EINSTEIN AND MODERN PHYSICS

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Although this essay is self-contained, it is also to be the third part of a trilogy of which the other two parts are called *Galileo Versus the Geocentric Theory of the Universe* and *Sir Isaac Newton and Modern Astronomy*. In consequence, there are frequent cross-references between this essay and the other two, which make it, while certainly not necessary, nevertheless obviously desirable that all three parts of the trilogy be read in conjunction with each other. The cross-references do not affect the argument of the essay.

Grateful acknowledgement is given to the late Mr. Arthur Koestler for permission to quote extracts from his book *The Sleepwalkers* and to Macmillan & Co. for permission to quote extracts from the late Lord (C.P.) Snow's book *The Physicists*.

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"Relativity is now accepted as a faith."
(*Treatise on Light* by Houston, a textbook on physics.)

1. Introduction to Modern Physics

Physics is traditionally defined as the study of all the material things in the universe that are not alive, or, if a more specific definition is sought, as the study of the properties of energy and matter.[1]

Its purpose is to help us to understand better the things we see, feel, hear and smell; and until this century those studying that science, even if they sometimes lost the way, directed their efforts at least ostensibly to such better understanding. This is no longer so: in our remarkable era even the pretence of pursuing the true aim of physics has been abandoned, as can be ascertained without difficulty by studying the recent works of many authoritative writers.

To demonstrate that what I have just asserted is true, I select as an example an extract from one of the best known works on the history of science, *A History of Science* by the late Sir William Dampier, who was a Fellow of the Royal Society; and I think the reader will find it remarkable for the number of admissions, not buried very deeply between the lines, that it makes about the recent developments in its author's own profession. Before beginning the passage, however, I must add a caution. The danger of using establishment writers to expose the nonsense of others is that, even as they do so, they will often impose on us further nonsense of their own; and thus, both in general and here in particular, my quotation of a writer should never be considered as an invitation to uncritical acceptance of what I quote. If this warning seems obscure, the meaning of it should emerge clearly enough from among the comments that I shall occasionally interpose in the passage by Sir William Dampier that now follows.

> "Towards the close of the nineteenth century atoms had shown signs of failure to account for the facts."

If atomic theory failed to account for the facts, lesser men might have abandoned it, as it had been abandoned once before two a half thousand years ago;[2] but not the

[1] The modern definition of physics is a slight modification of the traditional definition. "The science of the properties and inter-relations of matter and energy." (*Oxford English Dictionary*)

[2] Atomic theory had been advanced by two Greeks of the fifth century B.C., Leucippus and Democritus. ("Whatever be its value in philosophy, in science the Democritean atomic theory is nearer to the views now held than any of the systems which preceded or replaced it." - *A History of Science* by W.C. Dampier: p.25.)

heroes of nineteenth century science.

> "Kelvin's vortex atoms and Larmor's centres of aethereal strain were attempts to express in more fundamental terms what had hitherto been regarded as scientific concepts. Maxwell's proof that light is electromagnetic radiation foreshadowed the end of the elastic solid theory of a luminiferous ether and the identification of J. J. Thomson's corpuscles with the electrons of Lorentz and Larmor similarly turned matter into electricity."

Already, in the sentence just ended, we have an example of the dangers incurred when quoting from establishment scientists, even on the occasions when they are providing useful admissions about their own profession. Dampier has hardly started to help us see through one set of false assumptions before he is foisting upon us yet another set. Blandly though he tosses off the theories he refers to as facts, Maxwell's proof of the make-up of light is no proof, the identification of Thomson's corpuscles with electrons is by no means indisputably valid, and indeed the very electrons themselves of Lorentz and Larmor are purely hypothetical, all of which I shall show in some detail later in this chapter. Returning to Dampier (my emphasis added):

> "*Indubitably the world became less intelligible*... During the next stage, electrons and protons were used with increasing success in new physical theories. We grew so accustomed to handling them in thought that they became familiar ideas, till Bohr and Sommerfeld almost persuaded us that their wonderful atomic models represented physical, though not of course metaphysical, reality... From another angle, de Broglie and Schroedinger also resolved atoms or their parts into systems of waves and the waves may be mere alternations of probability."

The reader does not even need to read between the lines to see what is happening. He need only read what is there. By constant repetition that body of people called scientists, and after the scientists the public, became convinced that reality existed where observation and logic showed no reality to exist; and in due course the stage was reached where it was claimed and believed that matter - solid, touchable, visible, audible, smell-able matter; that which constitutes the entire physical world about us and everything that is physical of ourselves – was not actuality or reality but a mere wave of probability.[3]

[3] For the sake of completeness, I must make it clear that physicists do often admit, and even affirm, that they know that they are not talking about reality and that particles and waves do not exist; for in theory modern physics is less concerned with reality than with constructing models which enable them to make predictions. It need hardly be pointed out that basing science on models which are admittedly unreal is outrageously unsound philosophically, and also that to forget that they are unreal is a temptation that is both easy to fall into and most certainly fallen into in practice. This is not an unsupported assertion that I have invented. Professor Herbert Dingle, whom I shall quote often in this chapter, and who against any yardstick must be acknowledged as a leading authority, wrote in a discussion of this very subject in his book *Science at the Crossroads* (p.143) : "It is impossible to believe that men with this intelligence to achieve the near miracles of modern technology could be so stupid as to fall into (such an) elementary error had they not, through long familiarity with the words, unconsciously come to believe that mass, time, distance and such terms mean the same for hypothetical particles as for the world of the senses. *Physicists have forgotten that their language is metaphorical,* and interpret the language literally." (Emphasis added)

Dampier again (page 476):

> "The new quantum mechanics now hold the field and we have to leave our explanation of the phenomena in the form of mathematical equations. On the old idea of substance, matter was resolved into molecules and atoms, and then the atoms were analysed into protons and electrons. These in turn have now been dissolved into sources of radiation or into wave groups: into a mere set of events which proceed outward from the centre...
>
> "Similar results have been reached by the way of the doctrine of Relativity. To the philosopher of old, matter was in essence something extended in space which persisted through time. But space and time are now relative to the observer and there is no one cosmic space or cosmic time. Instead of persistent lumps of matter or electrons in a three dimensional space, we have a series of 'events' in a four-dimensional space-time. Forces at a distance, especially gravitational forces, have gone... Even the electrons, which for a time replaced particles of matter, have become but disembodied ghosts, mere wave forms. They are not even waves in our familiar space, or in Maxwell's ether, but in a four dimensional space-time, or in a scheme of probability, which our minds cannot picture in comprehensible terms."

And if there is one man who more than any other has come to be regarded as the personification of modern discovery in the field of physics it is the reputed giant among scientists whom I shall now introduce without further delay – Albert Einstein.

2. Introduction to Albert Einstein

Although the place of Einstein in the context of modern science has received brief mentions in another essay of mine (*Galileo versus the Geocentric Theory of the Universe*), there are at least two reasons which justify giving him the accolade of a treatment in which he is the principal hero.

The first such reason is that Einstein and what he represents are, by almost any standards of judgement, of the very highest importance. The concept of relativity attached to his name and propagated by him represents an attack on human reason so insidious and diabolical, and so successful, that no opportunity of demonstrating its falsity, and not only its falsity but, to anyone prepared to believe his own powers of reason, its blatantly obvious falsity, should be allowed to pass.

The second and almost exactly opposite reason is in order to provide sufficient opportunity to expose him as yet another legendary world figure of modern times who on the strength of his own talents was of no importance at all. By "of no importance" I mean of no importance except inasmuch as he was the convenient vehicle used for the task of launching Relativity Theory at the appropriate, even necessary,[4] moment to bring about yet another stage in the cumulative degeneration of science and the destruction of

[4] As is shown in paragraphs 25-34.

mankind's power to reason. Like another artificially created giant of the twentieth century, who is the subject of another essay I have written (*Winston Churchill*), if Einstein had not existed another would have been selected to fill his place, for he possessed no qualities which are not available in profusion in almost any place in any age.

Many will find this assertion so astonishing as to doubt that it is made with carefully chosen words. "One may like Einstein or dislike him," comes the retort, "approve of him or disapprove of him; but that he was one of the great geniuses of this or any age surely cannot be questioned. Look at his reputation. No modern book dealing in any generality with astronomy, physics or mathematics could omit his name; the splitting of the atom, which in the middle of the twentieth century altered the whole concept of warfare, is intimately associated with him; no discussion of the forces and personalities most responsible for the shape of modern civilisation could fail to give him prominent mention; probably no day passes without his name appearing frequently in newspaper articles and in television programmes; statues have been erected to him in capital cities; he was recipient of the Nobel Prize; in 1979 the centenary of his birth was commemorated all over the Western world with celebrations and exhibitions at which he was universally proclaimed as a man who had placed his stamp upon the science of the twentieth century and who would be considered one of the greatest thinkers of all time."

I stand by what I have said, however. All that the foregoing gives is valuable additional testimony to the concerted power which the occult forces can wield when they wish something untrue to be believed. The obstinate truth about Einstein is that in mathematics he was no more than competent and that among the so-called discoveries presented to the world under his name one can search in vain for one that was original. Had Einstein not been selected, for reasons which had nothing to do with intellectual ability, to act out a role which was deemed necessary for the furtherance of the war against God and civilisation, his claim to immortal fame would have been that of a talented and not-undistinguished physicist, a life-long Zionist,[5] an occasionally enthusiastic admirer of Stalin's Russia, and an eccentric who forbore to wear socks even on the occasions when he wore shoes instead of his more customary sandals. If we allow the very utmost in his favour, it is demonstrable that he would have been far less well-known than Riemann, Minkowski, Thomson, Fitzgerald, Maxwell, Lorentz, Larmor, Planck, Poincaré, Hilbert, Ricci, Levi-Civita, Bohr, Schroedinger and Heisenberg, all of whom were approximate contemporaries of Einstein's, all of whom were more competent and original in the areas of science which have made Einstein's name immortal, and none of whom will be known even as names to most readers who do not have specialist knowledge of mathematics and physics.

[5] In 1930 he wrote a book called *About Zionism*.

At this point an interesting question arises. Let us assume for the present that what I have just said is true and that what I shall set out to prove during much of the remainder of this chapter has already been proved. Why was Einstein chosen to play this role?

The question divides into two halves: why was it thought necessary that one man should be presented to the public as being responsible for the achievements, alleged or real, of a large number of other men, and why was Einstein in particular chosen to play that role?

To help give at least a partial answer to the first half of the question, there are two generalities which are relevant to consider. First, the enemies of society are bent on persuading us that mankind is evolving and progressing and that the intellectual capacities of the human being are steadily increasing. This deification of modern man - and what is being attempted is no less than that – is greatly assisted if the last century or so is shown to have produced intellects of unprecedented capacity, capable of opening the eyes of the world to truths which had remained hidden in all the previous centuries of his history. The second generality is that it is much easier to impose false beliefs on the world if they are personalised. If a theory is put forward without reference to the person who originated it, there will be a tendency for it to be judged on its merits and then, if it clearly has no merits, for it to be rejected. This is far from being the case if a theory, however ludicrously opposed to common sense, is put forward by a man of universally acknowledged genius. When that happens, the tendency will be for the theory to be examined with respect; if it cannot be understood, this will be ascribed to the incapacity of the person examining the theory; if it appears manifestly illogical, it will be assumed that the originator has grasped a logic which is beyond the reach of lesser mortals. In short, it will gradually become accepted on no better grounds than the authority of the person who has advanced it.

There is a further generality which is relevant to both halves of the question of why Einstein was chosen.

From the middle of the nineteenth century onwards, those presented to the world as the modern geniuses marking the turning points in civilisation have been Jews. I do not wish to exaggerate this, and it is certainly true that non-Jews too, such as Darwin at the beginning of the period and Lord Keynes in more recent times, have had their nonsense presented as majestic contributions to human knowledge. Nevertheless, if asked to name the three men whose writings had the greatest influence in shaping the modern world, few would go beyond Karl Marx, Sigmund Freud[6] and Albert Einstein.

[6] It must surely be significant that Freud and Einstein collaborated and wrote a book together (*Why War* in 1933).

Explanations for the phenomenon, adequate or otherwise, are suggested elsewhere in other papers that I have written. Here I record only the fact and the inference that can be derived from it. The Jews are entering into what they believe to be their inheritance.

If it be accepted that it was desirable to build up the reputation of a single man for the difficult task of imposing Relativity on the world and that that man should be a Jew, why was Einstein, out of all the other Jewish scientists available, chosen to play the role assigned to him? One can only speculate. Clearly his being a Zionist and a Communist would have recommended him highly to those who selected him;[7] it seems to be agreed by all who came into contact with him that he had much charm, probably indispensable in the task allotted to him; and eyewitness accounts of his lectures provide evidence of considerable abilities as an actor and a showman, which, for the successful accomplishment of the purpose for which he was used, are talents even more necessary than charm. There must, however, have been many other people with similar or better credentials even in a population restricted to people interested in physics. Failing some revelation by those who chose him, all that can be said is that we need have little doubt that he earned his duties and his privilege somehow. I have given some indication of what Isaac Newton did to earn the rewards that he received and is still receiving in this world. Those who recall this and take seriously verses eight and nine of the fourth chapter of St. Matthew[8] have little alternative to the belief that such fame and adulation as Einstein received in his lifetime and has received since, and which on the face of it were wholly undeserved, must have been earned at the expense of an extremely exacting bargain in respect of his immortal soul.

I said that there were three reasons for devoting a chapter specifically to Einstein, and so far I have mentioned only two. The third and possibly most important reason is that he provides another opportunity to show up the fallacy of the general belief that modern science, in every field but perhaps especially in mathematics and physics, is so complicated that it cannot be understood by the non-specialist, and that the layman has no choice but to rely on the words of experts with superior intelligence and training. Stripped of its disguises, which – as with other sciences and elite professions – are mostly jargon and bluff, Relativity, whether Special Theory or General Theory of Relativity, involves no major challenge to the intellect in order to be understood. Relativity is not merely nonsense, it is *simple* nonsense; and the only difficulty in seeing this lies in bringing oneself to believe it possible that anything so wholeheartedly accepted by so many intelligent

[7] The words "those who selected him" begs a question which I make no attempt to answer in this essay. A detailed context for these words will however be found in places in my other writings.

[8] "And the devil...showed him all the kingdoms of the world and the glory of them and said to him: All these will I give thee if falling down thou wilt adore me."

people really can be such *obvious* nonsense. As always, the reader must remember the Hans Anderson fable of the emperor who had no clothes. Overwhelming majority opinion, whose most distinguished and infamous blunder was its vote for the Crucifixion of Christ rather than that of Barabbas, is fallible, not only in matters of right or wrong and truth or falsehood, but even in matters where the rightness of one side of an argument is almost universally held to be virtually self-evident while the holding of the opposite opinion is considered by the acknowledged experts to be suggestive of insanity.

3. The Prelude to Relativity

Although I do not wish to delay for a second longer than necessary presenting to the reader the fruits of the man regarded as one of the greatest thinkers of all time, I think it essential before doing so to review briefly the historical events in the march of science that led up to the promulgation of Relativity theory. For it is vital to a clear understanding of the true nature of the theory to recognise that the announcement of the theory was no random event. On the contrary, as we shall now see in the context in which it appeared, Relativity was discovered because it was desperately needed. Relativity was indispensable in order, to quote Plato's aphorism, "to save the appearances." If it did not exist, it has been said of Switzerland, it would have to be invented. Relativity did not exist, and therefore it *was* invented.

As is made clear in almost all textbooks dealing with the history of mathematics and physics, the emergence of the theory of Relativity was intimately related to the Michelson-Morley experiment and its dramatic failure to show any velocity for the earth's travels through the ether. Explanations for that failure were strenuously sought. The obvious solution, that the earth was stationary, was, as has been seen in my essay *Galileo versus the Geocentric Theory of the Universe*, not even considered. A second possibility was that the instruments used in the experiment were not sufficiently sensitive for the purpose. At first sight this might seem to the layman not improbable; for if it be true that the earth is orbiting around the sun, its velocity through the ether is only one ten thousandth of the speed of light and the experiments are claimed to show that there is no discernable difference even of one hundred millionth of the speed of light – the quantities being measured, in other words, are extremely small. I think, however, that this is an area in which we can trust the scientists. Their ability to derive logical conclusions from experiments may not exist, but their ability to conduct experiments of extraordinary delicacy certainly does. Furthermore, not only has this particular experiment been reviewed time after time both in theory and with progressively more sophisticated equipment ever since, but the possibility that the apparatus may be the cause of the invariably nil result has never been seriously maintained; and it certainly would have been if this could have been justified, for the results of the experiment were not convenient to the scientific world.

A second possibility was that either the whole ether or that portion of the ether immediately surrounding the earth, moved along with the earth. As regards the first alternative, it was justifiably held to be unreasonable that the movement of all the ether in space should be caused by one planet as insignificant, in physical terms, as the earth; and the second alternative, that a portion of the ether moved with the earth at the same speed, contradicted any properties that could be ascribed to the ether by logical deduction.[9]

A third possible explanation for the failure of the Michelson-Morley experiment was that ether did not exist. Now it is true that Einstein did indeed abolish the ether - not of course by anything so rigorous as proof but merely by simple decree - but it is important to realise that he could never have done this in isolation, but only as part of a much larger and completely revolutionary scientific package. This is because, even though ether cannot be seen or weighed or directly experienced in any other way, its existence was too firmly and demonstrably established to be vulnerable to mere force of argument. For a multitude of phenomena such as the propagation across space of light, electricity and (however it is caused) gravity would be inexplicable without it, and for these and other reasons, its existence has not been seriously questioned from the days of the ancient Greek philosophers to the present century.[10]

4. Introduction to Relativity Theory

It is a matter of history that there was apparently also a fourth possibility. With the context of the appearance of Relativity now established, let us turn for excellent summary of the main features of the Special Theory of Relativity and the subsequent General Theory of Relativity to an article that appeared in 1977 in the London *Economist* and from which extracts have already been quoted in previous chapters. Surprised though the reader may be to find the theories so comprehensible, and even more surprised though he may be at the article's frankness, all the most important elements are included.

> "The famous Michelson-Morley experiment in 1887, though designed to establish the velocity of the earth with respect to the luminiferous[11] ether, failed to find any velocity. Such problems were the concern of an outstanding band of physicists at the turn of this century. Poincaré and Lorentz both

[9] Another reason why this alternative was considered impossible was the phenomenon known as stellar aberration which James Bradley had discovered in 1725. (See my paper *Galileo versus the Geocentric Theory of the Universe,* paragraphs 32 and 33.)

