should decrease as you descend, but of course it does not. Instead we must consider a force, pressing downwards from space through the atmosphere in a gradient. I have named that force COPRESUMY^{iv}.

The discovery in 1965 of the cosmic microwave background, an all pervading radiation throughout the Universe, seen to be polarised, said to have last interacted with matter 14 billion years ago, shows matter to be evenly spread throughout space⁷. How was it that this ether has only now been "rediscovered" in the third millennium. In France during the seventeenth century the ideas of Descartes and Huygens held sway for a hundred years or so. Later, Einstein seized upon the ideas of Poincaré, (1854-1912) the greatest mathematician of his day, ignoring the ideas of Maxwell, and Fresnel. Huygens, Thomas Young and subsequently Doppler showed the waveform of light. This waveform propagates in all directions without

^{iv} Copresumy a new word to refer to the cosmic pressure, coined from: Cosmic/pressure/Rumble/y

apparent diminution in all directions like a ripple in a pond. Particulate energy travels outwards from a single point in space. Even after a mile, these particles, if moving, would be so thinned out as to disappear entirely. Imagine a point in the centre of a balloon, being translated into the same point size on the whole of the surface of that balloon. The multiple of the particle to produce the same particulate energy at that surface would be a factor of many millions. What actually happens is that the particles which transmit the light are packed tightly together and do not move at all. Instead, they transmit a waveform that our eye can detect.

We easily forget, but Newton's idea of action at a distance was always in doubt. Maxwell, Faraday and Hertz proposed forms of radiation that could only be propagated through dark matter (an ether). The Michelson-Morley experiments showed the constant speed of light though the dark matter. If the dark matter moves with the planets around the Sun, then even allowing for experimental limitations, their experiments prove the existence of the dark matter, not the absence of it. Lorenz postulated that light was electromagnetic transmission by particle. Poincaré expounded a theory of relativity in 1905, and Einstein his own theory in 1906. Einstein's theory had considered motion, but ignored gravity and acceleration. He postulated particles and waves for the transmission of light, but argued that space and time were equivalent, and that mass and energy were equivalent in the most unprovable of all equations, $M=EC^2$. In 2003, equally implausibly, two researchers claimed to have measured the speed of gravity⁸.

Time and Space

Einstein had apparently shown that time was a dimension. This is not so and can be disproved. Time is not an independent variable. Space-time is not as Einstein postulated, and relativity theory does not hold true.

A simple time experiment.

If time is truly independent of events, then time can be applied to events and cause them to vary. If we look at an event that happens with absolute regularity, and can show that it can be altered in any way by the application of time as an independent force or dimension, then time truly has that effect. If we can apply time in a simple manner to a regular but random event, and see a difference, then Einstein may be right. The alternative is simply that time is only a construct of the rate of change. Usually we choose to measure time as defined by a day, one revolution of the Earth around the Sun, or an atomic clock. This speed is only judged by our own experience. To a baby a day appears infinite, yet as we get old, the years start to blur.

To understand whether time has any independent meaning, first imagine the movement of a pendulum in a room. If it were to move slowly, would it be possible to move in and out of the room at will and see only the forward movement of the pendulum, and not the backward movement? If the pendulum moves as predicted, its movement can be foreseen by timing it, and it will be possible to see all the forward strokes and none of the backstrokes. This would not be a manipulation of events by time. If however we flip a coin and record how many times it falls as "heads", and how many

are "tails", then overall, as we all know, the number of each is absolutely equal with the passage of time. Indeed try this yourself and the longer you go on the more even it becomes. There can be a variance up to about a factor of ten, but there is a true oscillation about the mean, and as time progresses, the result is always even. If however we suppose that time is truly a variable, then it can be applied to this random process. If the coin is flipped once, it may come down heads. If it comes down tails first, then maybe it will come down heads next. If therefore we flip the coin until we have scored an excess of one occurrence of heads over tails, then we have applied time to the process. If then we go away and come back another day, whilst the process of flipping the coin or rotating a roulette wheel for example, continues, then we should be able to start from a random beginning, and again proceed until there is an excess of one "head". If overall this process can be continued indefinitely, then time, as an independent variable will be shown to exist. This is much more practical than attempting to exceed the speed of light. When this coin experiment is continued over many days and months, the events are random, and the number of heads versus tails always eventually returns to zero, equality. In practice an apparent excess of up to ten heads can be built up. Likewise in roulette, an excess of ten times will allow a gain to be built. As surely, the number will return to zero or up to minus ten will build, only to gradually revert again. Time is only a measure of the speed of a process relative to another event. Time is not independent of the process. Equally, Light is the propagation of a wave from one virtually massless particle to another at a finite and measurable speed. Whereas it can be measured in time by comparison to the movement of the earth around the sun in a year (light year), the passage of light cannot be changed by the application of time as a dimension. Time is not altered by flying around the universe at infinite speed, or by coming in and out of the time experiment at different moments. Time therefore does not exist outside of human experience.

Unfortunately Einstein based his ideas on Newton's gravity theory. Few wanted to believe Einstein's theories anyway, until the eclipse of 1919, when the light from a star appeared to be bent by the gravity of the Sun. Few seem to have remembered those wise men of earlier theories. The light was as one would expect, refracted in the altered density of the dark matter around the Sun. The sun, as other molecular bodies, displaces the dark matter, causing an altered density of the dark matter around it. Different densities of material are well known to refract light, and there is little difficulty understanding that concept. What is not clear is why so many persons have grasped the idea of Einstein's relativity concerning the warping of an integrated space-time, pretending that they understood it and that the concept was real.

The Known Universe

There are about 100 billion stars in our own galaxy (the Milky Way). The Milky Way was probably formed by an amalgamation of several smaller galaxies. Those galaxies did not come together as an amorphous mass under the influence of an attractive force, but instead have formed a spiral structure that is essentially flat with a bulge in it. This central bulge contains an estimated 200 million suns. The Milky Way is some 100,000 light years across. Our solar system lies on the edge of the spiral, about 2/3 of the way from the centre of the galaxy. The whole Milky Way spiral is rotating, and thought to take about 300 million years to make one single rotation. In the centre of the galaxy there is considerable turbulence, and many stars orbit erratically. One cluster of stars has been observed to move at a speed of 3 million miles an hour.