[10] For a summary of the most important arguments demonstrating the necessary existence of ether, I refer the reader to *Galileo versus the Geocentric Theory of the Universe,* paragraphs 23-27.

[11] Luminiferous means lightbearing.

postulated theories of relativity, but Einstein's was the most revolutionary. *Also, it was based on the minimum of both experimental evidence and mathematics*. (Einstein knew little mathematics at the time he brought out his special theory.)

"Einstein began with two assumptions for his special theory. One was that absolute motion and absolute rest could not be detected by any experiment. The other was that light travelled in a vacuum at a constant velocity, regardless of the motion of its source. He then showed that the position and time of an event could only be established relative to an arbitrarily chosen frame of reference. Thus, from the earth, the moon appears to be moving and the earth at rest, but to the man in the moon it appears that the moon is static and the earth moving. So far, so innocuous. But Einstein drew some surprising conclusions.

"One is that, as the speed of an object increases, relative to the observer, its length decreases and it gains mass: if you propel a one-foot ruler and a one-pound weight at 163,000 miles a second, the ruler will measure six inches and the weight will have a mass of two pounds. *If that sounds nutty, wait for more*. As the speed increases, time slows down. This so-called time dilation can be illustrated by a tale of twins. One stays on earth, while the other hurtles into space at extraordinary speed: the stay-at-home brother gets older faster. Furthermore, in Einstein's relativist universe, space and time are interchangeable. The farther an astronomer looks out into space, the farther back is he looking at time. He is a Wellsian time-traveller, or, as T.S. Eliot put it, 'All time is eternally present.'

"The general theory of relativity, which Einstein published in 1915, proved no less sensational. It is about the gravitational effect of the huge objects that make up the universe. According to Einstein, gravity curves space, which he says is finite but unbounded. The traveller heading off into space would describe a gigantic circle and eventually come back to where he started from; another space traveller, starting from the farthest point on the first astronaut's orbit, would define another, more distant circle." ("Einstein challenged", an article in *The Economist*, 5 February 1977. Emphases added)

That, good reader, although I shall tell you more, is all you need to know. It is all that Aristotle[12] would have needed to know. I mention too, since it is considered later in this chapter, that in the illustration of the twins, to which the article refers in the second paragraph, Einstein's concept of relativity means that, seen from the point of view of the twin hurtling into space, it is the twin remaining on earth who is travelling and aging more slowly, so that each twin ends up older than the other. This is the famous "twin paradox" or "clock paradox". But in fact what need is there to add evidence of insanity to evidence of insanity? Professor Herbert Dingle, who, as will be seen, could reasonably claim by the time he wrote his last book on the subject to have as great a competence on the subject as anyone in the world, described Relativity as less plausible and less supported by observation than Ptolemaic astronomy. Aristotle would have seen at a glance that the theories had no connection whatever with observation, and, if possible, still less connection with common sense; and no further time would have been wasted.

[12] For the reason for my bringing in Aristotle here and subsequently in this essay, see *Galileo versus the Geocentric Theory of the Universe*.

As we embark on our investigations, I emphasise most strongly, as is made necessary by the fact that our age has a greater ability to ignore common sense than that of Aristotle, that we must not be shy and we must not be hypnotised by the mystique which surrounds the subject. Although the theory of Relativity is generally believed to be so abstruse that only a select body of experts can understand it, the man who, as I shall show, was in his day probably the greatest living expert on the subject, Professor Dingle said that this was quite false. "The theory itself is very simple, but it has been quite unnecessarily [he is wrong of course; it is *very* necessary! - N.M.G.] enveloped in a cloak of metaphysical obscurity which has really nothing to do with it." (*Science at the Crossroads* by Herbert Dingle: p.16.) Nonsense can be dressed up in jargon to overwhelm the laity and even other members of the relevant profession - in due course[13] I shall give an example of this being done – but it remains nonsense and can easily be exposed as such. Diogenes of old, when the Sophists tried to prove that there was no such thing as motion, simply got up and walked.

There is in fact no *need* to be shy. Whenever a new outrage to commonsense is rammed down the throats of the public as a beautiful new truth, the early stages of the indoctrination always seem to be accompanied by protests from men of intelligence, of sufficient qualifications to give their views authority, and of some residual integrity. It was so when the doctors Jenner and Pasteur gave their murderous theories[14] to the world; it was so when Galileo tried to propagate Copernicanism; and it has been so with Relativity, in connection with which the list of dissidents, though unpublicised, is long and distinguished.

5. Some Opposition to Relativity Theory

Let us look at some of the Relativity dissidents.

Lord Rutherford, for example, "is reputed to have said that any Anglo-Saxon would have the sense to see that the theory of Relativity is nonsense",[15] and went on with his experiments, ignoring the whole thing.[16] Now it is arguable that any Anglo-Saxon would hold the same opinion about the life's work of Lord Rutherford, and I am certainly not going to assert that he was in closer touch with reality than his colleagues. It was he who first propounded the theory that an atom was a miniature

[13] In paragraphs 120-122.

[14] For justification of the term "murderous" as applied to the theories of Jenner and Pasteur, see my paper *Disease, Health, Medicine and Nutrition*.

[15] Article in the *Economist* from which extract quoted in paragraphs 30-33 was taken. See also paragraph 182.

[16] *Science at the Crossroads* by Herbert Dingle: p.180.

solar system consisting of a tiny, relatively massive nucleus surrounded by planetary electrons, all held together by electrical forces; and to him belongs the credit for "discovering" in 1902 that an atom had electrons, in 1911 that it had a nucleus and in 1914 that it had protons.[17] And I qualify the word "discovering" by the use of inverted commas advisedly, because, not only is the supposed atom too small to be seen, touched, weighed or in any other way detected (and therefore proved to exist) by any human sense or mechanical instrument, but the nucleus, which forms part of the atom, is a mere 1/50,000 approximately (one likes the word "approximately" that the scientists modestly use in this context) of the atom, and in turn the proton is only a minute part of the nucleus. We can either be grateful that, when considering whether or not to embark on his search, Rutherford was not subject to the ordinary mortal's aversion for the almost infinitely easier task of searching haystacks for needles which may not even be there; or we can sorrow over a generation which approves vast expenditure of effort on unprovable speculations of no practical worth and at the same time condemns mediaeval scholars for allegedly considering the numbers of angels that can dance on the end of a pin.[18] What cannot be denied, however, is that the scornful dismissal[19] of Relativity by Lord Rutherford is a dismissal by a voice that is authoritative.

Who else?

Charles Lane Poor, Professor of Celestial Mechanics at Columbia University and the author of a number of standard textbooks on astronomy,[20] wrote the first significant book of criticism of Einsteinian reasoning and Relativity Theory of which I am aware, *Gravitation Against Relativity*, published in 1922, and followed this up with two short papers, *The Relativity Motion of Mercury a Mathematical Illusion* and *Relativity and the Motion of Mercury*, published in 1924 and 1925 respectively. We have not yet reached the appropriate point at which to embark on the refutation in detail of Einstein's proposed proofs of his Theory, so I shall restrict myself here to quoting a very valid general point that Professor Poor makes, drawing attention to the dishonesty of the scientific method of Einstein and his followers.

> "The Relativity Theory strikes directly at our fundamental concepts as to the structure of the universe; its conclusions are startling and completely upsetting to our common-sense way of looking at

[17] These discoveries left only the neutron to discover which James Chadwick duly did in 1932 until it was found that atoms contained large numbers of other kinds of particles such as mesons and deuterons.

[18] Whether or not atomic theory has any basis in reality is examined in some detail in Appendix 6.

[19] "Lord Rutherford...could be more accurately described as scornful rather than as critical of the relativity theory." (*Science at the Crossroads* by Herbert Dingle: p.96)

[20] For instance The Solar System (his best known), Nautical Science, and Simplified Navigation.

physical and astronomical phenomena. To have such a theory accepted, it would seem that the evidence in its favour must be overwhelming, that the experiments cited by its supporters must be clear-cut and admit no other solution. The burden of proof should be on the relativist, and it should be clearly shown in each case of experiment, cited by him, that the relativity theory is *necessary* and *sufficient* explanation; it should be established beyond no reasonable doubt, not only that the phenomena can be explained by the Relativity Theory, but that no other hypothesis or theory can equally well account for the observed facts.

"Has this been done?"

I give just one of Poor's examples which shows that it has not. One of Einstein's proofs is the Fizeau experiment on the velocity of light in a stream of flowing water. This experiment is described in paragraphs 166, 166F1 and 166F2 of my paper *Galileo versus the Geocentric Theory of the Universe*, but in fact, as the reader will see, it is not necessary to understand it to see from what follows the dishonesty of Einstein's method clearly exposed.

"The results of Fizeau's experiments are in accord with the heretofore accepted laws of optics. Sir Oliver Lodge finds them to be in strict accord with classical ideas of a stationary ether and with the ordinary laws of optical phenomena. Lorentz also gave a satisfactory explanation of these results...

"The Relativity Theory can, however, also explain the results of these experiments. By using approximations but discarding certain small terms as negligible, Einstein succeeds in bringing his formulae into close accord with observed facts, and in showing that these experiments do not invalidate his theories. But the fact that Lorentz had fully explained the phenomena long before the Relativity theory was formulated 'does not in the least,' according to Einstein, diminish the conclusiveness of the experiment as a crucial test in favour of the theory of relativity, for the electrodynamics of Maxwell-Lorentz, on which the original theory was based, in no way opposes the theory. Rather has the latter been developed from electrodynamics as an astoundingly simple combination and generalisation of the hypotheses, formerly independent of each other, on which electrodynamics was built.'

"These two sentences of Einstein are, from one point of view, as important as any in his work on Relativity. They give a direct insight into his methods of reasoning. Here is an experiment, the details do not matter, an experiment claimed by Einstein as a 'crucial test' of his theories, yet in the very sentence in which this claim is advanced he admits that other theories, *the very theories he attempts to overthrow* (my emphasis – N.M.G.), can equally well explain the phenomena. How can an experiment, equally well explained by several different theories, be a 'crucial test' in favour of one of them?"[21]

It is worth adding that the shifting of the burden of proof to where it does not belong is a favourite tactic of fraudulent scientists. We saw an example of it in our survey of Galileo.[22]

I shall return to Professor Poor later in this essay. Meanwhile there are many other

[21] Gravitation versus Relativity - A Non-Technical Explanation of the Fundamental Principles of the Astronomical Evidence Cited as Proof of the Generalized Theory of Relativity by Charles Lane Poor: p.55.

[22] See Galileo versus the Geocentric Theory of the Universe paragraphs 95-101 and 109-111.

important authorities who have dismissed Einstein to note.

Dr. Arthur Lynch, a distinguished mathematician, in 1932 wrote the next significant book in criticism of Einstein and Relativity, *The Case Against Einstein*, from which I shall quote frequently in this chapter. In 1971, Dr. Louis Essen, another distinguished mathematician, a Fellow of the Royal Society, and described by Sir Charles Darwin, one time director of the National Physical Laboratory where Essen's work is conducted, as probably the world's greatest authority on the practical problem of timekeeping,[23] wrote a devastating demolition called *Special Theory of Relativity - A Critical Analysis*[24] which included the statement that it was not a physical theory but a number of sometimes contradictory assumptions. Dr. G. Burniston Brown, Reader in Physics at University College, London, published several criticisms of the theory not only drawing attention to particular details but claiming that the Maxwell-Lorentz electromagnetic theory, which Special Relativity was designed to protect, was inherently faulty, thus automatically condemning the theory which had made electromagnetic theory appear plausible. Among examples of distinguished scientists who admitted privately (in writing) that they did not understand the theory but refused to say so publicly are Lord Blackett (then President of the Royal Society), Lord Woolley (Astronomer Royal), Dame Kathleen Lonsdale (who called the theory "esoteric nonsense") and Sir Bernard Lovell (even though the theory is profoundly related to theories of cosmology with which radio--astronomy, and therefore Lovell, is largely concerned).[25] M. Bouasse, Professor of Physics at the University of Toulouse, went so far as to speak of the "insanities of the Relativists."[26]

6. Professor Dingle

All these authoritative and weighty criticisms are of slight importance by comparison with an indictment published in 1972 in a book called *Science at the Crossroads* which,given the combination of what is revealed in it and the authority of the man who wrote it, is one of the truly sensational books of all time, and from which information and extracts have already been cited in this chapter. Let us deal immediately with the qualifications of the author, Professor Herbert Dingle, for writing such a book. On page 105, with considerable embarrassment but having decided that he was compelled to present the

[23] *Science at the Crossroads* by Herbert Dingle: p.114.

[24] Part of the Introduction to this work by Dr. Essen is reproduced in appendix 1.

[25] The circumstances of the statements of these scientists is given in *Science at the Crossroads* by Herbert Dingle.

[26] *The Case Against Einstein* by Arthur Lynch: p.197.

situation faithfully and completely, he wrote as follows: "To the best of my knowledge there is no one now living who can give objective evidence that he is more competent in the subject than I am." Of this claim it can be said, not only that it has never been publicly contradicted, although many establishment scientists must have ached to do so, but, more importantly still, that the evidence in support of it is truly impressive. In 1922, three years after Relativity first attracted the attention of the public, he wrote *Relativity for All*, one of the first textbooks on the subject. During the following fifty years he studied the theory intensively and discussed it with all the physicists whose names are best known in connection with it; such as Einstein, Eddington, Tolman, Whittaker, Schroedinger, Born and Bridgman. His second book on the subject, *The Special Theory of Relativity*, remained for long a standard work on the subject, much used in English and American universities. One of the two articles on the subject of Relativity in *Encyclopaedia Britannica* was written by him. When Einstein died Dingle was chosen by B.B.C. television to broadcast a tribute to him. And so on.

And in 1959 Dingle suddenly woke up to an impossible internal contradiction in the theory that was so obvious that a schoolboy could be expected to notice it in scarcely more than an instant. This was simply that the theory required each of two clocks to work faster than the other, each of two twins to age more slowly than the other, each of two masses to be greater than the other, each of two measuring rods to be shorter than the other. No, I am not exaggerating either the simplicity of Dingle's discovery or the obviousness of the fallacy. Here is what Dingle himself says (*Science at the Crossroads*: pp. 17 and 45):

> "It would naturally be supposed that the point at issue...must be too subtle and profound for the ordinary reader to be expected to understand it. On the contrary, the point at issue is of the most extreme simplicity. According to the theory, if you have two exactly similar clocks, A and B, and one is moving with respect to the other, they must work at different rates, i.e. one works more slowly than the other. But the theory also requires that you cannot distinguish which clock is the 'moving' one; it is equally true to say that A rests while B moves and that B rests while A moves. The question therefore arises: how does one determine, consistently with the theory, which clock works the more slowly?... [To quote] one of Einstein's own examples which is the best known and the one most often claimed to have been indirectly established by experiment, 'Thence we conclude that a balance-clock at the equator must go more slowly, by a very small amount, than a precisely similar clock situated at one of the poles under otherwise identical conditions.' Applied to this example, the question is: what entitled Einstein to conclude *from his theory* that the equatorial clock and not the polar clock worked more slowly? A single sentence would be sufficient for an answer and such a limitation is highly desirable to prevent observation of the essential point by irrelevant considerations.
>
> "Unless this question is answerable, the theory unavoidably requires that A works more slowly than B and B more slowly than A which it requires no super-intelligence to see is impossible. Now, clearly a theory that requires an impossibility cannot be true, and scientific integrity requires, therefore, either that the question just posed shall be answered, or else that the theory shall be acknowledged to be false."

"Here is a paradox..." wrote Sir Arthur Eddington, one of the most enthusiastic and influential supporters of Relativity.

"...beyond even the imagination of Dean Swift. Gulliver regarded the Lilliputians as a race of dwarfs; and the Lilluputians regarded Gulliver as a giant. That is natural. If the Lilliputians had appeared dwarfs to Gulliver, and Gulliver has appeared a dwarf to the Lilliputians - but no! That is too absurd for fiction, and is an idea only to be found in the sober pages of science." (*Space, Time and Gravitation* by A.S. Eddington: chapter 1)

For thirteen years Dingle asked for an answer to his proof that Einstein's Special Theory was false. His question was dealt with in consistent fashion by the most distinguished scientists in the world, by the Royal Society, by the scientific journals in England and America, and even in the lay press with the sole exception of *The Listener*. It was "ignored, evaded, suppressed and indeed treated in every possible way except that of answering it by the whole scientific world." (*Science at the Crossroads*: p.15.) For a brief summary of the results of Dingle's struggles to obtain an answer to his question, which incidentally are recorded in full and enthralling detail in his book, it would be difficult to improve upon the following letter written to the London *Times* by the Rev. W. J. Platt following his having read correspondence in the only periodical which did not refuse to handle the subject. Dingle reproduces it on page 91 of *Science at the Crossroads*.

"In the *Listener* last year there appeared a long correspondence following an article entitled 'Definitions and Realities' by Professor H. Dingle, which was published on July 3. In its course, certain alleged facts transpired which, if true, are manifestly of public concern. I have been waiting for some authoritative statement showing either that the assertions were unfounded or that steps were being taken to rectify a dangerous situation. As far as I am aware, none has appeared, and the implications of the matter seem so serious that public interest demands one without delay.

"Professor Dingle, who, I believe, is recognised as a leading authority on Einstein's special relativity theory, on which physicists acknowledge that they rely, has advanced what he claims to be a fatal criticism of that theory. On such a matter the layman is, of course, not qualified to speak: he is, however, entitled to an assurance that the scientific world remains true to its principle of answering or accepting informed criticism. This appears to be not only, as it has always been, a moral duty of scientists, but in these days, when the experiments performed are of such enormous potential danger, a necessity. According to the uncontradicted assertion in the *Listener* of October 30 last, however, the President of the Royal Society failed to give an assurance that scientific integrity is still preserved. If earlier statements in the correspondence are true, he could hardly, of course, do so.

"May I give a few of these statements?

"(1) Some of the most eminent workers in modern physics have admitted privately that they either do not understand the theory or regard it as nonsensical: nevertheless, they continue to teach it to students and to use it in high energy experiments.

"(2) It is stated that the Royal Society has declared privately that Professor Dingle's fallacy is 'too elementary even to be instructive,' but the Society has not stated what the fallacy is, and the journal *Nature*, which had previously published the criticism without eliciting a refutation of it, has refused to publish a letter from Professor Dingle asking that the Royal Society shall state the fallacy.

"(3) *New Scientist*, after asking Professor Dingle to write an article on public dangers inherent in modern scientific research in which he would 'not be restricted in any way,' refused to publish the article offered, which stated these and similar facts, on the ground that 'refutation of a theory surely depends on the consensus of scientific opinion' - not now, it seems, on reasoned argument.

"(4) After correspondence between Professor Dingle and Professor J.L. Synge, who, I understand, is an acknowledged mathematical authority on relativity, the latter, in a letter published in *Nature*, agreed that the point at issue was not an abstruse mathematical one but concerned only the possible behaviour of clocks, and Synge 'cast his vote' for relativity. It is accepted that relativity, which concerns itself with matters of space and time, must be dependent on measurement of time, i.e., on clocks. Dingle replied that the matter was not to be decided by voting and that his demand of one clock was that it should not work both faster and slower at the same time than another. This reply was not allowed publication in *Nature*, a fact which led two correspondents in the *Listener* to assume that Dingle had not replied.

"The situation thus disclosed, if the facts are as stated, is alarming. According to Dingle's closing letter (October 30) all that is required to settle the matter is an answer to the question: What is it, on Einstein's theory, that determines which of two clocks, relatively moving uniformly, lags behind the other, as Einstein says. Dingle's contention is that to be true the theory demands that the clocks must work faster and slower at the same time. It is therefore untenable. I repeat, Sir, that I make no attempt to judge the issue, but ask, in the public interest, since the foregoing assertions have been published and remain uncontradicted, that an authoritative and conclusive assurance shall be given that scientific integrity continues to exist."

This letter was submitted to *The Times* on 9th August 1970, and was acknowledged. It was not published.

"*Surely* the Special Theory has been proved?

"Its physical characteristics involve some intellectual subtlety and this Professor Dingle was never able to acquire; but the special relativity theory is the bedrock on which all physical theory now rests and its accuracy is guaranteed by the behaviour of high velocity particles which are observed every day in laboratories throughout the world to be in exact accordance with the predictions of the theory."

Thus wrote D. F. Lawden, Professor of Mathematics in the University of Aston in Birmingham, in a letter to the *Daily Telegraph* published on 2lst June 1980. He also added:

"Far from being 'esoteric nonsense', as Dame Kathleen Lonsdale described it, the theory is of no great mathematical difficulty and is now frequently taught to first and second year university students. It is found to be in complete conformity with the facts as they are known today and no one can ask more of any theory.

"If you take a particle (a mu-meson) that decays in two microseconds when it rests in the laboratory and accelerate to such an energy that relativity says that it takes sixty microseconds to decay, then it does."[27]

It is not true. It is none of it true. Neither the velocity nor the mass nor the lifetime of a particle has ever been measured, as Professor Waldron of Ulster Polytechnic pointed out in a reply to Professor Lawden which was published a week later.

"I would strongly disagree with Professor Lawden's final sentence on two grounds.

"Special Relativity is not in complete conformity with the facts as they are known today; moreover

[27] Letter by Dr. Wm. Randolf Franklin published in May 1979 issue of the *Bulletin of the Tychonian Society*.

> one must ask more than such conformity of any theory - one must ask it to be internally consistent... As long as Dingle's question remains unanswered and my argument remains unchallenged, Einstein's theory cannot be regarded as a suitable basis for modern physics. Not even if it is endorsed by Professor Lawden's first year students."

Accurate though his letter is as far as it goes, even Professor Waldron misses the real point - which is that the properties and activities of the particles not only *have not* been measured, they *cannot* be measured. As Professor Dingle explains:

> "The interpretation of the particles as 'clocks' and of the observed phenomena as their 'rates', and the assumption that they move with the velocities ascribed to them (it is, of course, quite impossible to observe them; their existence and properties have all to be inferred on theoretical grounds) depend on the truth of a theory that itself depends on the truth of the Lorentz transformation,[28] so the argument is circular: the observation proves the physical truth of the Lorentz transformation only if we first accept a theory which itself requires the transformation to be physically true. An experimental test of this requirement of the special relativity theory is therefore at present impracticable, and the claims often advanced that such a test has been made are spurious."[29]

Elsewhere in his book he adds:

> "What, then, can we mean when we say that special relativity receives confirmation from the verification of its prediction that the mass of a body increases with its velocity? I need hardly say that the 'velocity' of the electron in the supposed verification resembles Roger Bannister's velocity of a mile in four minutes no more closely than the 'mass' of the electron resembles that of the lump of lead, in order to make it clear that what we confirm by the experiments (i.e. by the observations and our inferences from them) is that the whole complex of conceptions that yields the highly metaphorical 'mass' and 'velocity' hangs together if we include special relativity (or Lorentz's theory) as a part of it... [Since] the theory (Lorentz's or Einstein's) is conceived for the purpose of justifying an essential part of that complex - to wit, the Maxwell-Lorentz theory - it proves nothing at all. All that the experiments so far performed (for example, those showing increase of mass with velocity, extended lifetimes of cosmic ray particles, etc.) show is that if we assume the electromagnetic equations we must correct them by the Lorentz transformation; they throw no light at all on the physical interpretation of the equations.
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> "It is like claiming, as a proof that a man always speaks the truth, the fact that he says he does... Through long familiarity with their world, physicists have unconsciously come to believe that mass, time, distance, and such terms mean the same for hypothetical particles as for the senses. They have forgotten that their world is metaphorical, and interpret the language literally."[30]

What has happened is that the scientists, freed from the so-called tyranny of disciplines of the Aristotelian scientific methods, have created their own entirely arbitrary fairy-land and now live in it.

[28] See footnote 39.

[29] *Science at the Crossroads* by Herbert Dingle: p.34.

[30] Ibid: pp.142, 143 and 232. (I have altered Dingle's order, but without affecting the meaning of what he is conveying.)

7. Simple Hoax and Elaborate Fraud

Length shrinks, mass increases, time shrinks, straight lines form circles. Constants, in fact, cease to be constants and nature is now seen not to act in accordance with nature. How is all this done? Where is the fallacy in the equation which allows the mathematics to prove the impossible? How is the conjuring trick achieved? It is done by simple hoax and elaborate fraud. Let us examine both.

No apology is needed for describing Einstein's achievement as a conjuring trick. Conjuring tricks are accomplished by illusion, such as sleight-of-hand, which, without the assistance of misdirection, would be exposed in an instant; yet hours can be spent staring at them without seeing wherein the fallacy lies. Let us confront ourselves with the problem facing the swindlers. How can we demonstrate to the geniuses in the scientific professions and to the gullible masses that three constants - length, mass and time – are in fact not constants but variables?

The answer is simple and beautiful, even though it could never have served until our own lunatic century. Choose a *fourth* element, which clearly *is* a variable, such as the speed of light; describe it as – or rather, "postulate" (Einstein's term) that it is – a constant; forbear to fear – science has travelled far since the days of Euclid – that anything so rigorous as self-evident truth will be required of our postulate;[31] and now crank out some mathematics. And, naturally, we shall find that if the variable is falsely inserted into the calculations *as a constant*, the mathematics cannot fail to demonstrate that the constants are variables.

Is it in fact certain that the speed of light, generally agreed to be in the region of 186,000 miles or 300,000 kilometres per second, is, in my words, clearly a variable? By the time Einstein had finished postulating about the behaviour of light he left no possibility whatever that the speed of light, as it was incorporated into his theory, could in reality be anything but variable. He made three main *assumptions*, each of which we shall consider.

The first is that the measurements taken *within* the earth's atmosphere over *limited* distances[32] are equally valid *outside* the earth's atmosphere over *vast* distances. This

[31] See paragraph 247 for a summary of the classical (and correct) method of arriving at a knowledge of the truth. Euclid used only five postulates (in addition to five "common notions"), it being realised that the number of assumed truths must be kept to the absolute minimum.

[32] One obvious possible source of error in this assumption is that light may - and very probably does - move more

assumption, which was not even Einstein's innovation, has no evidence,[33] and not even much probability,[34] to support it. Furthermore, once Relativity is introduced, why should there be any valid reason for holding that velocity is an absolute while denying that space and time, the only concepts in which velocity could have any meaning, are absolutes? As Dingle said, "light, according to Einstein, consisted of waves, with a definite length, frequency and velocity, in nothing." (Try to imagine the waves of the sea without the sea.) "It was the grin without the Cheshire cat."[35] If the Sophists had thought up such an absurdity, they might have left even Diogenes gaping.[36]

Einstein's second assumption about light was that no greater velocity than the speed of light is possible to anything anywhere in the universe. I mention this not because of its importance in any exercise in detecting the flaws in his theory – indeed it is not easy to see that it is of any value to his theory[37] – but as a sample of the treasures which our great thinker so generously showered onto the world.[38] The assertion is of course no more than an article of blind faith which he had not the slightest grounds for putting forward. Had human beings been constructed without the gift of eyesight and therefore only able to receive whatever information was revealed by the other four senses, Einstein would have had exactly as much reason for saying that no velocity greater than the speed of sound was possible in the universe.

Of these two assumptions, at least it can be said that, if it is impossible to prove them right, it is also impossible to prove them wrong. As one comes to his third assumption one almost wonders if Einstein had paused and worried lest by coincidence his first two might have been correct after all in spite of the reckless way at which they had arrived. Dread the thought! For, if his variable which he had decreed to be a

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slowly inside than outside the earth's atmosphere, as it certainly moves more slowly when travelling through water. And two other possible sources of error are that of potential variation in speed caused by change of direction and that of error owing to inadequacy of the instruments used in making the measurements.

[33] See Sir Isaac Newton and Modern Astronomy, paragraphs 123-127.

[34] It will be remembered, for instance, both that light demonstrably travels more slowly through water than through air (so that an analogous difference might be expected between air and space, and indeed all Relativists accept that the velocity of light in air is slower than in a so-called vacuum) and that falling bodies provide an example of speed which increases Over distance rather than remaining constant.

[35] Ibid: p.155.

[36] See paragraph 35, last sentence.

[37] Presumably the assumption does help him to answer the awkward question of why the speed of light should be the one and only absolute in the universe. It also helps him to provide us with some further remarkable pieces of information, one of which is that "as the speed of an object approaches that of light its mass becomes infinite." (See *Einstein* by Jeremy Bernstein: p.80)

[38] How, we must keep asking ourselves in admiration, does Einstein manage to find out all these wonderful things?

constant should actually turn out to *be* a constant, equations would fail to prove the constants of time and space to be the variables he had decreed them to be. His third assumption, whatever the feelings that prompted it, is his masterpiece, ensuring that there was no possibility that he would be right. It is that the speed of light is a constant, *independent of the speed at which its source is moving and independent of the speed at which the recipient is moving.*

The first half of this third assumption is bad enough even if, although as usual there is no possible ground for the assumption, the mind can perhaps grasp it. If a man in a moving railway carriage fires a gun in the direction in which the carriage is moving, the speed of the bullet is that at which it leaves the gun plus that of the train. Not so, according to Einstein, in respect of the speed of light, which remains the equivalent to that at which the bullet leaves the gun. As I have said, we can grasp it even if we see no reason to believe it. The second half, however, perhaps the most fundamental and essential part of the theory, truly boggles the mind: it states in effect that light in a vacuum always passes through a measuring device at its constant velocity, **c**, of 300,000 kilometres per second *whether the measuring device is racing towards or running away from the light source.* If you throw a ball at a man it will hit him no harder if he is running towards it than if he is stationary. It might occur to the reader to wonder whether the motion of a source of light might in some way compress the light waves (on the hypothesis that light moves in waves) by an appropriate amount and expand them if it were moving in the opposite direction to the light, so that the speed of the light itself remained unaffected; and additionally whether the motion of the recipient of the light could cause such compression or expansion. For the purpose of assessing Einstein's Relativity Theory he need give it no further thought. Such contraction and expansion could only take place if there were resistance to cause it; and such resistance could only exist if there were an ether. Not only did Einstein postulate that such resistance could only exist if there were an ether. Not only did Einstein postulate that there was no ether, but it was necessary for his theory that he do so. "When a Relativist tells us that by adding to a quantity something of its own kind we leave it unaltered," wrote Dr. Arthur Lynch; "if anyone fails here to use his common sense, I say that he is deficient in faculties essential to the pursuit of science."[39] I say so too. And so, I am sure, would have Diogenes.[40]

[39] *The Case Against Einstein* by Arthur Lynch: p.67. Dr. Lynch also quotes one of Einstein's most learned and faithful disciples, M. Pierre Bricout, as having remarked, perhaps half in admiration and half in terror: "The new theory wounds in more than one point our philosophic conception of the Universe." (p.53)

[40] In order to make every possible attempt to be fair to Einstein, it must be pointed out that there is some analogy between his assumed behaviour of light and the actual behaviour of sound; for, as can be readily noticed by watching and listening to aeroplanes at the same time, sound can be "left behind" by a moving source. We *can*, therefore, envisage the possibility that the velocity of light be not affected by the velocity of the *transmitter*. To suppose, however, that it should not vary in any way with any motion on the part of the receiver is a remarkable intellectual feat. And anyway Einstein himself removed any possibility that the sound-wave analogy could be apposite, even as regards

That is the sleight of hand; and misdirection ensures that attention is almost never directed at it. Mathematicians produce mathematics to prove that the train and twin paradoxes are impossible. Other mathematicians produce mathematics to show that they are not paradoxes at all and have been observed repeatedly in laboratories. Some claim to prove that Einstein applied the "classical" Lorentz-Fitzgerald contraction and Lorentz transformations in areas where they had no applicability.[41] Yet others point to enormous numbers of experiments which support their applicability. The layman who seeks the truth, if he is aware at all that such arguments are taking place, can reasonably do no more than sigh at the thought of weighing up the arguments and mathematics of one distinguished mathematician or physicist against those of another and decide to accept the prevailing majority opinion. Euler faced the non-mathematical sceptic, Diderot, with the challenge, "Sir, $a + b^n/n = x$, hence God exists: reply!" Diderot did not reply and Euler's case prevailed. Well, I hope the reader now realises that the theory rests on an assumption which even a six-year-old child knows to be false; for the statement that the speed of light is constant irrespective of the motion of its source of target is literally the same as saying that two plus two equals not four but two.[42]

The sleight of hand having slipped through unobserved, all that is necessary is to build up the illusion. Since mathematical formulae have been chosen to suit the effect which needs explaining, the predicted mathematical answers will appear. Now we can claim that the hypothesis has been proved. Shall we raise it to the status of law? No need:

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motion of the transmitter, by asserting that there was no substance analogous to air, i.e. ether, through which light travelled.

[41] Such claims are certainly in part correct. (This footnote is probably the most difficult part of this chapter. But do not break off in dismay! If I can understand it, so can you!) In order to explain the negative result of the Michelson-Morley experiment, Professor Fitzgerald of Dublin had suggested, on the basis of the electrical theory of matter which was prominent in the 1890's, that the instrument holding the mirror used in the experiment had expanded when moving. This, a supposed lengthening of a moving body at right angles to the direction of its motion, is what is known as the Fitzgerald Contraction. (As is clear from the preceding sentence, the Fitzgerald Contraction should in fact be named the Fitzgerald Expansion. Because of its incorrect name even most mathematical scholars incorrectly state that what Fitzgerald hypothesised was a contraction of the longitudinal arm of the interferometer rather than an expansion of the transverse arm; but Professor Dingle, on page 163 of *Science at the Crossroads*, quotes the original source to show that they are wrong.

[42] Einstein in due course abandoned his doctrine of the absolute invariance of time but, as Dr. Lynch points out (Ibid: p.71), the abandonment was only a make-shift. He had to retain the most unreasonable part of it, the dogma of the invariance of the velocity of light relative to an object irrespective of the movement of that object, for that is indispensable for his explanation of the Michelson-Morley experiment and is the Foundation Stone of Relativity. Some of his less courageous followers try to explain it away as being a mere illusory appearance, but in doing so they are of course admitting that behind the illusion lies the reality of absolutes are and thus disposing of the whole basis of relativity. Furthermore, it could not possibly lead to an explanation of any of the objective phenomena for which the theory was designed. Finally, as Dingle points out: "The supposition that the theory is concerned merely with appearances was not Einstein's interpretation of the result, nor has it been that of any of his followers when dealing with this point alone and not seeking an interpretation that will dispose of some other difficulty." (*Science at the Crossroads* by Herbert Dingle: p.236)

the mind of modern man is quite happy to equate "theory" with absolute fact. Further experiments will sometimes give approximately right answers which can be held to reinforce the theory, sometimes wrong answers which can be presented in such a way as to do the credibility of the theory no harm. When an experiment throws up a wrong answer, we shall not accept that a wrong answer invalidates our theory; we merely add to it a subsidiary hypothesis with supplementary hypotheses – we can always "save the appearances of our quaint opinions", to borrow from Milton – and repeat this process as often as is necessary.[43] This is exactly how Relativity was built up.

We have briefly examined Special Theory, first expounded by Einstein in 1905. By 1915 he had expanded the Special Theory into his General Theory of Relativity. "Many physicists believe this theory to be the most perfect and aesthetically beautiful creation in physics, perhaps in all science,"[44] writes one of his admiring biographers. We must ensure that we do not neglect such a work of intellect and art. It is of majestic simplicity:

> "Gravitation was not treated as a force but as an intrinsic curvature of space-time. Small bodies such as the planets moved in orbits round the sun not because the sun attracted them but because in the curved space-time around the sun there simply were no straight world lines.[45]

The concept of gravity's being a result of geometry rather than a force can be explained by analogy. For example a billiard ball on a billiard table constructed with depressions around the holes would roll towards the holes and accelerate towards them as if it were pulled by the holes themselves. Either the geometry of the billiard table or some attracting power of the holes, acting at a distance with the help of the "ghost fingers" necessitated by Newton's theory,[46] would create the same effect.