There is a current obsession with black holes. Einstein proposed the existence of "dark stars" (black holes). Without gravity there can be no black holes. A black hole has been suggested as the centre of each galaxy, somehow holding the galaxy in its spiral, yet permitting the enormous speeds and erratic star orbits at its centre. In the black hole it is said that an area of the size of a speck of dust is consuming matter, and is 3 million times the weight of the sun. Thought to have such massive gravity and mass, yet having only a local influence, this super-massive black hole if it existed, would surely devour the Universe in an instant.

The Andromeda galaxy and the Milky Way galaxy are headed towards each other at about 500,000 kilometres an hour, yet they are not expected to coalesce for some 5-7 billion years yet. It has been predicted that the two postulated central black holes will come together 25 billion years after the big bang. All the stars in the two galaxies would then be devoured and "switched off". In a further great stretch of imagination, Steven Hawking has claimed that even black holes will eventually evaporate, one molecule at a time, 10^{100} years from now (ten google years). More logically, in that situation, if there had been a big bang producing everything from nothing, then all would collapse to nothing again with the end of all time.

In a further example of Newton's continued influence, Professor Fred Adams of the University of Michigan recently suggested that as the sun reaches the end of its life, the Earth's population could use the gravitational tug of a giant asteroid to adjust the orbit!

The sun will one day swell as a "red giant". Slowly burning its hydrogen, it will become 10,000 times brighter, and become larger in diameter than the current orbit of the earth. Long before that a rise in temperature of only 60 degrees will be enough to evaporate all the water on Earth. Such conditions billions of years in the future, long before the sun becomes a red dwarf, will cause the extermination of life on Earth. It is truly inappropriate that anyone should worry now concerning an event so far in the future. Every person on Earth now, will be in the spirit world within a mere 120 years.

The History of “gravity”

Let us remind ourselves how the scientists evolved their theories over the centuries. No one has come up with a complete theory of physics in one attempt. Ideas have inevitably evolved and been worked upon by physicists over many centuries.

Cosmology is perhaps the most ancient science known to man, having been studied for many millennia, yet still we seem to have few good answers to the oldest questions. Perhaps now a little more “light” can be shed upon the origin and fate of the Universe. The purpose of the individual human existence is as uncertain to most of us now, as it was to early man.

The following paragraphs will chart the changing ideas of man in his search for answers to the ancient riddle of the stars. Stone circles and pyramids date from thousands of years ago. Prehistoric man discovered the idea of a telescope, and mapped the passage of the sun and planets. (Archaeologists have dug up glass lenses in Egypt that could have formed a telescope.) Ancient Mayan texts⁹ that describe astronomical calculations^v were written in hieroglyphic language and survive today. It was the ancient Greek society in Athens though, that produced the first extensive written theories of a truly modern cosmological theory. The Greek philosophers and scientists Socrates, Plato and Aristotle laid the foundations of modern ideas in the 5th and 4th centuries BC.

Socrates (470-399 B.C.) was the first philosopher and scientist to have his life related in a biography. Though hardly likely to be the first with many of these ideas, we have no earlier written texts. He analysed human life, and proposed a theory of the soul in the ether. His most famous saying is “know thyself”. He had been a soldier in the infantry, had two wives and three children. He was sentenced to death for his moral stance and forced to drink the poison made from the hemlock plant. He was a great orator. Plato wrote an extensive biography of Socrates, his teacher and mentor.

Plato (c.428-348/7 BC) was an Athenian who established a wide-ranging moral philosophy that had an influence on western society that lasts until today. After the death of Socrates, he and other philosophers had to travel around Europe to escape persecution. He founded an academy in Athens in 387 BC. where science and philosophy were taught and developed. He wrote extensively on philosophy, religion, psychology, metaphysics, politics and government. He developed science, including a theory of atoms and geometry of the Universe.

^v The Dresden Codex discovered in Vienna in 1739 in the former Royal Library; the Madrid Codex (Codex Tro-Cortesianus); the Paris Codex (Codex Peresianus of the Bibliotheque Nationale). They appear to be copies of the ancient writings similar to those on 5th century tombs and stone pillars.

Aristotle (384-322 BC) of Macedonia was a mathematician, philosopher, and author who worked with Plato, and learned from Socrates. He was the son of the Royal Physician to the Macedonian King. After Plato died he travelled from Athens to Assus, Macedonia. There he established his own school, tutoring the boy who became Alexander the Great. He wrote extensively and 47 of his works survive. He established the Lyceum at Athens where history and science were taught. He developed scientific theories of the Earth and of gravitation. He also wrote on philosophy, historiography, genetics, reproduction, monetary systems and microbiology, among the many diverse topics of his expertise. Centuries later Martin Luther amongst others in the sixteenth century popularised his work, teaching the philosophy and science of those ancient Greeks.

Other Greek mathematicians, Eudoxus and Heracleides added to Plato's geocentric mathematical theory^{vi}. Aristotle proposed a theory of matter, but as far as we know, Plato was the first person to describe the Universe in mathematical and geometric terms. Plato again is the first *recorded* person to describe matter as consisting of (atomic) particles. Since Socrates regrettably never wrote anything down, we rely on the writings of Plato and Xenophon to pass on his thoughts. Because of this it is impossible now to separate Socratic and Platonic theory, or indeed that of any other prior persons. Socrates was 43 years older than Xenophon and Plato. All his ideas were passed by word of mouth.

It is thought that it was Plato who derived the first mathematical theories of planetary motion. Plato decided that the maths were more important than theory and causation. This reverence for calculation as pure expression has persevered to the present day. Socrates on the other hand was a true metaphysicist^{vii}. The Platonic ideology that mathematics describes the *cause* of events is a fallacy. Mathematics describe the *course* of events, and then those calculations require constant adjustment to fit the observed constant variation.

It was in 300 BC that Euclid laid the foundations of modern geometry. Yet another Greek, Archimedes (287-212 BC) theorised on objects floating in liquids^{viii}. The Greek scientist, Ptolemy (127-145) catalogued the stars and again argued the geocentric (earth centred) system.

There followed many centuries bereft of new scientific ideas. The Roman Civilisation that displaced that of the Ancient Greeks produced no great scientists. The only scientists of note in the Roman period were immigrant

^{vi} Geocentric theory saw the Universe with the Earth at the centre whilst the Sun and planets revolved around the Earth, like the Moon. Perhaps that was eminently reasonable at the time.

^{vii} The science of things transcending what is physical or natural. That branch of speculation which deals with the first principles of things, including such concepts as being, substances, essence, time, space, cause, identity etc.; Theoretical philosophy as the ultimate science of Being and Knowing.

^{viii} He displaced his bathwater, no doubt spilling it on the floor, and famously leaped out exclaiming "Eureka" - (I have found it).

Greeks. The Greek and Roman civilisations declined, leaving no record of scientific thought from the Roman period. If the following dark ages produced any science, it was not recorded or preserved for posterity. Monastic life in Europe developed no noted science. Even the 1,000-year civilisation of Byzantium produced no science.

The 12th century produced some science in the Arab World. In Islamic civilisation, the Muslim philosopher Averroës developed a mystical “Neoplatonic Cosmology in which light was studied as the clue to reality that was to be grasped by the senses and described geometrically¹⁰”.

It was in the sixteenth century that discoveries and theory took a real leap forward. Universities had been established in Europe. Martin Luther (1483-1546) the great religious theologian, qualified BA in 1502, MA in 1505, and Doctor of Theology in 1512. Once established as professor at Wittenburg in Germany, he taught and promoted the works and science of the ancient Greeks. Leonardo Da Vinci (1452-1519) followed by Benedetti and Stevin (1548-1620), experimented with falling bodies. Copernicus (1473-1543) produced his paper on the motion of the heavenly bodies (the heliocentric system) in 1514. Improvements in the accuracy of observations allowed the Copernican view of an infinite Universe. It was no longer possible to support Ptolomy’s description of the movements of the stars, moon and sun around the earth. The idea of the earth being only a small planet in an infinite universe was hard for some to accept. Fortunately, Pope Clement VII approved, whilst Martin Luther and other zealots clung strongly to Aristotle’s ideas.

In due course, the Copernican view was accepted. Bruno (1547-1600) published a treatise based on the Copernican system, although in 1583. Tycho Brahé (1546- 1601) plotted the positions of the stars, yet still supported the system of a fixed Earth.

Galileo Galilei (1564-1642), applied the art of mathematics to pendulums, the free fall of bodies, projectiles, and acceleration, and recognised that the planets revolved around the Sun. He did not discover the telescope, which had been in use for many centuries, but likely was more a curiosity than a very useful instrument. He refined the telescope, for the first time grinding lenses accurately enough to see the craters on the Moon. Observing the movement of sunspots, he showed the rotation of the Sun on its axis for the first time. He observed the librations (wobble) of the Moon, but believed that the orbits of the planets must be circular (as they would have to be if gravity existed). Galileo was accused of blasphemy for his support of the Copernican heliocentric theory. After trial in 1633, he narrowly escaped execution. The Pope commuted his prison sentence, and he remained confined on his secluded estate at Arcetri near Florence for the remainder of his life.

As the 16th century turned into the 17th, Kepler and Descartes were about to redefine the foundation of physics. Johannes Kepler (1571-1630) believed in a divine plan. He realised that Mars could not be orbiting the Earth. He

ascertained that the planets move in ellipses, and sweep out equal areas in equal time. He laid the foundation of the inverse square law with his third law of the period of revolution of a planet. He redesigned the telescope, by moving the position of the second lens beyond the point of focus of the first lens. This simple adjustment to the telescope allowed it to magnify as much as a thousand times more than the design used by Gallileo¹¹.

In the seventeenth century science and philosophy continued to evolve. Rene Descartes (1596-1650), perhaps the wisest philosopher of all time, built a theory of man and the universe. He reasoned, "I think, therefore I am." He advised criticism, scepticism and rechecking of ideas. He described the path of a moving object at any point intersecting two parallel lines at right angles, by a list of positions and times. This he expressed in algebraic terms. He described a universe infinitely large, filled with infinitely divisible matter. Matter was "set in motion by God and the matter imparted motion to any body within". The rotation of the sun was caused by the rotation of the matter in a whirlpool of dark matter. Planets were carried round the sun in this vortex. Matter continued in motion unless affected by that around it. He proposed two laws of motion: if two bodies have equal mass and velocity before collision then they will be reflected by that collision and retain their speed. If two bodies have unequal masses then the lighter body will be reflected with a speed equal to that of the heavier body. This was unfortunately not verified. Cartesian^{ix} theory survived almost indefinitely in France but was at odds with later Newtonian science. Descartes built a theory of the nature of man and the universe. He described the motion of a body in time and mathematical terms, using algebra for the first time, and a universe full of infinitely divisible matter, set in motion by God. His concept of inertia proposed that the Earth does not move relative to the material it is within. He formulated two laws of motion. For a philosopher as obsessed with mechanism as Rene Descartes¹² the relationship between visible machines and the invisible machinery (dark matter) of God's cosmos was paramount. Two theories were proposed to account for optical phenomena. Descartes was the author of one of these, surprisingly, the erroneous emission theory that supposed light to consist of small particles shot out by the luminous body¹³.

Christiaan Huygens (1629-1695) developed Descartes' ideas of matter. After further improving the telescope, he saw Saturn's rings. He analysed the movement of a pendulum, defined inertia, and proposed a theory of gravitation based upon Descartes vortices.