> "In his General Principle of Relativity Einstein made this following postulate: that the laws of nature were the same for all observers moving in any manner relative to one another; that the geometry of spacetime was non-Euclidean; that all gravitational motions take place along the shortest paths in spacetime; and that the curvature of a given region of space-time was dependent upon the amount of matter in that region. Combining these postulates, Einstein selected as his model for space-time a restricted type of the non-Euclidean geometry invented by Bernhard Riemann, 1826-66. The properties of Einstein's model were such that all observers moving relatively within it were symmetrical

[43] This description of the procedure is no exaggeration. Dr. Louis Essen, a distinguished mathematician and member of the Royal Society, wrote the following in an article called *A Criticism of the Special Theory of Relativity*: (*Instauration*, March 1977 issue) "Einstein, commenting on the notorious 'clock paradox', admitted that the result contradicts the initial postulates and, in a most extraordinary paper, he attributes it to gravitational effects, by the help of another thought experiment, in which he makes further 'experimental' mistakes."

[44] *Einstein* by Jeremy Bernstein: p.63.

[45] *Einstein* by Banesh Hoffmann and Helen Dukas.

[46] See Sir Isaac Newton and Modern Astronomy: paragraph 70.

> and equivalent one to the other, and that it gave geodesics,[47] that is, paths corresponding to straight lines in Euclidian geometry, which could be identified with motions in gravitational fields."[48]

Thus, analogously to the billiard ball which took the shortest route on the billiard table and gave the illusion of being attracted towards the hole, the planets in these orbits are taking the shortest routes to their destinations in curved space-time. It may be hard to think of a more imbecile suggestion - if Galileo was dissuaded for over twenty years by fear of ridicule from publishing his belief in Copernicanism, one wonders how long he would have delayed admitting he believed in Relativity, but it is not difficult to understand.

Einstein's amazing piece of make-believe has been established to the satisfaction of the scientific fraternity and the public by just three main "proofs". ("Up to the present we have been able to find only a few deductions from the general theory of relativity which are capable of investigation and to which the physics of pre-relativity do not also apply,"[49] wrote Albert Einstein.) Blood sports have not yet been completely outlawed, so let us satiate such lust for cruelty as any of us may regrettably possess by examining each of the three in turn.

The first concerned the phenomenon, discovered by the nineteenth century French astronomer Leverrier, known as the Perihelion[50] of the planet Mercury. Instead of performing a perfectly elliptical orbit, Mercury, in common with the other planets, slides away fractionally in its orbit, forming instead a slight spiral. The shift was just under 5,600 seconds of arc per hundred years, and most of it is accounted for by Newtonian physics,[51] but a minute but definite residual increase of between forty and fifty seconds of arc per century remained unexplained. Einstein claimed that Relativity provided the answer, explaining that the shortest path in space time around a weighty particle of matter would be an ellipse which spiralled round the particle rather than imitating the stationary ellipses indicated by Newton's action-at-a-distance gravity. He produced a

[47] "Geodesy" is the branch of mathematics dealing with the shape and area of the earth or large portions of it. There is also a secondary, purely mathematical definition of "geodesic" (which applies here): pertaining to the shortest line between two points on any mathematical surface - N.M.G.

[48] *A History of the Sciences* by Stephen F. Mason.

[49] Relativity: The Special and the General Theory by Albert Einstein: Appendix III.

[50] The perihelion point is the closest approach of a planet, or other moving celestial body, to the sun. (The perigee, opposite to the apogee, is the closest approach of a celestial body to the earth, a term now applied to the moon but also used in connection with the orbits of man-made satellites.)

[51] According to Newtonian physics, the orbit would not be a perfect ellipse because a planet's orbit is decided not only by the sun but also by the gravitational forces of the other planets. (The small deviations caused by the latter are known as perturbations.) Thus some shift was expected even in Newtonian physics, but the 43 seconds was the shift over and above such expected perturbations.

formula, made his calculations, and, perhaps understandably since he knew in advance the result at which he was aiming,[52] came up with a thoroughly appropriate figure of 42.9 seconds per arc.

It is true that there were difficulties attached to this "proof" of Relativity which might have depressed people less robust than the Relativists. One was that it was found that the formula he used was identical to one derived by Gerber eighteen years previously to explain the phenomenon but founded on a quite different hypothesis,[53] a discovery which provided the unmistakable inference that, instead of working out a formula which harmonised with his theory, he stole from someone else a formula which he knew to fit the mathematical facts – an expedient presumably made necessary by the fact that he did not have the mathematical ability to concoct such a formula himself. Another difficulty was that, when applied to the other planets, the formula produced inaccuracies which were embarrassing. "The motion of the perihelion of Venus is particularly embarrassing for the relativity theory," wrote Professor Charles Lane Poor, Professor of Celestial Mechanics at Columbia University, in 1922. "The perihelion of this planet is rotating more slowly than the computations indicate it should, the difference being 7.3" per century. The Einstein formulas would increase the theoretical speed of rotation by an additional 8.6", thus making the total discrepancy between observation and theory 15.9" or 37% of the entire observed motion! The Einstein formulas, in this case, make a bad matter worse; they give the orbit a rotation in the direction opposite to that which is required to fit the observations. Thus the Relativity theory is not sufficient to explain the discordances in the planetary motions. It accounts approximately for only one among the numerous discrepancies that of the perihelion of Mercury. It fails completely to explain any position of several well-tested irregularities and it doubles the observed discrepancy in the motion of Venus."[54] Despite these and

[52] It would anyway have taken a brave man to question the mathematics of Einstein's prediction. The General Theory employed a new branch of mathematics called tensor calculus, invented by two brilliant (I use this word to describe their intellectual capacity rather than to suggest that they were in touch with reality) mathematicians of that period called Ricci and Levi-Civita, and at that time unknown (it was the tensor calculus that was unknown, not Ricci and Levi-Civita). Should the reader feel tempted to try his hand at acquiring a competence in this field, let him be warned that Professor Dingle described it as "extremely difficult of mastery," (*Science at the Crossroads* by Herbert Dingle: p.176) and that the famous authority Professor A.N. Whitehead said of it: "It is not going too far to say that the announcement that physicists would have in future to study the theory of tensors created a veritable panic among them when the verification of Einstein's predictions was first announced." (*The Concept of Nature* by A.N. Whitehead: p.182)

[53] Letter to *The Listener* (5th August, 1971) by Dr. G. Burniston Brown, Reader in Physics at University College London.

[54] In the same chapter as that in which this passage occurred, Professor Poor gives further insight into Einstein's scientific methods (*Gravitation Versus Relativity* by Charles Lane Poor: p.194.): "A simple investigation will show that the [Relativity] theory is not <u>necessary</u> to explain even that discordance which it can more or less account for: the

other defects, however, General Relativity was held to have triumphed.

Even more important to the credibility of the Theory were Einstein's predictions about the influence of gravitational fields on light. Since light had energy it should be bent in towards any massive object it passed, or, to be precise, "it should move through a curved path in regions of space time bent by the presence of matter."[55] Thus if a star were in fairly close alignment with the sun it would appear to be closer to the sun than it really was. In 1919 an experiment (repeated in 1922) was performed to test the claim. As Einstein tells us, the Royal Society and the Royal Astronomical Society...

> "...undaunted by the war and by difficulties aroused by the war, sent several of Britain's most celebrated astronomers (Eddington, Cottingham, Crommelin, Davidson) to Sobral (in Brazil) and to the island of Principe (in West Africa) to obtain photographs of the solar eclipse of 29th May... The reason why we must wait for a total eclipse is that at every other time the atmosphere is so strongly illuminated by the light from the sun that the stars situated near the sun's disc are invisible."[56]

First, a photograph was taken of the sky when the sun was absent. Shortly afterwards a second photograph was taken with the sun present but, in order to make such a photograph possible, eclipsed by the moon. All the nearby stars should have been displaced towards the sun. They were not. They were displaced in every conceivable direction, some moving in the opposite direction to that predicted and most moving sideways. Undismayed, the proponents of Relativity adopted one of the courses described in paragraph 90 *and published the results together with the assertion that they proved Relativity*. "The results of the measurements confirmed the theory in a thoroughly satisfactory manner," wrote Einstein modestly.[57] Dr. Arthur Lynch was just one expert who did not find the confirmation nearly so satisfactory. This is what he says on page

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motion of the perihelion of Mercury can only be accounted for by the action, under the Newtonian law, of matter known to be in the immediate vicinity of the sun and the planets. "Newcomb [one of the leading astronomers of that period – N.M.G.] showed that this motion can be completely accounted for by one of several possible distributions of matter in or near the sun e.g. (1) a non-spherical sun; or (2) a ring of matter between Mercury and the sun; or (3) a group of planetoids outside the orbit of Mercury; or (4) the Hall hypothesis [an exposition of which I do not think I need inflict on the reader – N.M.G.]." So why was the perihelion of Mercury a problem? "The difficulty which faced Newcomb is not how to account for the motion of Mercury, but how to account for it in such a way to explain, at the same time, the other irregularities." So how, may we ask, did Einstein succeed where Newcomb failed? I do not think that the reader will be disappointed by his ingenious solution. "This difficulty, which appeared nearly insurmountable to Newcomb, is readily disposed of by Einstein by the simple expedient of saying how such other irregularities did not exist or rather 'had it been sufficiently attested.' " Such assurance, coming from a non-astronomer and defying the unanimous judgement of all leading astronomers that the other irregularities did exist, is admirable in its way. The problem is, however, that, as Poor points out, "if the methods of the author of Relativity are to be admitted [which would certainly have saved Newcomb and his colleagues more exhausting labour and worry - N.M.G.], there is no necessity of explaining the perihelion motion of Mercury. If it is troublesome to our theories, it can be discarded with all the other discordances." (*Ibid*. p. 195)

[55] *A History of the Sciences* by Stephen A. Mason: p.547.

[56] *Relativity: The Special and the General Theory* by Albert Einstein: Appendix III.

[57] Relativity: The Special and the General Theory by Albert Einstein: Appendix III.

264 of his book *The Case Against Einstein*:

> "The results of the observations are shown on a chart, by a series of dots, and by tracing connections between these dots it is possible to obtain a 'curve' from which the law of deviation is inferred. But the actual charts show only an irregular group of dots, through which, if it be possible to draw a curve that seems to confirm the theory of Relativity, it is equally possible to draw a curve which runs counter to the theory. Neither curve has any justification."[58]

Sir Edmund T. Whittaker, an accomplished mathematician who was by no means hostile to Einstein or his theory, was another dissenting expert, as the following tactful words about the same experiment show (*A History of Aether and Electricity*, vol.2, page 180):

> "While it must not be regarded as impossible that the consequences of Einstein's theory may ultimately be reconciled with the results of observation, it must be said that at the present time (1952) there is a discordance."

The most devastating contradiction of Einstein's claim to the confirmation of the theory "in a thoroughly satisfactory manner" came, however, from our valuable informant Professor Poor. For his full superb analysis of the experiment, based on the official record of the experiment, I must beg the reader to look up the chapter "The Eclipse Plates" in *Gravitation Versus Relativity* for himself; but the following revelations will give some idea.[59] (All emphases added are mine.)

> "The table showing displacement of individual stars shows that *on average* the observed deflection, as given by the British astronomers, differs by 19% from the calculated Einstein value (i.e. from Einstein's prediction if the theory be correct – N.M.G.). In the cases of two stars the agreement between theory and observation is very nearly perfect...in other cases, however, the differences range from 11% to 60%... The diagrams show clearly that the observed displacements of the stars do not agree in direction with the predicted Einstein effect. *This point was nowhere mentioned in the Report...* But, after the measurements of the plates became available for study, several investigators called attention to this fact of a radial disagreement in direction between the observed and predicted displacements, in the case of the star furthest from the sun a difference in direction amounting to 370.
>
> "It has been claimed by many that the differences between the observed and predicted shifts are no greater than should be expected... This very question was investigated by Dr. Henry Davies Russell, of Princeton University, a most ardent upholder of relativity theory. He studied these star

[58] Perhaps significantly, although there have been many total eclipses of the sun since 1922, the results of subsequent experiments are seldom mentioned, any reference to this "proof" usually incorporating solely the 1922 experiment.

[59] The sheer number of technical terms used (though not any difficulty in understanding any of the terms individually) may make the following eight paragraphs quoted from Professor Poor's book a little demanding on the reader who, like myself, is not comfortably familiar with the vocabulary of astronomy (rather like a person listening to a foreign language which he knows but not in the same way that he knows his own language); but even those who do not wish to take trouble to ensure that they have arrived at the exact meaning of every sentence will, I believe, have no difficulty in understanding the overall argument, which, let it be repeated, is advanced by a person of the highest eminence on his field.

displacements with a view to determining whether the departures from Einstein predicted effects are real or not... As a result of an exhaustive examination of them, he concludes that these differences between the observed and predicted displacements, those non-Einstein displacements, as he calls them, are REAL, and cannot be attributed to mere accidental errors of observation and measurement.

"The results given in the Report for the observations are the means[60] of the radial components[61] only; nothing whatever being given as to the directions in which the actual displacements took place. The Einstein theory requires a deflection, not only of a certain definite component, *but also in a certain observed direction*. To discuss the amount of the observed deflection is to discuss only one-half of the whole question, *and the less important half at that.* The observed deflection might agree exactly with the predicted amount; but, if it were in the wrong direction, *it would* disprove, not prove, the relativity theory. You cannot reach Washington from New York by travelling south, even if you do go the requisite number of miles."

Of course. So how did the impressive and expensive team of famous astronomers come to leave out such an integral part of the "thoroughly satisfactory" confirmation of the theory?

"Now the diagrams of the seven best plates [the remaining twenty-six, which were much less 'satisfactory', were discarded! – N.M.G.], the seven taken at Sobral with the 4-inch camera, show clearly and definitely that *the observed deflections are not in the directions required by the Einstein theory*... The Relativist either totally disregards these discordances in the directions of the observed deflections, or invokes the heating effect of the sun to distort the vision by just the proper amount to explain them away!

"Further...there are other perfectly possible explanations of a deflection of a ray of light; explanations based on every-day, common-place grounds. Abnormal refraction in the earth's atmosphere is one; refraction in the solar envelope is another. The atmosphere conditions under which the eclipse plates were taken were necessarily abnormal; and the plates themselves clearly show that the rays of light passed through a mass of matter in the vicinity of the sun.

"Such is the evidence, and are the observations, which, according to Einstein, 'confirm the theory in a thoroughly satisfactory manner.'"[62]

And before I let Professor Poor leave the witness box I must mention that, as he hinted at the end of the extract just given, he has an alternative theory which not only perfectly explains, in accordance with classical methods of physical and astronomical research, the deflection of starlight that we have just been discussing, but accounts for the perihelion deviation of Mercury also. His solution is no more obscure than simple refraction of light, and in summary he suggests that the perihelia and bent starlight are both optical illusions caused by the immense envelope of matter which is known to surround the sun and to extend far beyond the orbit of the earth. Here is part of what

[60] "Mean" here means "average".

[61] "Radial" literally means "of the rays (or radii)". "Radial component" here means the extent and direction toward or away from the sun, omitting any "sideways" component of motion.

[62] *Gravitation Versus Relativity* by Charles Lane Poor: pp.218-226.

he says:

> "The Sobral photographs show clearly that the rays of light, in their course from the distant stars, passed through masses of matter near the sun. This matter was sufficiently dense and reflected enough sunlight to imprint the image upon the photographic plates, and there can be no question as to its existence and its presence in the paths of the light rays. Further, whenever a ray of light passes from free space into or through a medium of any kind of density, such a ray is deflected, or bent out of its straight course. The path of such a ray becomes curved, and the amount of refraction, or curvature, depends on the density of the medium into which the ray passes and the angle at which it meets the surface.[63] This is a fundamental law of physics: upon the refractive effects of different media are based our optical instruments and experiments: eyeglasses, cameras, microscopes, telescopes; all depend upon the refractive effect of glass upon the ray of light. It is certain, therefore, that the rays of light, in passing through the solar envelope, suffered a refraction or bending, of some kind or amount. This fact is as well established as the sun itself. The sole question is whether this refraction was sufficient in amount and in direction to account for the observed displacements of the star images.
>
> "While it is certain that the rays suffer some refraction in passing through the solar envelope, it is claimed by most solar-physicists that the effect is so small as to be negligible in comparison with the observed deflections. This idea is so firmly fixed that the possibility of explaining any portion of the deflections was dismissed by the British astronomers in their Report with a scant phrase or two. The entire question depends upon the possibility of the solar envelope having density large enough to bend a ray of light by the required amount, and this in turn upon what that density really is."

Poor shows that the assertions to the contrary are based on assumptions which can be proved to be false, concluding: "In view of this and of all the complicated and largely unknown conditions of the solar envelope, it is certainly not proved that cosmic refraction is an impossibility." He then moves on to the crucial point.

> "While, thus, there is a very open question as to the *amount* of refraction which would be caused by a medium of varying density, there is on the other hand practically no question as to the *direction* in which the bending will take place. This is purely a matter of geometry, and depends upon the fundamental law, that the incident ray, the normal to the surface, and the refracted ray, all lie in the same plane. In the case of the photographs taken at Sobral during the eclipse of May 29, 1919, an approximate solution can be made with great simplicity."

The reader will doubtless not be surprised to learn that the predictions resulting from Poor's formula were many, many times more accurate than those produced by Relativity Theory. Moreover the same explanation, the assumption of the self-same solar atmosphere, enabled him also to predict correctly the perihelion of Mercury and without, incidentally, being thrown into confusion by the perihelia of the other planets. The same assumption, in other words, gave as satisfactory an answer as could be desired in two radically different investigations.[64] Despite the facts, however, that General Theory was

[63] It is this phenomenon which, when caused by the earth's atmosphere, keeps the sun visible for a short period after it has in reality disappeared [if something that is still visible can strictly speaking be said to have disappeared over the horizon. – N.M.G.]

[64] It is worth mentioning that, showing an attitude which contrasted notably with Einstein's attitude to Relativity,

manifestly contradicted by the very experiments conducted and cited to prove it and that there was an alternative theory which accounted for the same phenomenon vastly better and completely comprehensibly, it was General Relativity that, wet-nursed by a group of intellectual prostitutes at the very top of their profession in 1919 and fostered by their descendants ever since, continued to thrive.

Enough, surely, has been said about simple hoax. It is time to turn our attention to elaborate fraud. It is time, also, to acknowledge that the reader may be becoming dissatisfied with learning about Relativity as expounded by me, and to make some small demands on his concentration by supplementing my explanations with those of, for once, an expert whose belief in the theory is without any qualification or reservations whatever. An appropriate object for examination in this manner is the third main test used to establish General Relativity: the experimental confirmation of the theory that the lines of a spectrum[65] should be displaced when emitted in a strong gravitational field, causing the light, as it loses some of its energy when moving away from the field, to become redder. I am not sure that the brief disquisition on the test that I have given in the previous sentence is as good as it should be, but never mind. I shall take a rest in my self-imposed task for a moment and hand you over, for full enlightenment on the subject, to Sir Arthur Eddington, perhaps the most distinguished and highly regarded of all the experts who have expounded the theory.[66] Please do not feel embarrassed if you feel the need to read the passage slowly and even more than once: I shall be waiting patiently until you have finished.

> "*Displacement of the Frauenhofer lines*.[67] Consider a number of similar atoms vibrating at different points in the region. Let the atoms be momentarily at rest in our coordinate system (r, 0-,O/, t). The test of similarity of the atoms is that corresponding intervals shall be equal, and accordingly the interval of vibration of all the atoms will be the same. Since the atoms are at rest we set dr, d0-, dO/ = 0 in (38.8) so that $ds^2 = y\ di^2$. Accordingly the times of vibration of the differently placed atoms will be inversely proportional to y.
>
> "Our system of coordinates is a static system, that is to say the g v do not change with time. (An

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Professor Poor did not claim that the satisfactory results yielded by his theory were conclusive evidence that the theory was correct, but was content to claim that he had "indicated", at least, the possibility "that he had explained the observed light deflections" and "indicated clearly the superiority" of his hypothesis "over that of Einstein." (Ibid.: pages 255, 253)

[65] The spectrum is the band of colours into which a beam of light is decomposed on passing through a prism or other refracting agent.

[66] Sir Arthur Eddington led the 1919 expedition to Principe, off the coast of West Africa, to test Einstein's prediction that the sun's mass would deflect starlight towards it (see paragraph 99 and subsequent paragraphs). One of the highlights of his contributions to science is given in footnote 82.

[67] The Frauenhofer Lines, of which the first careful observations were taken by Joseph von Frauenhofer (1787-1826), a Bavarian optician and physicist, are the dark lines of the spectrum of sunlight.

arbitrary co-ordinate system has not generally this property; and further, when we have to take account of two or more attracting bodies, it is in most cases impossible to find a strictly static system of coordinates.) Taking the observer at rest in the system (r, 0-, O/, t), a wave emitted by one of the atoms will reach him at a certain time dt after it leaves the atom; and owing to the static condition this time-lag remains constant for subsequent waves. Consequently the waves are received at the same time-periods as they are emitted. We are therefore able to compare the periods of the waves received from them, and can verify experimentally their dependence on the value of y at the place where they were emitted. Naturally, the most hopeful test is a comparison of the waves received from a solar and a terrestrial atom whose period should be in the ratio of 1.00000212:1. For the wave-length 4000 A^o, this amounts to a relative displacement of 0.0082 A^o of the respective spectral lines. The verdict of experiment is not yet such as to secure universal assent; but it is now distinctly more favourable to Einstein's theory than when *Space, Time and Gravitation* was written.

"The quantity dt is merely an auxiliary quantity introduced through the equation (38.8) which defines it. The fact that it is carried to us unchanged by lightwaves is not of any physical interest, since it was defined in such a way that this must happen. The absolute quantity, ds, the interval of vibration, is not carried to us unchanged, but becomes greatly modified as the waves take their course through the non-Euclidean space-time. It is in transmission through the solar system that the absolute difference is introduced into the waves, which the experiment hopes to detect. The argument refers to similar atoms, and the question remains whether, for example, the hydrogen atom on the sun is truly similar to the hydrogen atom on the earth. Strictly speaking it cannot be exactly similar, because it is in a different kind of space-time, in which it would be impossible to make a finite structure exactly similar to ours existing in the space-time near the earth. But if the interval of vibration of the hydrogen atom is modified by the kind of space-time in which it lies, the difference must be dependent on some invariant of the space-time. The simplest invariant which differs at the sun and the earth is the square of the length of the Riemann-Christoffel tensor, viz.:

$$B^{E}vo \qquad B_{E}^{uvo}$$

The value of this can be calculated from (38.8) by the method used in that section for calculating the Gpv. The result is m^2/r . By consideration of dimensions it seems clear that the proportionate change will be of the order $o4m^2/r$ where **o** is the radius of the atom; there does not seem to be any other length concerned. For a comparison of solar and terrestrial atoms this would be about 10^{-100}. In any case it seems to be impossible to construct from the invariants of space-time, a term which would compensate the predicted shift of the spectral lines, which is proportional to m/r. [68]

It is hard to improve on Dr. Lynch's commentary on this exposition.

"And that's why your daughter is dumb," as the quack doctor of Molière concluded, though his arguments seem to me a model of cohesion and clarity compared with this of Einstein. It may be my own deficiency, and if, dear reader, you have made good sense out of this, I admit that your intellect soars at a range inaccessible to me.

"Yet I have not always shrunk before what Carlyle calls 'tough reading', and I have appreciated Byron's saying that he liked 'something craggy to break my mind on'... But here!"

And although no further comment is necessary, I think Lynch's further comment is sufficiently educational to be well worth including.

[68] *The Mathematical Theory of Relativity* by Sir Arthur Eddington: p.91. (Quoted in *The Case against Einstein* by Arthur Lynch.)

"From first to last there is no suggestion offered as to which is an atom, how it vibrates, how the vibrations produce a certain influence which we must not here call waves although Sir Arthur uses the term because Einstein and his disciples have abolished ether[69] and supplied its place with mathematical formulae.[70]

8. Einstein's Originality

The most extraordinary feature of the whole Einstein story has yet to be told. The alert reader will have noted with interest that many elements of the Theory of Relativity were not the discoveries ("inventions", used in its modern sense, would be a better word) of Einstein. Curved space, for instance, was thought of by Riemann; adding a fourth dimension, that of time, to geometry to create the new concept of space-time, by Minkowski; the doctrine that objects contract in proportion to the speed at which they moved, by Fitzgerald; and the idea that the velocity of light in a vacuum was constant irrespective of the notion of any object connected with the light ray, by Lorentz. He will be anxiously awaiting the revelation of the great new concepts which have earned for Einstein undying renown and the title of one of the greatest thinkers that ever lived. Having read this far in my book he will hardly expect Einstein to be right, but he will hardly doubt that he is a genius of great originality, even if the principal mark of his genius be the disdain of common sense.

The truth is otherwise. Whereas men such as Kepler, Descartes, and Newton may have been wrong but were brilliant, *Einstein's works can be searched from beginning to end without revealing a single original thought of real importance.* Did he first assert the impossibility of detecting the velocity of the earth through the ether? No, this was done by J.H. Poincaré and H.A. Lorentz. Says Sir Edmund Whittaker: "Poincaré believed in 1899 that absolute motion is indetectable in principle. 'Our ether,' he said, 'does it really exist? I do not believe that more precise measurements could ever reveal anything more than relative displacements'... Lorentz in 1903...obtained a transformation to the fundamental equations

[69] I have mentioned on a number of occasions Einstein's abolition of the ether by decree (for the sake of completeness, I must add that with characteristic inconsistency he did on some occasions readmit a "special" ether), and the time has now come to explain that it was an absolute necessity that he should do this, because to admit the existence of ether would have made his notion of relativity impossible. Ether provides a standard of rest in space against which motion can be judged absolutely, which is what the Michelson-Morley experiment set out to test, and Relativity Theory denied that motion was absolute. Einstein's solution to one problem merely created another, however; not surprisingly, since it is never possible to make a fraudulent theory internally consistent. As I have indicated earlier, the abolition of the ether made impossible Einstein's second postulate: that the speed of light was constant irrespective of the speed of its source. For if, when the source of light accelerated, light did not accelerate in proportion, it must be experiencing resistance to acceleration. The supposed increase in mass must be caused by the same resistance. "Is it conceivable that a moving body can experience a resistance to acceleration unless there is an ether to provide the resistance?" (*Science at the Crossroads* by Herbert Dingle: p.233.)

[70] *The Case Against Einstein* by Arthur Lynch: p.258.

of the ether which is exact to all orders of small quantity.[71] Did Einstein coin the name Relativity? No, Poincaré did. "In a lecture to a congress of arts and science at St. Louis, U.S.A., on 24th September, 1904, Poincaré gave to a generalised form of this principle the name, 'The Principle of Relativity'.[72] It was Poincaré too, who first asserted that no velocity can exceed that of light. Einstein was not the first to assert that a clock in motion runs slow. This was done by Sir Joseph Larmor. Einstein was not the first to assert that matter is crinkles in curved space. Professor W.K. Clifford advanced this quaint notion in 1870, nine years before Einstein's birth. (Clifford's lunacy is worth a short digression in order to quote it in full; contrary to observation though it is, if you read it a few times you may go mad and believe it. "I hold in fact (1) that small portions of space are in fact of a nature analogous to hills on a surface which is on average flat; namely – that the ordinary laws of geometry are not valid in them; (2) that this property of being curved or distorted is continually being passed on from one portion of space to another after the manner of a wave; (3) that this variation of the curvature of space is what really happens in that phenomenon which we call the _motion of matter', whether ponderable or ethereal; (4) that in the physical world nothing else takes place but this variation, subject (possibly) to the law of continuity."[73]

Did Einstein even invent the famous equation, $E = mc^2$, which has become almost synonymous with his name the equation from which nuclear energy and nuclear destruction capability are supposedly derived? Not even that. In 1881 J.J. Thompson had produced a formula, $E = 3/4\ mc^2$, in respect of a charged spherical conductor moving in a straight line. In 1900 Poincaré suggested that electromagnetic energy might possess mass density in relation to energy density, such that $E = mc^2$, where E is energy and m is mass. (*A History of Aether and Electricity* by Sir Edmund T. Whittaker: vol.2, p.51.)[74] It was Max

[71] *A History of Aether and Electricity* by Sir Edmund T. Whittaker: vol.2; p.30. Whittaker was a Fellow of the Royal Society and, as already mentioned, a highly accomplished mathematician.

[72] Ibid.: p.30.

[73] William Kingdom Clifford's Collected Math Papers: p.21.

[74] $E = mc^2$! I am sure the reader would not wish me to pass over this famous incantation without comment. According to Einstein (and to Poincaré who originated the idea), $E = mc^2$ represents the energy of a particle at rest. Mass and energy, the theory goes, are mutually convertible, every material object, including the piece of paper you are looking at now, containing dormant energy; and such dormant energy is equal to the mass of the object times the square of the speed of light. In a single ounce of coal or sand, for instance, there resides (according to the supposition) energy equivalent to that obtainable by burning approximately one hundred tons of coal. Einstein first reproduced this formula of Poincaré's (without acknowledgement) in 1905 in a paper separate to his paper on Special Theory published in the same year. In what he described as a "thought experiment" (a term which was to become famous) he imagined an atom which decayed radioactively by emitting radiation, gamma rays. Having achieved this feat of imagination, he then argued in incomprehensible fashion that the atom that was left after the decay must be less massive than the original atom; and that the amount of mass (m) that was lost was just equal to the total energy (E) carried away by the radiation divided by the square of the velocity of light (c). Or, put in his own words, "*If a body gives off energy E in the form of radiation, its mass diminishes by E/c^2.*" (Einstein's emphasis) This is in effect the statement that all energy

Planck, God help him, who in 1900 invented and introduced into physics the quantum, and Schroedinger and Heisenberg, God help them, who in 1925 made the theoretical breakthrough which lead to quantum mechanics.[75] Almost the only connection Einstein had with nuclear fission was his famous letter to President Roosevelt in August 1939 advising on the feasibility of the development of the atom bomb (and, as the letter itself makes clear, in writing it he was in effect doing no more than playing the part of messenger boy); in the fields of nuclear engineering and physics he had no expertise at all. Was Albert Einstein the greatest mathematician of his day? "The greatest mathematician

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of whatever sort - he had decided and decreed (as though he were omniscient God) that the fact that his calculations were only in respect of energy given off in the form of light "evidently makes no difference" (the 1905 Einstein paper, published in *Annalen der Physik*) - had mass. Better was to come. Two years later, "led by aesthetic reasons," (*Einstein* by Banesh Hoffman and Helen Dukas: p.81) he came to the "stupendous realisation" (Ibid.) that the reverse must also hold - a piece of reasoning every bit as sound as a deduction that because all dogs are animals all animals are dogs - and that all mass of whatever sort must have (or be?) energy, and that $E = mc^2$ expressed their equivalence. Let us try to keep calm; and let me say no more than that Einstein's, or rather Poincaré's, concoction is completely unverified. No, I shall go further, and say that there is no possible reason for saying that mass and energy are in any way equivalent or mutually transferrable, nor for saying that the speed of light (or, for that matter, the square of the speed of light) can have any bearing on the matter. As I implied in the first sentence of this footnote, the equation is more like a magic spell than a mathematical formula. (Also, while emphasizing that I am neither a mathematician nor a physicist, I add that no one has ever demonstrated to me that it would have made the slightest practical difference if Poincaré had said that $E = mc$ or mc^3 rather than mc^2.)

[75] The reader who has admiringly followed with me (the admiration being directed at what he has followed, not at me!) in other chapters the development of scientific theories since the Renaissance, and in particular during the nineteenth century, and is wondering what is coming next, will not be disappointed if he studies quantum theory. It would be impractical to try and produce a comprehensible account in a short space but two quotations should convey sufficient to whet the appetite. "Suppose that Max Planck had said in all seriousness that a swing can swing only in arcs of three feet, six feet, nine feet and so on, and not four feet, half a foot or any other such prohibited value, surely you would say that he was talking nonsense. Yet this, on a microscope scale, was part of what Planck had to assume in order to deduce his formula. Put differently, he had had to assume that these microscopic oscillations did not change energy smoothly but in jumps of discrete amounts that he called quanta. He had also had to assume that the fraction energy/oscillatory frequency must have the same value for every such quantum jump. This value, which he denoted by h, is now called Planck's constant, and his quantum hypothesis towers as a transcendent landmark in the history of science. It transformed physics." (*Einstein* by Banesh Hoffman and Helen Dukas: p.482.) The second quotation is an objection raised by Erwin Schroedinger against the insistence of the quantum theorists that the quantum equations, which forbid in principle the prediction of the precise moment at which an event will occur (only probabilities being knowable), tell the whole story. "Place a cat in a closed room with a vial of cyanide. Place a potentially radioactive atom in a detector in such a way that if the atom undergoes radioactive decay the detector will trigger a mechanism that breaks the vial and thus kills the cat. Suppose that the atom is of a type that has a fifty-fifty chance of undergoing radioactive decay in an hour. At the end of the hour is the cat dead or alive? "It must be one or the other, or so we would think. But according to a standard Copenhagen interpretation of the mathematics of quantum mechanics, the cat at the end of the hour is in a limbo state, with a fifty-fifty chance of being alive and a fifty-fifty chance of being dead. Of course, we could look and see whether the cat is alive or dead at the end of the hour. The mere act of taking a peek could hardly kill the cat, and if it were dead could surely not bring it back to life. *Common sense thus tells us that here the looking is inconsequential*; the cat is either definitely alive or else definitely dead, whether we look or not. Yet according to the above-mentioned interpretation, the looking causes a drastic alteration in the mathematical description of the state of the cat, changing the state from its limbo character either to one in which the cat is definitely alive or else to one in which it is definitely dead, whichever the case happens to be." (*Ibid.* p. 198. My emphasis added. – N.M.G.)

of Einstein's day was David Hilbert,[76] without any doubt; and after him (among those who had some dealing with Relativity) Poincaré, Minkowski, Ricci, and Levi-Civita. Einstein made no contribution whatever to mathematics as such unless one counts his summation convention for *not* writing some signs of summation – a notational convention without which we should know precisely as much but which does save a little chalk in lectures."[77] (Letter to the author dated 6th March 1978, by a doctor of mathematics at Reading University.[78])

What did Einstein originate? "He contributed to the theoretical work in quantum mechanics, photo-electricity and statistical mechanics." (Letter from the doctor of mathematics cited in previous paragraph.)

The truth about Einstein is that he was no more than a puppet. The theories of the mathematicians and physicists from whom he plagiarised may have been devoid of common sense, but at least they tended to be internally consistent and capable of standing up to *mathematical* scrutiny. (To take one example, the "Transformations" of Professor H.A. Lorentz, which I explored in footnote 39 and on which much of Relativity is based, bear no relation to observed data, but they have never been mathematically contradicted and can be used to produce perfectly correct calculations.) Einstein's theories did not even meet that test. His life's work was a hotchpotch of plagiarisations which were in total not only defective in logic but also so full of internal error that, as Lynch, Dingle and Essen showed, any mathematician brave enough to investigate them critically cannot fail to destroy them. And let me repeat that he plagiarised. His contributions to Thought were not only childish; they were not even his.

How material. Now that we know the reality of Einstein and his imbecile theories, let us for a brief spell not concern ourselves about why the conspirators decided to bring about his apotheosis and what they hoped to, and did, achieve from it, but simply look

[76] In this chapter and the two preceding chapters I have from time to time referred to various men of science of the last century or so and have described them, or quoted descriptions of them, in such terms as "celebrated", "distinguished" or, as here, "great". Such terms are intended to be an objective representation of their reputation in the eyes of those whom most people would consider best qualified to judge. They do not imply any admiration on my part and, while acknowledging their sometimes exceptional intellectual capacities compared with many of the rest of us, as a generality I have none. Modern scientists, I hope this book demonstrates, know a very great deal, but most of their knowledge "just ain't so" and very little that they genuinely know is worth knowing.

[77] Of course it was not necessary for Einstein to have been a mathematician for his theories to have been correct. I mention his lack of mathematical qualifications simply because, although the lack is fully acknowledged by the learned, it is not generally known of by the public.

[78] Although he has since confirmed that what he has said here is well known among mathematicians and non-controversial, the writer of this letter wishes to remain anonymous.

in admiration at what happened.

9. Einstein's Renown

Although it is obvious from an analysis of Einstein's career that the plans had been laid much earlier, 1919 appears to have been the year marked for the turning point in our hero's career. Until then Einstein had not been heard of outside his own restricted circle and had been heard of little enough within it. His Special Theory of Relativity and other papers such as that which contained the formula $E = mc^2$ had generated little interest; and, indeed, from 1904 until 1919 the Theory of Relativity meant to all concerned "the Relativity Theory of Lorentz", Einstein's theory (the mathematical part of which is still called the "Lorentz Transformation") to the extent that it is known at all, being regarded merely as a more obscure form of that theory. (Dingle, Ibid.: p.167) In 1919 the gears were engaged with an effectiveness that can only be described as breathtaking. Something induced the Royal Society and the Royal Astronomical Society to spend large sums of money and send some of their most distinguished members to distant parts of the earth to test Einstein's fairly recently published General Theory; and something persuaded those most distinguished members to put what even many supporters of Relativity admit to be an unjustifiably favourable[79] interpretation on the results of their experiments.