Robert Hooke (1635-1703) was the first to suggest a wave theory of light. In his treatise entitled "Micrographia" of 1664, he asserted that light is a quick and short vibrating motion. This was "propagated every way through an homogeneous medium by direct or straight lines extended every way, like rays from the centre of a sphere". "Every pulse or vibration of the luminous body will generate a sphere which will continually increase and grow bigger just after the same manner though indefinitely swifter as the waves or rings

^{ix} From Descartes' name, this was called "Cartesian" theory.

on the surface of water do swell into bigger and bigger circles about a point on it." On this hypothesis he gave an account of refraction, reflection, dispersion and the colours of thin plates, but his reasoning was "vague and unsatisfactory"¹⁴. One of his works was a (*Cartesian*) hypothesis of the cause of gravity. In this he correctly stated that the force was to be found in any propagated pulse of the ether (dark matter). It was posthumously published, but by that time, Newton had entered centre stage.

Straddling this and the next century, Isaac Newton (1643- 1727) experimented with light, likewise attempting to improve the work of Descartes. Newton developed a method of calculus, and a theory of universal gravitational attraction. He applied (*Kepler's*) inverse square law to the movement of planets and comets. He decided that in ether (dark matter), the movement of planets would be slowed, as would that of a pendulum. He did not consider it possible that the ether (*dark matter*) might move at the same time, or that only ether (*dark matter*) could explain inertia. He simply discarded the ideas of Socrates, Plato, Descartes and (especially) Hooke^x. Edmund Halley (1656-1742) made observations of the paths of comets, and encouraged Newton to mathematically explain their path. Mathematical equations were devised to calculate and describe reality, but they cannot explain the cause. Newton's laws thus describe the action of force upon a mass and remain largely an accurate description. The planets though do not follow a fixed path. They wobble around an inconstant mean path. To be fair to Newton, he realised that gravity within the universe would lead to total instability and that the whole would collapse to a solid, but he chose to ignore those thoughts entirely.

At the same time Leibnitz (1646-1716) in Germany appears to have independently devised calculus^{xi}. He disbelieved the idea of gravitation at a distance. He developed a theory of "Monads" which were spiritual substances, the basis of all composites (*a Socratic, also Lutheran idea*). Another of Leibnitz's ideas was to substitute Cartesian^{xii} mechanics - the conservation of energy with the idea of kinetic energy.

As we progress into the eighteenth century, the French scientist Lagrange (1736-1813) analysed the Moon's motion relative to the Earth. He showed that at some points there is a stable balance between them. (*This is to be expected when two bodies rotate with the semi-solid dark matter*). Another Frenchman, Laplace (1749-1827) applied the idea of gravitation to the orbits of Jupiter and Saturn, showing that they vary with a periodicity of 926 years. (*Again the two moving slowly in dark matter better explains this slow wobble.*) Laplace, suggested that the planetary systems may have condensed out of a huge gaseous nebula. Like Jupiter and Saturn, the movement of Uranus predicted the existence of Neptune and Pluto (*but the*

^x He was so at odds with Hooke that it affected his theories; a result of his dissent and secrecy.

^{xi} It has never been certain whether Leibnitz or Newton first invented calculus, or for certain whether was independently arrived at.

^{xii} Descartes's ideas are referred to as "Cartesian"

movement of dark matter was not discounted). Indeed the orbit of mercury varies on each and every circuit. Dozens of new moons around these planets have recently been discovered¹⁵.

In the nineteenth century, modern technology saw infancy. Englishman Michael Faraday (1791-1867) investigated the nature of electricity and magnetism, and its effect upon light. He (*correctly*) thought that energy was to be found in the space between the molecules, in dark matter (ether). In 1826 Samuel Heinrich Swabe of Dessau in Germany started a series of observations on sunspots, recording each group as it traversed the Sun's disk. Twelve years later he published his counts in "Astronomische Nachrichten". (*Searching earlier records, an estimate was made of maximum and minimum sunspot activity back to 1610*¹⁶). The Scotsman James Maxwell (1831-1879) showed that electromagnetic waves moved at the speed of light, and could be explained by dark matter (ether). His paper on lines of electromagnetic force was read to the Cambridge philosophical society in 1856. His field theory of electromagnetism was published in two parts in 1864. His theory of heat was published in 1877.

Albert Michelson (1832-1931) devised an experiment with light to test the presence of dark matter (ether), but assumed that the dark matter did not move with the Earth, which negated the experiment. (Using the Michelson-Morley interferometer)

As progress rushed towards the twentieth century and modern times, Hendrik Lorenz (1853-1928) together with Zeeman, constructed a single theory for the transmission of light and electromagnetism. Lorenz and Henri Poincaré then developed a theory of relativity, published in 1905. Poincaré also postulated gravitational waves.

Gravitational waves cannot exist if dark matter acts as a structured semi-solid, with all incompressible matter being in contact. This idea is supported if the pattern CMB (cosmic microwave background) is fixed. If the dark matter particles were not in contact and lightly attached, they could not transmit light or electromagnetism. Because the particles of dark matter are so very small, with almost negligible mass, they conduct light waves almost indefinitely. A waveform degrades only slightly after transmission over many light years of distance from the source (red shift). Likewise, copresumy (the force exerted by dark matter upon molecules) is transmitted as a constant pressure wave, which has a gradient near to a solid object. In proximity to a large body such as a planet, the displacement increases the density of dark matter. This produces an even pressure upon that large body. The change in density of dark matter around a planet will result in refraction of the wave, and apparent "lensing", which Einstein predicted as showing gravity, yet he said that gravity did not exist, and that this lensing was due to a curve in space. About 90% of the entire mass of the Milky Way is thought to consist of dark matter¹⁷. The galaxy is warped, but there is still no agreement as to what produces the warping¹⁸. At the same time, Nebulae are observed to flow¹⁹.

Christian Doppler (1803-1853) born in Salzburg, Austria, was professor of physics at Vienna. He discovered the effect that velocity has on light, sound and microwaves in 1842. He postulated that light from a receding star would demonstrate a change in the wavelength of its light. This idea was to be taken up by Hubble in the 1920's.