"The name of the theory changed," wrote Professor Dingle,

> "...as though by magic, from the 'Relativity Theory of Lorentz' (known to a mere handful of specialists) to Einstein's Special Relativity Theory' (known by name, though little else, to everyone)."[80]

From that point Einstein's elevation into the public eye was, considering that he was neither a politician, a filmstar nor a sportsman, astounding.

> "No sooner did the news leak out that Einstein was coming to America than he was deluged with cabled invitations from presidents of academic institutions to lecture, and visit, and receive academic honours... America had fought against Germany. Nevertheless the Americans received Einstein with a tumultuous enthusiasm... On 2nd April 1921, as the boat was docking, reporters besieged him on shipboard. The mayor of New York City gave him an official welcome as if he were an American

[79] See paragraphs 101-112.

[80] *Science at the Crossroads* by Herbert Dingle: p.176. Dingle was an observer of the sudden change as he was successively a demonstrator and lecturer in physics at the Imperial College during the period, and was in close association with leading physicists, astronomers and mathematicians.

> war hero. President Harding invited him to the White House...[81] In October 1922 Einstein left for a visit to Japan... In a report to Berlin the German ambassador to Japan likened Einstein's visit to a triumphant procession. Wherever he went enthusiastic crowds gathered spontaneously to catch a glimpse of him. He was received by the Emperor. The newspapers vied with one another to report his activities in both factual and fictional detail. He was showered with honours and all manner of gifts."[82]

And so on. His fiftieth birthday in 1929 was a world event. In 1952, on the death of Chaim Weizmann, Einstein was asked to succeed him as President of the State of Israel. (He refused.) At his death in 1955 there was worldwide mourning. In 1979 a statue of our great thinker, three times life size, was built at a cost of one million eight hundred thousand dollars – at a time when the dollar was worth very much more than it is today – and placed not far from the Lincoln Memorial in the Washington Mall in the heart of the American nation's capital...

I have reserved until last the most extraordinary of all the many manifestations of determination to raise Einstein to the status of one of the greatest men of all time, an event which happened in 1929. In the early part of that year he believed he had solved the problems involved in writing down field equations for his simplified field theory:[83]

> "On the day of official publication of the third of a formidably technical series of nine articles on the theory that were comprehensible only to specialists, excited headlines appeared in foreign newspapers throughout the world. A paper in New York City (the *New York Times* – N.M.G.) printed an English translation of the whole abstruse article, complete with formulas, cabled direct from Berlin... Einstein's new theory was hailed in the press as an outstanding scientific new advance."[84]

Now mark the sequel. Within a very short period of time the "outstanding scientific advance" was found to be too full of errors and contradictions for even twentieth century science to swallow and Einstein had to abandon it. What had been considered worthy of headlines in leading newspapers throughout the world were undigested and ill-considered speculations in an obscure area of physics. Dear reader, do you care whether Einstein or anyone else produces a unified field theory or not? And if you do care about such things, can you please explain why the speculations and what establishment science would call discoveries of the mathematicians and physicists who genuinely were thinkers of brilliance and originality have never been printed in full

[81] *Einstein* by Banesh Hoffmann and Helen Dukas: p.144.

[82] Ibid.: p.150.

[83] After publication of his General Theory in 1916, Einstein spent the rest of his life trying to construct what the reference books call a "unified field theory in which his General Theory is merged and harmonised with the electro-magnetic theory of matter." Perhaps surprisingly, considering the deranged and self-contradictory ideas he did get away with, he never succeeded.

[84] Ibid.: p.226.

in the *New York Times*? Indeed, unless you are a specialist in their fields yourself, how many of the scientists and mathematicians mentioned in this chapter such as Riemann, Minkowski, Thomson, Fitzgerald, Maxwell, Lorentz, Rutherford, Larmor, Planck, Poincaré, Hilbert, Ricci, Levi-Civita, Eddington,[85] Bohr, Schroedinger and Heisenberg have you even heard of?

10. Einstein's Impact

The time has now come to look at the *effect* of Einstein. His puppet-masters must have enjoyed the feeling of omnipotence which their arbitrary bestowal of world greatness on funny, silly little Einstein gave them, but of course that was very much a subsidiary reason for their having done it. The principle reason? "What science may do *for* men is not enough. This must become subordinate to what science may do *to* men," said Otis W. Caldwell, General Secretary of the American Association for the Advancement of Science, a few years ago.[86] This is the point. We may not know what it was that Einstein did for his puppet masters which persuaded them that he was the man who should be plucked out of obscurity to serve their purposes, but what we certainly <u>can</u> know is what those masters, using him as their principal vehicle, have done and are doing, not <u>for</u>, but <u>to</u> the minds of those who make up the human race. Some indication of this I have already provided with the help of the extract from Dampier's *A History of Science* quoted at the beginning of this chapter. For reinforcement and for much greater clarification I now turn back to Arthur Koestler's *The Sleepwalkers*, where there is to be found a valid, entirely unexaggerated and beautifully written summary of the stage now reached in the science of physics. Starting appropriately with Galileo, he writes:

[85] I should not miss the opportunity provided by the final reference in this chapter to this distinguished scientist (the reader may remember that he was a member of the team sent by the Royal Society to Principe in 1919 to photograph a solar eclipse to obtain supposed evidence for Einstein's Special Theory) without informing the reader about one of his major contributions to scientific knowledge. It is to him that we owe the discovery that there are exactly - not approximately but exactly - 136 to the power of 256 protons in the universe, and an equal number of electrons. For the benefit of those readers who are out of practice in calculating to the power of 256, the number written out in full is 15,747,724,136,275,002,577,605,653,961,181,555,468,044, 717,914,527,116,709,33-6,231,425,076,185,631,031, 276 - accurate, according to Eddington, to the last digit. (To those readers who would prefer me to have written out the number in Roman numerals, I apologise and shall consider doing so in a subsequent edition.) Sir Arthur did not in fact count all the protons in the universe (which, given that the existence of atoms, let alone protons, is only theoretical, would have been difficult) but he does have a complicated theory to justify his claim. As one treatise on mathematics says, "Anyone with a better theory may challenge Sir Arthur, for who can be referee?" (*Mathematics and the Imagination* by Edward Kasner and James Newman: p.40.) Of course, I am giving this theory as an example of the insanity of modern science. That there are any people, let alone highly regarded and influential scientists, who either think that such things, whether hypothetical or real, can be calculated or think that it is of slightest interest or importance that they be calculated is hardly credible and until present age would not have been credible.

[86] Quoted in *Science is a Sacred Cow* by Anthony Standen: p.142.

"The uncanny vanishing act began, as we saw, with Galileo and Descartes. In that famous passage in *The Assayer*,[87] Galileo banished the qualities which are the very essence of the sensual world colour and sound, heat, odour, and taste from the realm of physics to that of subjective illusion. Descartes carried the process one step further by paring down the reality of the external world to particles whose only quality was extension in space and motion in space and time. At first this revolutionary approach to nature looked so promising that Descartes believed he would be able to complete the whole edifice of the new physics by himself. His less sanguine contemporaries thought that it might take as much as two generations to wrest its last secret from nature.

"But in the two centuries that followed, the vanishing act continued. Each of the 'ultimate' and 'irreducible' primary qualities of the world of physics proved in its turn to be an illusion. The hard atoms of matter went up in fireworks; the concepts of substance, force, of effects determined by causes, and ultimately the very framework of space and time turned out to be as illusory as the 'tastes, odours, and colours' which Galileo had treated so contemptuously. *Each advance was brought by a loss in intelligibility*.[88]

"Compared to the modern physicist's picture of the world, the Ptolemaic universe of epicycles and crystal spheres was a model of sanity. The chair on which I sit seems a hard fact, but I know that I sit on a nearly perfect vacuum. The wood of the chair consists of fibres, which consist of molecules, which consist of atoms, which are miniature solar systems with a central nucleus and electrons for planets. It all sounds very pretty, but it is the dimensions that matter. The space which an electron occupies is only one fifty-thousandth in diameter of its distance from the nucleus; the rest of the atomic interior is empty. If the nucleus were enlarged to the size of a dried pea, the nearest electron would circle around it at a distance of about a hundred and seventy-five yards. A room with a few specks of dust floating in the air is overcrowded compared to the emptiness which I call a chair and on which my fundaments rest.

"But it is doubtful whether it is permissible to say that the electron 'occupies space' at all. Atoms have the capacity of swallowing energy and of spitting out energy in the form of light rays, for instance. When a hydrogen atom, the simplest of all, with a single electron-planet, swallows energy, the planet jumps from its orbit to a larger orbit say, from the orbit of Earth to the orbit of Mars; when it emits energy, it jumps back again into the small orbit. But these jumps are performed by the planet without it passing through the space that separates the two orbits. It somehow de-materialises in

[87] *Il Saggiatore* (*The Assayer*), was a celebrated, brilliant and often hilarious work of polemics written by Galileo in 1623. It was full of scientific errors but, in Koestler's words, "between the brilliancies and irrelevancies there are passages scattered about which have become classics of didactic literature." The particular passage referred to reads as follows: "To excite in us tastes, odours, and sounds I believe that nothing is required in external bodies except shapes, numbers, and slow or rapid movements. I think that if ears, tongues, and noses were removed, shapes and numbers and motions would remain, but not odours or tastes or sounds. The latter, I believe, are nothing more than names when separated from living beings..."

This mechanistic view of the universe was originally conceived by the Greek Atomists (Leucippus and Democritus – see footnote 2) and was finally brought to fruition by Bertrand Russell. Nothing hangs on whether I am right or wrong but for what it is worth it is my opinion that, if there were no other circumstantial evidence, this passage alone would be sufficient evidence that Galileo was a high-ranking member of an occult group. If there could be seen to be one single historical dividing point between the modern age, which sees the universe in terms of protons, electrons, neutrons, positrons, deuterons, mesons and quarks, and the age which saw the universe in terms of good and evil, it might be that passage in *The Assayer*.

[88] My emphasis. The fact should not be lost sight of that the only conceivable purpose of scientific investigation is to achieve *greater* understanding, to make the world *more* intelligible. Koestler is showing very clearly that from Galileo onwards "scientists" have been drawing a heavier and heavier veil over reality – N.M.G.

orbit A and re-materialises in orbit B. Moreover, since the amount of 'action' performed by the hydrogen electron while going once round its orbit is the indivisibly smallest quantum of action (Planck's basic constant 'h'), it is meaningless to ask at what precise point of its orbit the electron is at a given moment of time. It is equally everywhere.[89]

"The list of these paradoxa could be continued indefinitely; in fact the new quantum-mechanics consist of nothing but paradoxa, for it has become an accepted truism among physicists that the sub-atomic structure of any object, including the chair I sit on, cannot be fitted into a framework of space and time. Words like 'substance' or 'matter' have become void of meaning, or invested with simultaneous contradictory meanings. Thus beams of electrons, which are supposedly elementary particles of matter, behave in one type of experiment like little pellets, but in another type of experiment they behave like waves; conversely, rays of light behave sometimes like waves and at other times like bullets. Consequently the ultimate constituents of matter are both substance and nonsubstance, lumps and waves. But waves in, on, of what? A wave is movement, undulation; but what is it that moves and undulates, producing my chair? It is producing my chair? It is nothing the mind can conceive of, not even empty space, for each electron requires a three-dimensional space for itself, two electrons need six dimensions, three electrons nine dimensions, to co-exist. In some sense these waves are real: we can photograph the famous dart-board pattern they produce when they pass through a diffraction grate; yet they are like the grin of the Cheshire cat.

" 'For ought we know (says Bertrand Russell) an atom may consist entirely of the radiations which come out of it. It is useless to argue that radiations cannot come out of nothing... The idea that there is a little hard lump there, which is the electron or proton, is an illegitimate intrusion of commonsense notions derived from touch... "Matter" is a convenient formula for describing what happens where it isn't.'[90]

"These waves, then, on which I sit, coming out of nothing, travelling through a non-medium in multi-dimensional non-space, are the ultimate answer modern physics has to offer to man's question after the nature of reality. The waves that seem to constitute matter are interpreted by some physicists as completely immaterial 'waves of probability' marking out 'disturbed areas' where an electron is likely to 'occur', 'They are as immaterial as the waves of depression, loyalty, suicide, and so on, that sweep over a country.'[91] From here there is only one step to calling them abstract, mental, or brain waves in the Universal Mind without irony. Imaginative scientists of such different persuasions as Bertrand Russell on the one hand, Eddington and Jeans on the other, have indeed come very near to taking this step. Sir James Jeans for instance wrote:

[89] This is the Bohr theory. Koestler notes that, for all its paradox, it was the last theory which provided a kind of imaginable model of the atom. It has now been abandoned in favour of a purely mathematical treatment which banishes from atomic physics the very idea of a "model" with the sternness of the First Commandment ("Thou shalt not make unto thee any *graven image*").

[90] *An Outline of Philosophy* by Bertrand Russell: p.163.

[91] *The Limitations of Science* by J.W.N. Sullivan: p.68.

> " 'Today there is a wide measure of agreement, which on the physical side of science approaches almost to unanimity, that the stream of knowledge is heading towards a non-mechanical reality; the universe begins to look more like a great thought than like a great machine. Mind no longer appears as an accidental intruder into the realm of matter; we are beginning to suspect that we ought rather to hail it as the creator and governor of the realm of matter...'[92]
>
> "Thus the medieval walled-in universe with its hierarchy of matter, mind, and spirit, has been superseded by an expanding universe of curved, multidimensional empty space, where the stars, planets, and their populations are absorbed into the spacecrinkles of the abstract continuum a bubble blown out of 'empty space welded on to empty time.'" [93]

Dr. Lynch at the end of his book on Einstein wrote: "I have no doubt that there will arise a new generation who will look with a wonder and amazement, deeper than now accompany Einstein, at our galaxy of thinkers, men of science, popular critics, authoritative professors and witty dramatists, who have been satisfied to waive their common sense in view of Einstein's absurdities."[94] Such certainty is misplaced. Leaving aside the direct intervention of God, the minds of future generations are unlikely to be sufficiently coherent to be even capable of wonder and amazement.

11. "Much Mathematics Has Made Them What They Are"

A question remains to be answered: how has it all been brought about? This question may seem superfluous in the light of the answers given to many similar questions posed in many other places in my writings but the perversion of physics is not quite equivalent to the perversion of the other sciences. Abandonment of religion, corruption, censorship of criticism, indoctrination, pressure to conform to prevailing fashion and other assaulters of truth have undoubtedly played their part. There remains nevertheless the obstinate fact that one of the more important contentions of this essay is that the new physics is not the invention of one deceiver, with lesser men subsequently submitting to the pressure to follow where he led, but the continuous development of many people of great brilliance who undoubtedly believed in their theories. In a science as basic as physics, it is hardly credible that people should abandon, without any justification, reality which is capable of being tested by their senses.

Nor did they. They could indeed justify stating and believing what was obviously false, and their justification was provided by mathematics. In a process which started as

[92] *The Mysterious Universe* by Sir James Jeans: p.137.

[93] Ibid.: p.100. The entire passage by Koestler is from *The Sleepwalkers:* pp.539ff.

[94] *The Case Against Einstein* by Arthur Lynch: p.275.

one of the sequels of the Reformation, the role of mathematics, which until then was one of mere calculation, has gradually been extended; and to the function of calculation have been added the functions of assisting in reasoning and of describing physical observations. As a consequence, the habit of mind has gradually been built up which assumes falsely that, if a physical theory can be proved to be mathematically true, it *is* true.

"Mathematics is the paragon of truth and certitude," said Professor David Hilbert. Now Hilbert was generally regarded as the greatest mathematician of his day, but, even if he had been a thousand times more eminent than he was, I would still feel bound to point out that this statement is true only within strict limits. And since Einstein and his scientific descendants have long since abandoned these limits, they have made mathematics a servant of falsehood; and indeed they have used it to propagate errors so absurd that they could never have gained credence but for their being apparently vouched for by so trustworthy a science. As a result of its misuse and misapplication, mathematics has been despoiled of the dependability which properly belongs to it as an exact science, and the aura of infallibility which still hangs over it in its current decadence is often no more than a cloak for sophistry.

So what are the limits to the valid application of mathematics?, the reader may be wondering. As no one would doubt without the help of eminent thinkers such as Professor Hilbert, they are very simply (a) that no conclusion derived exclusively from mathematics may be accepted as certainly correct unless the computation is mathematically valid and the result unique, and (b) that no mathematical conclusion may be taken to apply to the real world except in accordance with, and subject to confirmation or rejection by, common sense and practical experimentation.

Surely, the reader may think, it is not necessary to point out the need for mathematics to be correctly used. Surely it is going too far to suppose that a professional mathematician or scientist would ever get his sums wrong! On the contrary, I am afraid that it is necessary to go further. The fact is that mathematical expertise does not prevent the professionals from making mistakes just as egregious as those of the densest schoolboy, though what it <u>does</u> do is enable them to disguise their errors more convincingly and to persuade others, even when common sense brands their invalid answers as evidently and definitely wrong, to accept them as correct.

Their principal means of both making their fantastic errors and also, at the same time, disguising them is that of manipulating zero and infinity as if they are mathematical quantities and therefore capable of being *treated* as if they are mathematical quantities - genuine mathematical quantities such as 9 or 99.99. And there is no excuse for it, no reason that such use of zero and infinity should be mathematically possible, since neither of them is in fact a *quantity* at all. If the distance between a and b is zero, the plain fact is that there is *no* distance between a and b and they are in exactly the same place; and to say that there *is* a distance but that its value is 0 metres or yards is at very best misleading. Similarly, if the distance between a and b is stated to be infinite, this means that there exists *no* point, no matter how far away from a, at which b is located - which is quite simply impossible; and to assign the value of "infinity" to the non-existent distance in question again can do nothing but confuse.

And when mathematicians are let loose on such distortions of reality, the results, surely not surprisingly, can be bizarre indeed. I offer an example.

We take a column of figures; we add 0 to it; in doing this we have not affected the result. So far so good; and similarly if we subtract 0 from the column of figures. But the inductive conclusion that has been too swiftly drawn from this and similar facts is that it is equally safe and mathematically valid to *multiply* or *divide* by zero. And it is not equally safe and mathematically valid; emphatically it is not.

It is obviously not good enough for me simply to assert this; I shall have to show that it is true. And in order to do that I shall have to suspend briefly my resolve to avoid any mathematics in this chapter and include a sequence of equations which not everyone will be able to follow. But courage, please! – even those readers who have not attempted to get their minds into training by seeing if they could make more sense of Eddington's helpful dissertation on the displacement of the Frauenhofer lines than Dr. Lynch managed to make! Unless you have never learnt any algebra or have forgotten all you knew, it will not be difficult to follow it. And even everybody else need not panic; for all they need to be aware of is that, although the following sequence of equations *ought* to be valid, since it obeys all the rules of mathematical manipulations (a fact they can confirm with any friend who knows enough mathematics), nevertheless it leads to the patently aberrant conclusion stated in the last line:

Suppose $a = b$

therefore $ab = a^2$

therefore $ab - b^2 = a^2 - b^2$

therefore $b(a-b) = (a + b)(a - b)$

therefore $b = a + b$

therefore $b = 2b$

therefore $1 = 2$

Yes, one is equal to two, according to the rules of mathematics. Did you spot the flaw? It is that, on the right-hand side of the fourth line of the equation, the multiplicand "(a - b)" is equal to *zero*.[95] And thereafter the equations are erroneous because the zero has been used to *divide*. And whereas even most mathematicians would acknowledge that this is not allowed in the context given, *it does not stop them doing similar things themselves*. And when they start treating infinity in the same way, the results are even more disastrous; and, of course, the more complicated the mathematics, the less easy it is for the layman to spot where he is being hoodwinked.

A whole chapter or book would need to be devoted to showing exactly why; but suffice it for the moment to say that these illegitimate manipulations were involved from the start in the integral and differential calculi invented and developed from the sixteenth century onwards, and underlie the *whole* of the branch of pseudo-mathematics founded by Georg Cantor to which reference will shortly be made in footnote 97.

All that now remains for me to say about the need for mathematics to be valid is that it should certainly not be supposed that, provided scientists get their sums right, their practical conclusions will definitely be correct. As I have pointed out earlier, the other main problem lies in the fact that mathematics sometimes supplies several different possible answers to the same calculation, between which, *from the mathematical point of view*, there is nothing to choose.

Let us suppose, for instance, that I have a square whose area is four square feet and that I wish to measure one of its sides. I have lost my ruler, but fortunately I was taught mathematics at school and can find the answer without it. Let x be the required length, and all I have to do is solve the equation, $x^2 = 4$. The equation, however, has *two* solutions: $x = 2$ and $x = -2$. Observation and common sense tell me that a side of negative length is impossible, so I ignore the second solution. What I should *not* ignore, however, is that mathematics has enabled me to reach a completely false conclusion as efficiently and unanswerably as it has enabled me to arrive at the truth, *and that, within the scope of mathematics, there is no way of telling one from the other*. Observation and common sense, which alone enable me to choose correctly among the divers results mathematics may offer to a single problem, are assistance brought in from outside to *help* mathematics. The fact that, in examples such as the one we have just considered, they are so readily available that there is no *practical* danger of error should not be allowed to obscure this, because mathematics is today put to very many uses in which observation and common sense *cannot* be turned to for confirmation or refutation of the results generated; and indeed there are no few instances, as we have seen and shall be seeing, in which unsupported mathematics is used to refute, purportedly, what observation and common sense tell us *must* be so. And, of course, as already mentioned, the more comp-

[95] A multiplicand is a quantity which is to be multiplied by another quantity.

licated the mathematics, the greater the scope for error: had I wished to find the length of edge of a cubic object whose volume was eight cubic inches, mathematics would have given me *three* alternative answers: the answer two; the answer one subtracted from the square root of minus three; and the answer one subtracted from *minus* the square root of minus three. Relying solely on the "paragon of truth and certitude", my chance of reaching the correct solution is not even fifty percent.

So far I have pointed out how mathematics can serve as an instrument of falsehood by its abuse at a purely mathematical level – as occurs when zero is treated as a quantity or when straightforward mistakes are made in circumstances in which independent verification is not possible; and I have highlighted the potentially, and actually, disastrous consequences of the fact that not all equations have a mathematically unique solution. There is, however, yet *further* scope for error in the use of mathematics, owing to the fact that the real world does not always accommodate itself to mathematics.

Nothing is more certain in mathematics, for instance, than that 1 + 1 = 2. This is not just an opinion or a proposition which is verified in a large proportion of cases: it is an absolute, admitting of no exception whatsoever. But it remains so only as long as the digits "1" and "2" are understood as what they truly are: purely mathematical entities, abstracted from concrete existence; not quantities <u>of</u> anything, but just quantities. And yet this abstract principle, despite being in itself undeniably valid and true, is of no practical utility unless it is applied to some concrete example in which reference is not just to "one" and "two" but to "one *something*" or "two somethings". And the moment that "1 + 1 = 2" is applied to a concrete example in such a way as to be of practical utility, scope for error is introduced, *because the real world is full of characteristics of which mathematics can take no account.*

Thus, although it is unquestionably true, as an abstract statement, that 1 litre of liquid plus another litre of liquid is equal to two litres of liquid, a person wishing to draw practical conclusions from this information would have to tread cautiously. If, for instance, he wished to know the capacity of container needed to hold the two liquids if they were *physically* added together, he would need to know *what* liquid or liquids were in question: a litre of water plus a litre of orange juice would indeed require a two-litre container, but a litre of water added to a litre of ethyl alcohol will occupy significantly (about a twentieth) *less* space.

Thus, too, one drop of water added to another *mathematically* makes *two* drops of water, but *physically* it can make just *one* drop of water, twice as large as the first. One Distinguished Service Order (a British military decoration) plus another Distinguished Service Order will make *two* D.S.O.s, *unless* both are awarded to the same serviceman, in which case the result will be a "D.S.O. with bar". One noise plus another noise may make two noises, or it may make one *louder* noise, or it may make one noise that is no louder but lasts twice as long. Finally, and incredible though it may seem, if the interference pattern of the two sets of sound waves is carefully enough controlled, the addition of the two noises may generate perfect silence!

I emphasise that these results in no way reflect on the accuracy or dependability of the science of mathematics, nor do they in any way contradict the fact that 1 + 1 = 2. They simply indicate that the application of mathematical results - however correct they may be in themselves - to the real world, in which alone they are of any value, is fraught with danger and that a mathematician who is deprived of the ordinary experimental means of confirming his results is the last person to rely on for concrete information about the world. Mathematics, in short, must be kept ruthlessly in its place.

Instead the opposite has happened. Mathematics has been placed on a pedestal, has been described as a paragon of truth and certitude, and is treated as an infallible arbiter. Physicists use mathematics to reach conclusions which they cannot test with their senses and forget that an essential safeguard against error has been lost. If the mathematics of a theory are impeccable, that theory is regarded as proved. Indeed a further stage has been reached: if mathematics demonstrate a theory to be true, it will be believed even if it contradicts what can be observed.

What a revolution it is that has taken place! The traditional claim of science, after it learned to acknowledge the authority of divine revelation, was that it nevertheless acknowledged the absolute authority of experience (observation and experiment) over all theories, hypotheses, prejudices, expectations or probabilities. "Mathematics," writes Professor Dingle, "has been transformed from the servant of experience into its master... Truths which are in fact sheer impossibilities...are presented as discoveries which, though they appear absurd, are necessarily true because mathematical inventions require them. The situation is precisely equivalent to that in which the zoologist assured the astonished spectator that if he understood anatomy he would know that such a creature was impossible."[96]

The relationship between mathematics and scientists, in summary, is now one of idolatry.

And, in addition, mathematics itself has degenerated.

The decay started, if indeed it was not by then already underway, with the invention by Leibniz and Newton of calculus, of which the lack of logical justification and possible invalidity of method were subjects of hot controversy from the end of the seventeenth

[96] *Science at the Crossroads* by Herbert Dingle: p.13.

to the middle of the nineteenth centuries.[97] It was not however until the turn of the twentieth century that the leaders in the field of mathematics finally took complete leave of their senses. This occurred when paradoxes started to emerge. From this point a mathematical proof could be accepted even if mathematically impossible!

The word "paradox", though it sounds inoffensive, means, when used by mathematicians, logical contradiction. In the days of Euclid, and indeed at any time until recently, a paradox would have been regarded as proof of mathematical *error* and would have vanished along with the equation it has disproved. Now, however, paradoxes have been given an especial dignity, as have so many other errors in our world, and are studied in a branch of mathematics called Foundation Theory or Metamathematics. The reader may be relieved to learn that the distortion of the human mind so that it could embrace the paradoxes rather than retreat from them was not achieved overnight. Professor Hilbert, understandably since he looked upon mathematics as "the paradox of truth and certitude", wrote: "The existence of paradoxes is intolerable... They lead one to conclude that mathematical thinking is defective.[98] And many others took the same view.

But the feat was at length achieved. Let us turn to a book called *The Foundations of Mathematics – A Study in the Philosophy of Science* by Dr. Evert W. Beth, in which the development of the love affair been the paradox and mathematics is usefully summarised.

> "About half a century ago (the book was published in 1946 – N.M.G.) the world of science was startled by the discovery, which came quite unexpectedly, of a large number of paradoxes which seemed to threaten the very foundations of logic and mathematics."

Dr. Beth lists the seventeen paradoxes which had been discovered up to 1946. Apart from the famous liar paradox,[99] known in antiquity, which he places at the top of

[97] Here I am perhaps guilty of a "shorthand" leading to a misleading over-simplification which, at the cost of a small amount of repetition of what I have said a little earlier, I think I ought to put right. The early proponents of calculus (Newton, Leibnitz, etc.) used infinity (which they understood to be a greater quantity than all ordinary numbers) in a blatantly fallacious way that was clearly unjustifiable. This use of the infinite became completely discredited in the nineteenth century and is never used now - calculus is done without it. The newer use of the infinite, founded principally by George Cantor (see paragraphs 220, 224 and 242), deals with infinite *sets* (such as "a set of numbers"). The fallaciousness of this technique can at least be said to be not so evident; but what is evident is that it does often produce nonsensical results; and if there be any validity in the use of the infinite, certainly no one has spelt out exactly what can be done with it and at what point its limitations are reached. It should be noted that the logical justifications for the method of the calculus and differential equations generally known as "analysis" are still matters of controversy among specialists. See "The Metaphysics of the Calculus" by A. Robinson in *The Philosophy of Mathematics* edited by J. Hintikka: p.153.

[98] "On the Infinite" by David Hilbert in *The Philosophy of Mathematics* edited by P. Benacerraf and H. Putman: p.141.

[99] The liar paradox was invented by Eubulides, a sixth century B.C. Greek philosopher. Epimenides, the Cretan,

his list, all of them are dated subsequent to 1895 and six of them are subsequent to 1940.

> "The common feature of the arithmetic paradoxes, which distinguishes them from the pseudo-paradoxes such as the barber paradox[100] and from which they take their peculiar and serious character, resides in the fact that, without exception, they encroach upon the most fundamental notions of logic and mathematics... As a matter of fact these paradoxes threaten the entire edifice of deductive science and especially logic and mathematics."

There was a time when the error in logical and mathematical method to which such paradoxes unambiguously pointed[101] would have been ruthlessly discarded. Twentieth century mathematicians met the challenge differently.

> "After fifty years of an increasingly intimate acquaintance, mathematicians and logicians are no longer so impressed by the paradoxes; to a certain extent they have even learned to take advantage of them, as H. Poincaré early recommended. Indeed, many of the most profound results in modern logic have arisen from analysis of the paradoxes."[102]

This, having scraped some acquaintance with the profundities of modern logic, we can readily believe.

It is now not so difficult to see how men, even brilliant and sincere men, could create the impossible fantasy world in which, through weight not of logic but of propaganda, we are persuaded to believe. "Science," said Oliver Wendel Homes, "is a good piece of furniture for a man to have in an upper chamber provided he has common sense in the ground floor." Professor Dingle, who was as well placed to make a judgement as any man and was weighing up people with whom he was intimately acquainted, summed up a lifetime of observation as follows:

> "I think it is impossible to doubt that as a general rule the practice of mathematical physics goes hand in hand with lack of elementary reasoning power and of that normal form of human wisdom, somewhat misleadingly called common sense, that provides its own corrective of premature judgement and never allows the requirements of reason and experience to be overcome by the seductions of attractive speculations... Mathematical ability and ability to conduct operations of thought are distinct faculties, and although I know of no reason why they should not co-exist in the same person

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says: "All Cretans are liars." If he is telling the truth he is lying; if he is lying he is telling the truth. Simpler forms are "I am lying" and "I always lie". Not dissimilar paradoxes are the statements "There is no absolute truth" (not even that statement?) and "All things are relative." What these demonstrate, of course, is the philosophical impossibility of there being no absolute truth.

[100] The barber paradox is described and explained in paragraphs 229 and 230.

[101] In an article in the *Tychonian Society Bulletin* of December 1977, W. DeCew pointed out that the paradoxes were caused by the same fallacy, which was a false concept of the infinite. Out of the seventeen paradoxes the "set theory" paradoxes, which are in the minority, deal explicitly with the infinite; and the remainder, which are paradoxes of symbolic logic, deal implicitly with the infinite through their use of the terms "all" and "every". The introduction of the infinite into mathematics is the direct result of integral and differential calculus (which, incidentally, are used for all celestial mechanics).

[102] *The Foundation Of Mathematics* by Ewert Beth: p.481.

> it is only too clear that at the present time, except in a rare instance, they do not... The mathematical physicists of the current era were not necessarily born with a deficiency of common sense: they have exceptional mathematical ability, which has been mistaken for exceptional intelligence, and have been so trained that their normal intelligence has expired through desuetude; much mathematics has made them what they are."[103]
>
> It is easy to laugh at Einstein. It is less easy, but important, to realise that all his brilliant contemporaries and precursors who did not have their speculations announced in newspapers all over the world, wereno better.

Yet it is true. Taken as a whole, they are the vehicle through which modern physics has been brought about and Einstein is only the much publicised figurehead.

Would it be accurate to say that they were all mad? It is accurate to say that they had, and their successors have, a lower understanding of the realities of life than would be expected of a child or an ignorant savage. It is also true that in an age where scientists have unprecedented influence, where their pronouncements are treated like infallible revelations of divine wisdom, such lack of touch with reality is immeasurably dangerous.

Yes, such men, venerated pillars of society that they are, are dangerous, bringing about the same result, but on a vastly more extensive scale, as the pushers of mind-destroying drugs. Perhaps we should not try to excuse them by saying, as is certainly true, that they are the tools of powerful conspirators whose control of the academic world is such that they can organise praise, preferment, accolades on the one hand or, as Professor Dingle's experience showed, almost total exclusion from being able to publish, whether in national newspapers or specialised scientific journals, on the other hand. Every human being, after all, must take ultimate responsibility for his own actions.

But whether, as is certainly true of some of them, their mind-destroying achievements are the product of their consciously having sold themselves in exchange for a glamorous career in the academic world or whether, as is almost certainly true of most of them, it is simply that (in Professor Dingle's words) "much mathematics has made them what they are," we must protect our intellects against these maniacs as best we can. So completely have they and their ideas penetrated the fabric of society, that it is not practical to suggest introducing the methods, from Index of Banned Books to Autos-da-Fe, which orderly societies once used in order to survive, prosper and to promote the greatest good of their members. In the age in which we live we are individuals struggling for survival in an environment almost universally hostile to truth in any form. What we must do, therefore, is to realise that we can do no more than individuals are capable of, but at the same time not fail to do all that individuals are capable of. We ourselves must lay a determined and uncompromising hold on reality. As far as physics

[103] *Science at the Crossroads* by Herbert Dingle: p.127, 129.

is concerned, as in fact is true of many other areas of science, we must clearly realise that the sources of the illusions which have befogged and confused us, are, first, the notion that human reason is superior to Divine revelation, and secondly, unhinging human reason once it has been deified, the abandonment of the Aristotelian system of reasoning in exchange for reasoning through the medium of mathematics.[104] And, having made this realisation, we must try to channel the thoughts, reading, re-education and way of life of ourselves, and of anyone whom God has put into our sphere of influence, accordingly.

APPENDIX 1

Dr. Louis Essen on Einstein

The passage quoted in this appendix is useful because, although it contains nothing, or virtually nothing, that has not already been said in the foregoing, it does provide additional confirmation of some of the more important arguments from a source of undoubted authority. In particular it provides evidence that the Theory of Relativity has been imposed by bluff and propaganda rather than reasoned argument and that there exist powerful forces successfully seeking, for whatever reason, to impose the theory on everyone, from the most learned professor to the schoolboy, irrespective of whether it can be shown to be true.

Dr. Essen's credentials cannot be questioned. He is a Fellow of the Royal Society and has been authoritatively described[105] as probably the world's greatest authority on the practical problems of time-keeping, which of course bears closely on Relativity Theory (and if the reader has any doubts about whether time-keeping is a demanding branch of science I recommend him to investigate that subject a little further!). What follows is most of the Introduction to his 26-page booklet, *The Special Theory of Relativity – A Critical Analysis* published by the Oxford University Press in 1971.

> "No branch of science has received more public acclaim than the theory of relativity, and few scientists are held in greater esteem than its author, A. Einstein. The theory was accepted by such philosophers of science as B. Russell (1927),[106] de Broglie (1939), and W. Heisenberg (1958).

[104] It is interesting that Galileo was one of the principal agents for initiating the spread of both these pernicious errors; with his attack on Church authority, as described in *Galileo versus the Geocentric Theory of the Universe*, on the one hand, and with, for instance, his much quoted assertion that "the book of nations is written in the mathematical language," on the other.

[105] By Sir Charles Darwin, Director of the National Physical Laboratory (in England) where most of Dr. Essen's work is conducted. See *Science at the Crossroads* by Herbert Dingle, page 114.

[106] The date in brackets after each author mentioned by Dr. Essen in this Introduction is the date of the work by that author to which he (Essen) is referring in each case. Out of space considerations I am not giving the full references as Essen does in the original.