Max Planck (1858-1957) was the German physicist who in 1900 developed a mathematical theory of energy that he called quantum theory. He correctly asserted that energy was disseminated from a vibrating source. He defined the energy from this source as $E=hv$, where E is energy, h is Planck's constant, and v is the wavelength of the light. All this actually means is that the greater the amplitude, the greater the energy. It does not mean that the photons or energy quanta are actually shot out as vibrating energy packets at all. The vibration of one particle is transmitted to its neighbour. At the same time, the strength of the vibration is proportional to the size or amplitude of the vibration. That is straight forward enough. What might now be revolutionary is that the particles are packed tight together, and the size or mass of the particle affects its ability to vibrate and thus transmit energy. At high temperature, the wavelength shortens. Only a small part of the spectrum that is visible to the human eye is called "light". It again it should be no surprise that energy is passed faster with shorter and quicker vibrations. It is useful to describe this with equations if we are trying to calculate heat output. Simple mathematical explanations are invariably wrong, since some of the energy is passed in ways and at wavelengths not anticipated.

Albert Einstein (1879-1955) born at Urm, now in Western Germany, studied in Zurich, Switzerland, in 1905. He developed his theory of relativity in 1906, following a paper on Brownian motion, and another on the kinetics of heat. Einstein set out to show that space and time were the same, since the speed of light is constant; that mass and energy are equivalent. In 1918 he postulated that gravity is not a force, but a feature of space-time resulting from the curvature of space. Einstein's view was that if one travelled as fast as light, then light would not be observed, but would stand still. This observation would be made if any human could ever travel at the speed of the light wave. The fact that a human eye would fail to observe light at any speed that took the wave out of the visible spectrum has absolutely no bearing on the nature of the light wave itself. Einstein could not believe in the infinity of the Universe, so had to postulate a curved Universe that is shaped like a globe. Since Einstein's day, it has been shown that there can be differences in the speed of light.

Black holes have been predicted as a consequence of very dense matter in which gravity is so strong as to prevent the emission of light. Another theory would be necessary to explain a black hole if there is no such thing as the attraction of gravity. Indeed no black hole has ever been demonstrated. Likewise such phenomena as wormholes and time machines are a figment of imagination, and will never be demonstrated²⁰. If the transmission of light slows below that visible, due to a low enough temperature, it will naturally increase its transmission speed again as the transmitting medium warms up.

Heat after all is another type of energy associated with the vibration of particulate matter. If there is such a thing as a black hole, it will prove to be a cold spot in the Universe where matter is so low in temperature that matter altogether ceases to react or vibrate. Since all dark matter is continuous and will evenly distribute energy, this will never occur.

Edwin Hubble (1889-1953) saw that light from far away across the galaxy was redder than light from the sun. This led him to suppose that the stars were all receding from us at great speed, causing the light to change its wavelength in accord with Doppler's theory. There was always the alternative possibility that light was slowing down in wavelength, as the dark matter vibrates less, further from the source, instead of the star source moving. That hypothesis was rejected. The "Big Bang" theory was thus spawned, and has been a great favourite of contemporary physicists.

That all matter in the universe should have come from a pinhead by spontaneous explosion in a millisecond, proposed by Hubble in 1929, is surely the most preposterous theory of all time. It is simply enough countered by the demonstration that light waves can slow through cold matter to 30^{-1} ms^{-1} . The slowing of light vibrations thus is proved to occur other than simply by movement of the source of the light. The idea that all matter moves away from us, would anyway go against the idea of an infinite universe. That would assume that we are at the centre of all matter. The most distantly created waveform light from far across the Universe has now been shown to slow to microwave frequency by the time it is detected by us as the microwave background. Older light will be detected at lower frequencies still. The newly launched Space Infrared Telescope Facility (SIRTF) will look for this radiation²², which I predict will come from every part of the sky, and will appear much as the microwave background. In another demonstration of the variance of the speed of light under artificial conditions it has now been shown that light waves may travel *faster* than the standard fixed speed. It was reported in July 2000, that light may be caused to travel at least 7% faster than its normal observed speed²³.

That there is indeed dark matter, the particles of which pervade intermolecular space with particles in complete contact, can be explained by simple analogy. Suppose that there is a line of cars (separate particles) travelling in a traffic queue. Suppose then there is a slowing of any one car to (or almost to) a halt. You will find that every succeeding car is forced to come to a halt also. Then when the car that initially slowed, speeds up again, it moves ahead, yet the cars behind must come to a halt before the way is clear and they can speed up themselves. The only way that this would not happen is if the cars are all connected together by solid tow bars, like carriages of a railway train. Only if the cars or bodies are fixed together can there be a transmission wave along its length. Thus it can be seen that to transmit a wave through dark matter the particles must all be in contact, fixed ever so delicately to each other. This demonstration of structure within the dark matter is seen in practice as the pattern of the cosmic microwave background. Quantum entanglement²⁴ shows an interlaced

structure. Likewise the first data from the Wilkinson microwave anisotropy probe (WMAP) to be released also confirms this theory²⁵.

Conclusion

The galaxies are known to move and rotate in space in reaction to dark matter. Dark matter is composed of virtually massless particles, packed together as a cohesive material. This material forces atoms together into spherical bubbles that float and circulate much as described in Descartes' vortex theory. The dark matter is broadly even in density and temperature, yet is seen to have a distinct variability in radiation pattern. The displacement of the dark matter in space is greater the larger or denser a molecular body, so producing a greater displacement force upon the Earth than the Moon. The transmission of light and other waveforms are radial vibrations of that stable medium. Refraction of light occurs when the vibration is transmitted at an angle into a medium of different density. Thus, when displaced by a very large body such as a planet or star, the density of the dark matter around it is increased by that same displacement. This increase in local density is sufficient that the light that is transmitted through the medium close to the star is refracted or "lensed" around it.

Space is infinite, and has no discernable margin. Light will slow when transmitted over very long distances. As the waveform degrades it appears to us redder, eventually slowing from the visible spectrum into microwaves. This negates the idea of a "big bang". It never stood to reason that all matter came from one tiny particle in an instant. An infinite universe has an infinite structure. Devoid of time, this is not so hard to understand.

The age of the Universe was always academic. Time does not exist, so outside of human experience, all things can happen in an instant, or take forever. Time is only a measure of the progress of events. Events and processes speed up or slow down relative to each other. There is no age in an infinite, non-expanding universe. In the absence of time, all eternity may happen in a microsecond, or continue forever. Outside our own perception, events may proceed very differently. If we can understand that time does not exist, then time travel is unnecessary. Spirits outside the human body may experience the past and the future at the same time. God could indeed construct the world in seven days.

The existence of structure in the dark matter, demonstrated by the uninterruptedness of light waves and microwaves, allows us to postulate that human spirit and memories exist are recorded and experienced at the subatomic level. They work through the atomic medium, but they are not atomic matter themselves. Human memory and spirit exist in the dark matter. The experience known as "Life" is outside of the molecular world²⁶.

Now we have a theory that is all encompassing, we should never cease to wonder at our human state, remaining humble whilst enjoying our molecular world, and caring for all around us. In this world we will never know all the answers. Human memory is held in the subatomic level. That we shall take our human experience with us into an infinite future should make us critically examine every thought and deed, respect all other beings, preserve our planet, and fear God's wrath, should we fail.

END NOTES

¹ Newton, Sir Isaac 1642 -1727.

Newton was born in the manor house at Woolsthorpe, eight miles south of Grantham, Lincolnshire on 25th December 1642. Newton's father died at the age of 36, in October 1642, before the birth of his son. His mother then married Barnabas Smith, Rector of North Witham, Lincolnshire who died in 1656. On his mother's second marriage Newton was left at Woolsthorpe in the charge of his grandmother, Mrs Ayscough. He was sent in 1654 to the grammar school at Grantham kept by Mr Stokes.

Newton made little advance in his education but after a fight with an older boy he grew keener and soon rose to be head of the school. At the age of 14 his mother returned to Woolsthorpe on the death of her second husband. She took over the management of her farm, and removed young Newton from the school. On the advice of his uncle he was sent back to school in 1660, and on the 5th June 1661, Isaac was matriculated at Trinity College Cambridge under Mr Pulleyne.

In 1664 Newton made some observations on halos afterwards described in his "optics". He graduated B.A. in January 1665. His unrivalled genius for mathematical speculation showed in boyhood. Before coming to Cambridge he had read Sanderson's "logic" and Kepler's "optics". As an undergraduate he applied himself to Descartes' "Geometry" and Wallis's "Arithmetica Infinitorum". He attended Barrow's lectures. His mental activity immediately after taking his degree during 1665 and 1666 was extraordinary. He found the method for approximating series and the rule for reducing the power of any binomial to a series. This was his binomial theorem. In May he found the method of tangents of Gregory and Slusius. In the November he produced the direct method of "fluxions" (ie. the elements of the differential calculus). In the next year in January he wrote on theory of colours. In the following May he started work on integral calculus. In the same year he began to think of gravity extending to the Orb of the Moon. Newton was driven from Cambridge by the plague in 1665, and in that autumn "he fell into a speculation that the power of gravity is not found sensibly diminished at the remotest distance from the centre of the earth from which we can rise". It appeared reasonable to him that this power must extend much further than is usually thought. Why not as far as the moon? If so the motion must be influenced by it - "perhaps she is retained in her orbit thereby". Voltaire, who was told about this by Newton's step-niece, Mrs. Conduit, popularised the story that this train of thought was caused by an apple. Newton at this time by a simple deduction from Kepler's third law, proposed that if the Moon were kept in an orbit approximately circular by a force directed to the centre of the earth, then that force must be inversely proportional to the square of the distance between the Moon and the earth. He proceeded therefore to compare the consequences of his theory with the observed motion of the Moon and found them to answer pretty nearly. Still the matter was laid aside and nothing more came of it for nearly 20 years. To make the calculation, knowledge of the Earth's radius was required. The common estimate in use among geographers before Newton's time was based on the supposition that there were 60 miles to a degree of latitude and Newton took this common estimate but added "as this is a very faulty supposition, each degree containing about 69 and a half miles" his computation did not fit, and he concluded that some other cause must at least join with the power of gravity on the Moon.

Newton was elected a Fellow of the Royal Society in 1672. He was unable to calculate the attraction of a large spherical body on a point near its surface until about 1685. It was in his "Principia" that Newton first publicly divulged the solution of that problem. He was elected a Fellow of Trinity College in 1667. During the next few years he turned his attention to his optical work and made his first reflecting telescope in 1668. It had an aperture of about one inch and was six inches long. With it he saw Jupiter's satellites.

At the end of 1668 Mercator had shown how to calculate the area of a hyperbola. A copy of this was sent by John Collins to Barrow, and shown by him to Newton. Newton recognised that the method was mainly the same as the more general one he had already devised for finding the area of curved surfaces and for solving other problems. Newton was chosen in 1669 to succeed Barrow in the Lucasian chair at Cambridge. He was led to conclude from his optical experiments that it was impossible to perfect the refracting telescope and he applied himself to improving his reflecting instrument. Towards the end of the same year, 1671 he was busy enlarging his method of infinite series. He was proposed for election as a Fellow of the Royal Society in 1672. He wrote afterwards an account of the experiments with the prism bought in 1666 to try to explain the phenomena of colours. The experiment had shown conclusively "that light consists of rays differently refrangible - that colours are not qualifications of light derived from refractions of natural bodies as was generally believed but original and connate properties in which divers rays are diverse that to the same degree of refrangibility ever belongs to the same colour. The white light is never compounded and to its composition are requisite all the primary colours mixed in proper proportion". On this Hooke alone appears to have reported and his report was read at the next meeting. Hooke in the discussions about the telescope had already appeared as a critic of Newton. Descartes had in 1637 described the rainbow colours produced by refraction of light banded by shade through a prism and had elaborated a theory of colours. This theory was adopted by with modifications in 1664 by Hooke, who described an experiment practically identical with that of Newton's experiment with the prism. See the Dictionary of National Biography, 1893.

² Robert Hooke (1635 - 1703) postulated before Newton the theory of universal gravitation, but was unable to express it mathematically. He did moreover state the inverse square law and related this to the path of projectiles. He quarrelled constantly with Newton on the basis of who introduced these ideas first. He had made many inventions including an odometer; a hearing aid; a reflecting Quadrant; a system of telegraphy; a barometer; the universal joint; an anchor escapement for clocks and an arithmetical machine (calculator). He produced the Gregorian telescope and a theory of the variation of the compass. He explained the scintillation of the stars by irregular atmospheric retractions and inferred the solar repellent force in producing the tails of comets. He suggested the motion of the sun amongst the stars and propounded correct notions as to the nature of fossils and the succession of living things upon the earth (preceding Darwin). He also invented a marine barometer. One of his posthumous works was a hypothesis of the cause of gravity found in any propagated pulse of the ether (dark matter). See Dictionary of National Biography, 1893

³ Nature, vol 400, 1st July 1999, p.35. "Particles in the ether that have been postulated are myriad, including neutrinos, wimps, and axions".
Nature, Volume 400/ July 1999, p.21. "It is a widely believed half truth that protons and neutrons are made out of quarks. The modern theory of the strong force that binds quarks inside protons and neutrons, and that these particles in turn make atomic nuclei, is quantum chromodynamics (QCD). The colour gluons in this mix are now seen as the weightier and more dynamic constituents of matter".

⁴ Nature volume 404, 27th April, 2000, page 939.
 "The lunar experiments over Antarctica have produced a long awaited temperature map in the microwave sky. "This Map reveals sound waves that can be used to probe the early universe. According to the big bang theory the universe started hot and dense and then expanded and cooled. In the hot, dense conditions of the early universe, photons were

tightly glued to matter. When the universe was about 300,000 years old the temperature dropped below 3000 K, allowing atomic hydrogen to form and releasing the photons. These photons which travelled free through universe as it expanded and cooled make up the cosmic microwave background (C M B) that we see today. 10 to 20 billion years after the Big Bang, the CMB is a cold sea of photons with an average temperature of 2.7 K (minus 270 degrees centigrade) these photons are all around us, causing about one per cent of the noise on our TV sets. When it was discovered in the 1960s, the CMB was found to be remarkably uniform across the sky. It was not until 1992 that the cosmic Background Explorer (COBE) satellite discovered a temperature variation (or ripples) at the level of one part in a hundred thousand. Temperature maps of the CMB form a snapshot image of the universe when it was extremely young. So these ripples reflect tiny density fluctuations in the primordial soup of particles. These same density fluctuations are thought to grow by gravitational attraction into the familiar structures we see today (stars, galaxies and clusters of galaxies). This is the gravitational instability model of structure formation".

⁵ Nature, volume 411, 3rd May 2001, page 10.

"On the trail of the neutrino". "Huge arrays of detectors now have these ghostly particles in their sights - but will they lead physicists to rethink the standard model?"

In the sub-atomic Zoo, few particles are as elusive as the neutrino. The universe is awash with them, but they slide through most forms of matter with ease. Billions have passed through your body since you started reading this article. By one estimate the average neutrino could travel for 1000 light years through solid matter before being stopped. This reluctance to interact with matter makes neutrinos difficult to detect. But, almost half-a-century after they were first spotted, neutrinos have become the focus of intense study. Exciting results from existing detectors, together with plans for new detector projects, promise to make this a busy decade for the neutrino hunters".

"The only practical way to snag a neutrino hinges on the weak nuclear force and on the interaction between neutrinos and protons, neutrinos or electrons it governs. Physicists maximise their chances of observing these rare interactions by monitoring huge numbers of potential neutrino targets. Large tanks of water are a common choice - water is plentiful, cheap and being transparent, it allows physicists to observe any interactions that occur deep in the tank. The tanks are deep in the ground so that other particles are screened out by the overlying rock. There are several types of interaction to look for. The simplest is elastic scattering - high-speed collisions between electrons in water molecules and incoming neutrinos. The collision leaves the electrons travelling faster than the speed of light through water. As a result the electrons emit dim blue flashes of light known as Cerenkov radiation - the optical equivalent of the sonic boom created by supersonic aircraft".

⁶ Nature, volume 421/27th February 2003 p.907/ www.nature.com/nature "Prometheus and Pandora, two tiny moons of Saturn, have been straying. Chaotic interaction between them could be responsible for the perturbation of their orbits. The moons flank the F ring, which lies beyond Saturn's main ring system, and is itself dynamically complex. The two moons are among the smaller of Saturn's 18 satellites, and were discovered by the voyager space probe in 1980. Between 1994 and 2000, Richard French and colleagues detected gradual changes in the pair's (*of moons*) orbits using the Hubble space telescope."

⁷ Nature, volume 420, 19/26 December 2002, p747. "cosmic microwave background". "In 1992, data from the Cosmic background explorer showed that the temperature varies by ten parts per million, or thirty microkelvin, from one direction to another across the sky. The anisotropies in temperature and polarisation are thought to represent variations in the density of matter across the universe". (*These anisotropies are supposed to have been fixed some 14 billion years ago, remaining constant yet polarised!*)

⁸ Nature, volume 421/ 16th January 2003, p.198. "In 2003, two researchers claimed to have measured the speed of gravity. Gravity was said to propagate at the speed of light, a value close to that predicted by Einstein, but several theorists disputed this measurement by Fomalont and and Kopeikin, as "seriously flawed". Kenneth Nordtvedt said that the team

was seeing a gravitational analogue of the force of magnetism, caused by electrons moving at close to the speed of light”.

⁹ Encyclopaedia Britannica, 1973, volume 11, p.719.

¹⁰ Encyclopaedia Britannica, 1973, volume 16, p. 367.

¹¹ For a simple diagram and description, see Encyclopaedia Britannica, 1973, volume 18, p.97.

¹² Nature, volume 394, August 20th 1998, p.729, “A philosopher as obsessed with mechanism as Rene Descartes. Descartes’ publications brilliantly exploit the modes of illustration available in the 17th century, from pictorial representations, to abstract diagrams”.

¹³ Extracted from the Dictionary of National Biography, 1892.

¹⁴ Extracted from the Dictionary of National Biography, 1892.

¹⁵ Nature, volume 412/ 12th July 2001, p.133. “Dozens of new moons around these planets have recently been discovered. Saturn has 30 moons, Jupiter 28, Uranus 21, and Neptune has 8. A dozen new kilometre sized satellites were gleaned from observations of Saturn. These discoveries came from ground-based instruments, complementing spacecraft measurements that could not efficiently search for satellites more remote to the planet. Around Saturn are both prograde and retrograde orbits. Retrograde moons circle anticlockwise, and prograde moons circle clockwise. The mechanism of satellite capture remains an outstanding problem in planetary science.”

¹⁶ Nature volume 395, 24th September 1988, p.341: in Statistical visions in time, a history of time series analysis 1662-1938, Judy L.Klein.

¹⁷ Nature, volume 394/27th August 1998, p. 825. “About 90% of the entire mass of the milky way is thought to consist of dark matter. The nature of this dark halo is completely unknown, and the microlensing experiment was designed to resolve this question by monitoring background stars in our nearest neighbour galaxies, the Magellanic Clouds. There are a lot of lensing events from objects about half the mass of the sun, thought to be white dwarfs”.

¹⁸ Nature, volume 392/ 2nd April 1998, p. 471 . “The galaxy is warped, but there is still no consensus as to what produces the warping. It is now over 40 years since radio observations of neutral hydrogen revealed the gaseous disk of our galaxy to be warped. Subsequently the warp has been detected in the distribution of galactic dust, in molecular dust, and luminous stars. Roughly half of all spiral galaxies have similarly warped disks, which suggests that warps are a common and long-lived phenomenon. Data from the Hipparcos satellite is used to determine small stellar motions in the plane of the sky that are undetectable in the gas”.

¹⁹ Nature, volume 392/ 2nd April 1998, p.469 “Nebulae are observed to flow. The final expulsion of gas by a star as it forms a planetary nebula - the ionised shell of gas often observed surrounding a young white dwarf - is one of the most poorly understood stages of stellar evolution. Such nebulae form extremely rapidly (about 100 years for the ionisation). The formation process is inherently difficult to observe. Here are reported optical observations of the stingray nebula... collimated outflows are already evident, the nebular structure that focuses the outflows is identified. - Images from the Hubble space telescope”.

²⁰ Nature, volume 400 8th July 1999, p.111 “Edwin Hubble got it wrong by an order of magnitude, but claimed an uncertainty of 10%. Seventy years and much humble pie later, knowledge of the constant rate of expansion of the Universe” “Remained unreliable” ...”Had the expansion of the universe proceeded unchanged at the galloping rate

suggested by Hubble, the big bang would have taken place less than two billion years ago, making the Earth older than the Universe”

²¹ Nature, volume 409, 21st January, 2001, page 461.

“Stopping light in its tracks”. “Using lasers and ultra cold atoms, physicists have found a way to stop and start a pulse of light. This magic trick may one day be used to store data in a quantum computer”.

“Two years ago Lene Hou and her colleagues shot a pulse of laser light three microseconds in duration and about one kilometre in length into a specially prepared sample of ultra-cold sodium gas. The gas sample was about a 0.2 mm in length, and had the unusual property that the velocity of light within it was 10 million times lower than in free space. When the leading edge of the pulse entered the sodium cloud, it immediately slowed to an unheard of speed of 30 ms^{-1} . At this leisurely pace, the light pulse took so long to cross the sample, that, long before it emerged from the other side, the tail-end of the light pulse vanished into the sample as well. Squeezed to within one 10 millionth of its original length, the pulse crept across the sample until finally it emerged, restored to its original length, and accelerated to its customary speed of $3 \times 10^8 \text{ ms}^{-1}$. The key to slowing light is the presence of the second laser beam, the so-called “coupling” pulse. Distinguishable from the propagating or “probe” pulse by its polarisation, the coupling light delicately adjusts the internal energy levels of the atoms, suppressing their ability to absorb the probe light - in effect, a single absorption level is split into two levels that cancel each other out. This phenomenon is known as electromagnetically induced transparency. At the same time, the “refractive index” of the atomic cloud - in simple terms how much it bends light - develops a steep dependence on the probe frequency. This in turn leads to a very slow “group velocity” - the speed at which the envelope of light intensity moves through the sample”.

²² See <http://sirtf.caltech.edu>

²³ Nature, vol 406, p. 243. July 2000. “Mugnai et al report a large superluminal effect for microwave pulses. Now Wang et al., (p.277 of this issue, report pulses of light at a velocity of $-c/310$. This is explained by them as being possible, since the waveform is transmitted through matter. No particles are transmitted at all”.

²⁴ Physics Review, letters, 89. 270402 (2002) “With Quantum entanglement there seems to be an interlaced structure. Particles share a wavefunction, and measurements on one particle automatically define the quantum state of others with which it is entangled, according to Gingrich and Adami”.

²⁵ Nature, vol 421/ Feb 2003. “Data from the Wilkinson microwave anisotropy probe have now been released. (WMAP) This some eight years after the idea was first proposed to NASA. The satellite spent a year surveying the sky at more than 1.5 million kilometres from earth, and measured the temperature and polarisation of the cosmic microwave background. (CMB)” (*Whereas this is useful data, I fail to see that the dark matter has remained stuck in this state with no change even in polarisation or fluctuation in density since the beginning of the universe, as is suggested. However, that idea does lend weight to my argument that the dark matter actually has a fixed structure and is another world, invisible to us in our human state. The new data is said to suggest a distribution of mass and energy in which 4% of the universe is atoms, 23% dark matter and 73% dark energy. Even the age of the stars is said to be derivable from this data*). See <http://arxiv.org>

²⁶ Nature, vol 400, 1st July 1999, p.35. “Particles in the dark matter that have been postulated are myriad, including neutrinos, wimps, and axions”. Also see - Nature, Volume 400/ July 1999, p.21. “It is a widely believed half truth that protons and neutrons are made out of quarks. The modern theory of the strong force that binds quarks inside protons and neutrons, and these particles in turn to make atomic nuclei, is quantum chromodynamics (QCD). The colour gluons in this mix are now seen as the weightier and more dynamic constituents of matter”.

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