P.W. Bridgeman (1936) accepted the special theory of relativity with some reservations, although he was very critical of the general theory. A. Eddington, who was very influential in popularising the theory in England, expressed the view in the preface to *Space, Time, and Gravitation* (1920) that with the theory of relativity Albert Einstein provoked a revolution of thought in physical science; and more recently C. Lanczos (1959) has stated that within the span of a few years the name Einstein attained a lustre that is perhaps unprecedented in the entire history of the human race. In view of such comments it is surprising to find that the theory presents many strange features. Einstein and many other writers have found it necessary to write explanations of the theory, and although the explanations are largely repetitive they sometimes differ in important respects. There are examples of the same author giving, at different times, different explanations of some of the relativity predictions. It is a subject about which writers tend to use more emotive language than is usual in scientific texts. For example, L.B. Loeb and A.S. Adams (1933) state that most of those who attack relativity are either fanatics or so poorly equipped mathematically that they are incapable of understanding or following the processes involved. The reference here to mathematical ability is puzzling because, as we shall see, parts of Einstein's papers that are often criticised involve no mathematics.

"Other strange features are the brevity of the introduction in Einstein's paper of 1905, and the omission of any reference to the work of H.A. Lorentz and H. Poincaré, although this was so important that E. Whittaker (1953) in his detailed study attributes the theory entirely to them. Such points of historical interest are also mentioned by C.H. Keswani (1965, 1966) and G.B. Brown (1967). E.G. Cullwick (1959) and H. Dingle (1960, 1967) also criticise the theory. P.M.S. Blackett (1955) quotes a story showing that E. Rutherford attached no importance to it. Wien had been explaining to him that Newton was wrong in the matter of relative velocity and added, 'But no Anglo-Saxon can understand relativity.' 'No,' Rutherford agreed, 'they have too much sense.' This comment was not borne out later, and the theory became accepted wholeheartedly.

"Perhaps the strangest feature of all, and the most unfortunate to the development of science, is the use of the thought-experiment. The expression itself is a contradiction in terms, since an experiment is a search for new knowledge that cannot be confirmed, although it might be predicted, by a process of logical thought. A thought-experiment on the other hand cannot provide new knowledge; if it gives a result that is contrary to the theoretical knowledge and assumptions on which it is based, then a mistake must have been made. Some of the results of the theory were obtained in this way and differ from the original assumptions. (Essen 1957, 1963a, 1965, 1969.) Einstein himself calls one of the results peculiar, but in fact it must be wrong, since it disagrees with the initial assumptions.

"In spite of these unsatisfactory features, and in spite of the fact that attention has been drawn to them, the theory is still generally accepted. It is, of course, taught in universities, usually uncritically, and there are now plans to introduce it into school courses (Rosser 1969). H. Bondi (1967) has written that his ultimate aim is to get special relativity into the primary school syllabus. In these circumstances it is particularly important that any weaknesses in the theory should be openly discussed and remedied.

"A common reaction of experimental physicists to the theory is that, although they do not understand it themselves, it is so widely accepted that it must be correct. I must confess that until recent years this was my own attitude. I was, however, rather more than usually interested in the subject from a practical point of view, having repeated, with microwaves instead of optical waves (Essen 1955), the celebrated Michelson-Morley experiment, which was the starting point of the theory..."

APPENDIX 2

Some Revelations by Lord Snow on the Development of Modern Physics

The greatest difficulty that I believe the reader will have had with this whole essay of mine on Einstein is simply that of being unable to believe, no matter how logical what I say appears to be and no matter how good the evidence I have produced, that modern science really can be as unreal and insane as I have depicted it. I believe he will overcome this difficulty as effectively as in any other way I can think of, merely by reading a few accounts - selected at random by himself – of the development of modern physics by "establishment" writers on the subject and taking note of the admissions that they unhesitatingly, and even enthusiastically, make.

Just to give one example, I append here a few short extracts from a work called *The Physicists – A Generation That Changed the World* by C.P. (Lord) Snow, published posthumously in 1981. No commentary by me is needed.

Page 56, telling the story of how Niels Bohr founded modern theoretical physics:

> "Not many acts of kindness and good judgement have had more creative results than that of Rutherford. Einstein wouldn't have needed encouragement: the young Bohr did. He stayed in Manchester, buoyed up by Rutherford's zest and his gift for communicating that he was usually right. Within two years Bohr, with his characteristic mixture of cautiousness and daring, produced a theoretical equivalent of Rutherford's nuclear atom, a theory as daring as it was original.
>
> "In Rutherford's model of the atom, electrons orbited the central nucleus, held in by its electrical attraction, in much the same way as the planets are held in orbit about the sun by its gravitational pull. It explained his experiments neatly. Unfortunately, the laws of classical physics did not allow Rutherford's atom to exist. According to the electromagnetic theory which Maxwell had built on the foundations laid by Faraday, an electrically charged particle produces radiation if it is diverted from a straight path. The electrons in Rutherford's atom were in circular orbits, so they should have been radiating all the time. If they did so, they would be losing energy, and would have spiralled down into the nucleus in a fraction of a second. The atom would have collapsed on itself.
>
> "Rutherford was not perturbed: he was not a theoretician. It was Bohr who provided the theoretical backbone. Without contradicting Maxwell in the general run of physics, he simply asserted that when an electron is orbiting a nucleus it does not radiate. This made no sense in classical physics. But it worked. For Bohr was bold enough to include a second assumption which meant his new theory could explain the long-standing puzzle of the pattern of wavelengths - spectral lines - from hydrogen..."

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Page 63:

> "The fact was, there was no satisfactory theory of the atom. Bohr's model explained the simplest atom, hydrogen, brilliantly, but it totally failed when confronted by the spectra of other elements. Clearly the situation was much more complicated when atoms had more than one electron. And even in the case of hydrogen, Bohr had simply made two assumptions without any theoretical backing. There was no kind of logical rigour."

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Page 72 (Emphases added):

> "Heisenberg then produced one of the most dramatic of all physical concepts. It became known as the Uncertainty Principle, meaning that the exact position and precise velocity of an electron could not be determined at the same time. Which meant something more disturbing - that, in the sub-atomic world, causality broke down. It would never (literally never) be possible to predict exactly where an individual electron would be. The only statements that could be made, and this was as far as human minds could reach, were statistical. For an individual electron, one could only say where it was *likely* to be. Detailed predictions were valid for assemblies of large numbers of particles, not for one. This became the final ground of the Binstein-Bohr debate a few years later, a debate which continued until the end of Einstein's life.
>
> "In the late 1920's the masters of theoretical physics had reached a peak of achievement and confidence (Einstein dissenting). It was possible to say it was said by some with the most critical minds *that the fundamental laws of physics and chemistry were now laid down forever*. That wasn't a boast. Though there have been qualifications since, those laws are now part of the scientific edifice the most successful of the collective works of the human intellect.
>
> "It is true some of the laws when first enunciated appeared bizarre. But wise men said that, within a generation, those laws would become familiar, part of the common-scientific language, as taken for granted as those of Maxwell or Newton. That has been demonstrated, now that time has passed. Any competent student today accepts the Uncertainty Principle as a matter of course..."

...proving that in time you can believe in anything however insane, or, rather, "bizarre" provided that you are intelligent enough...

> "...and knows about the most beautiful creation of that extraordinary epoch in scientific history. Here I refer to the culmination of wave mechanics, quantum mechanics and atomic structure, in the work of Dirac.
>
> "Dirac crowned the achievement of that marvellous [!] decade by combining all the ideas of de Broglie, Schroedinger, Heisenberg and Born with the relativity theory of Einstein. Physicists had been totally preoccupied with sorting out atomic structure. Though they knew that relativity had to be included somehow, it wasn't obvious how. Dirac pulled all the strings together in 1928, and showed that incorporating relativity removed the last of the atom's puzzles. It explained quite naturally the rather odd fact that individual electrons spin around on their own axes, like miniature tops, as they orbit within the atom."

How do all you brilliant men *know* that electrons spin like miniature tops, when even the existence of an atom, let alone its component parts, is only a theory, unverified by any form of observation?

Oh, Euclid! Oh, Aristotle! Oh, Diogenes!

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And, on page 76, a final observation of interest, of which the reader may make what he will:

> "There was one oddity which didn't attract much attention at the time. If it had come to mind, it would have been dismissed as trivial. Theoretical physics, at this high point, was very much a Jewish science. Heisenberg wasn't Jewish, nor was Dirac or de Broglie. Almost all the other leading figures were. Bohr, the quintessence of Scandinavian virtue and the personification of Nordic manhood, had a Jewish mother. It would have seemed silly to wonder if this accidental fact about the physicists' origins was going to have its consequences."

APPENDIX 3

More on Paradoxes

In paragraphs 176-184 the effect on mathematics and mathematical thinking of the discovery of a number of paradoxes arising from mathematical "development" was briefly discussed. The reader who comes across the subject of paradoxes in the context of mathematics for the first time may be led by the fact that they are amusing puzzles to think that their importance is little more than that of entertainment value and has been exaggerated in the foregoing.

It is not so. In the earliest times the reason for the invention of paradoxes was to attack philosophical and mathematical systems, such as those of Aristotle, and therefore strenuous efforts were made to resolve them. Thus the famous liar paradox, that concerning the Cretans set out in footnote 99, was an attack on Aristotle's acceptance of the concept of absolute truth: and was not only thought by Aristotle sufficiently important to be answered (in *On Sophistical Refutations*), but was still being analysed, with new solutions being proffered, at the time of Cicero. The solution to the paradox is of course that a statement has been made about a class of persons which in the context simply cannot be true and must therefore be withdrawn. This particular paradox was, incidentally, well known to educated people in New Testament times and St. Paul refers to it in his Epistle to Titus ("One of them, a prophet of their own, said: The Cretians are always liars, evil beasts, slothful bellies."[107]).

[107] Titus 1:12.

All modern paradoxes are related to the infinite (or "sets" or "classes"[108]) in some way and many of them arise directly out of the use of the infinite in mathematics, an abuse which can be said to have been finally established as a legitimate part of mathematics by the nineteenth century mathematician George Cantor. There was intense opposition to him in his day, because mathematicians had not yet lost completely the power to reason; but in the twentieth century his theories triumphed, so that the "greatest" of the twentieth century mathematicians, David Hilbert, said: "No one shall expel us from the paradise which Cantor has created for us." Hilbert is welcome to stay in his paradise, provided that I do not have to be there too.

The difference between the classical paradoxes and the modern ones is that the latter could not be solved and were not solved and therefore, as was indicated in the main body of this essay, it was the whole foundations of mathematics which had to go instead. Nothing so vulgar as reality must be allowed to interrupt the march of human progress over the edge of the Gadarene cliff. I quote the following interesting passage from Morris Kline's *Mathematics in Western Culture* (p. 444 – my emphasis added):

> "The attempts to fill the gaps left during the heroic age (1600-1850 during which period mathematics had made 'gigantic strides') were frustrated by paradoxes, contradictions and more paradoxes. *There developed an imperative need* for critical thinkers with imagination and daring of another kind, *the kind that would be able to dispense with and even override intuition and 'common sense'.* This need was finally met. Neither the more circumspect workers, however, nor the trail blazers could have anticipated the astonishing and profound disclosures which their critical efforts brought forth."

I should think not. Kline, I must add, thoroughly approves of the manner in which "the need was finally met" and of "the profound disclosures". Later, after looking at some of the paradoxes in detail, he says revealingly (my emphasis added again):

> "In all of these paradoxes a distinct class of objects is involved, the class of Cretans, the class of people to be shaved, and the class of heterological words in the last example. Analysis shows that the statements about these classes are self-contradictory. Yet just such difficulties were introduced into mathematics by Cantor's use of the class concept. It is no wonder, then, that his work aroused a storm of criticism and became the subject of fierce controversies.[109]
>
> "It is painful to relate that the difficulties have not been cleared up. Because they involve problems on the borderline between logic and mathematics, several different approaches to the two subjects have been advanced, each of which claims to be the correct one, though no one approach has as yet proved satisfactory. Mathematicians are now divided into schools of thought, each advocating its

[108] A set, or class, is a number of persons or things that belong together as essentially similar.

[109] The differences between the classical philosophical paradoxes and the paradoxes arising from mathematics is of course that, whereas the former, when shown to be based on faulty reasoning - such as the making of a statement about a class which was logically incapable of being applied - could be, and were, withdrawn, the latter are not, it being logic instead that is withdrawn.

own philosophy of the foundations of mathematics.

"The doubts have at least given mathematics the opportunity to spoof their own work... *A proof, says one quip, tells us where to concentrate our doubts. Logic, says another, is the art of going wrong with confidence.*

God help them. They even admit that their so-called science is unreal.

For the convenience of the reader I conclude this appendix by giving some of the better known paradoxes.

1. *The Barber paradox*. The council of a village is supposed to have promulgated a regulation compelling any male inhabitant who does not shave himself to be shaved by the village barber. At the same time, the barber is strictly forbidden to shave anybody who is in the habit of shaving himself. Obviously the village barber will be in a rather painful dilemma: if he does not shave himself, he will be obliged to do so; if he forms the habit of shaving himself, this will be strictly forbidden to him.

There is in fact nothing contradictory about the supposition that a village council could make an absurd regulation. The event might have given rise to some knotty legal problems, but it does not raise any logical questions.

2. *Vicious circle fallacies*, caused by the neglect of the fundamental principle that what involves the whole of a totality cannot itself be a member of the totality. For instance: "Never say never", "every rule has exceptions", and "every generality is false".

3. *The Poacher paradox*. Poaching on the hunting reserves of a powerful prince was punishable by death, but the prince further decreed that anyone caught poaching was to be given the privilege of deciding whether he should be hanged or beheaded. The culprit was permitted to make a statement if it were false, he was to be hanged; if it were true, he was to be beheaded. One logical rogue availed himself of this dubious prerogative to be hanged if he didn't and to be beheaded if he did by stating: "I shall be hanged." There was a dilemma not anticipated. For, as the poacher put it: "If you now hang me, you break the laws made by the prince, for my statement is true, and I ought to be beheaded, but if you behead me, you are also breaking the laws, for then what I said was false and I should, therefore, be hanged." The end of the story is up to the reader!

4. *Paradoxes based on indiscriminate use of the word "all"*. For instance:

(a) This book consists of ten pages.

(b) This book was written by Confucius.

(c) Statements (a), (b) and (c) are all false.

(a) and (b) are indeed false, but (c) is both false dressed up as true and true dressed up as false neither false nor true. Or - another way of exposing the "paradox" - (c) is in fact not one statement but three and the words of it are not capable of doing three (actually two) different jobs.

5. *The Berry Paradox*, which is a little more difficult. I quote from page 486 of Dr. Evert Beth's *The Foundations of Mathematics*:

> "This is a very ingenious and instructive simplification of the Richard paradox.[110] Suppose we are given a lexicon containing every word actually occurring in the text of the present book; the number of words contained in this lexicon will obviously be finite; names of persons and logical and mathematical symbols actually employed will be considered as words. We consider the set P of the sentences which contain at most 50 words, all of which must be taken from our lexicon. The set P will also be finite.
>
> "Now we introduce the set Q of the sentences which are contained in P and which define a natural number. The set Q, being a subset of P, will a fortiori [all the more] be finite.
>
> "Finally we consider the set R of the natural numbers which are defined by a sentence in Q. The set R will be finite; consequently, there are natural numbers which are not contained in R, and among these natural numbers there must be one which is the first in accordance with the usual arrangement of natural numbers.
>
> "This natural number will be called the Berry number. Now let us consider the sentence: 'The Berry number is the first number, in accordance with the usual arrangement of natural numbers, which cannot be defined by means of a sentence containing at most fifty words, all of them taken from our lexicon.'
>
> "It is apparent that this sentence constitutes a correct definition of the Berry number.
>
> "However, it contains no more than 37 words, all of them taken from our lexicon, and therefore it is contained in P. As it constitutes the definition of a natural number, it is also contained in Q. Consequently, the Berry number, of which it constitutes a definition, must be contained in R.
>
> "On the other hand, owing to its very definition, the Berry number cannot be contained in R. Therefore, we are again led to a formal contradiction."

6. Finally, the greatest paradox of all, if such nonsense can be dignified by the term "paradox". As one of his contributions to our clearer understanding of reality, Gregor Cantor defined "infinite class" as a class which has the property that the whole is no greater than some of its parts.

APPENDIX 4

The Breach with Science from 1600 A.D. Onwards

In the preceding pages, and also in my *Galileo versus the Geocentric Theory of the Universe*

[110] I have not included the Richard paradox, and I do not recommend the reader who is merely in pursuit of some relaxing entertainment to trouble himself with looking it up. Yes, it *is* somewhat demanding! – N.M.G.

and *Sir Isaac Newton and Modern Astronomy*, it has been implied, suggested and emphatically stated that there was a point at which scientific development began to part company with reality and that from then on the passage of time only increased the gap between true science and what so-called scientists believed or pretended that they were discovering. I have also strongly suggested that the divorce of science from truth was deliberately and systematically organised, with each step of so-called progress straining the very limits of credulity at the time and then, once the public had accustomed itself to accepting the new insanity, leading onto the next even more absurd step up to point at which we have now arrived.

In the belief that it might help the reader to appreciate the enormity of what has been done if he is shown, very much in outline and without going into detail, the mechanics of how it was done, I reproduce the following very informative passage from a book from which I have already quoted more than once in this chapter, Evert Beth's *The Foundations of Mathematics – A Study in the Philosophy of Science.* As with some others that I have used, this book is useful to my purpose because the author does not take a position against what happened and therefore cannot be accused of bias in favour of my conclusions. He is merely reporting the facts that occurred. I shall interpose occasional comments. Pages 38 and 47 of the book (my emphases added throughout):

> "Aristotle's theory of science postulates, as we have seen, every science to have a deductive structure, to start from principles accepted as self-evident, and to have an empirical foundation."

In other words, the principles set out by Aristotle, which by the turn of the seventeenth century had survived examination over some two thousand years, were that truth could be arrived at by a combination of (1) what one could see or otherwise experience with the senses, (2) what every reasonable person would agree to be self-evidently true, (3) what could be deduced by correct use of logic, and (4) what could be tested by experiment.

> "About 1600, it became more and more clear from scientific practice that science could hardly hope to satisfy all three of these postulates at the same time.
>
> "In mentioning the date 1600, I do not mean to imply that it was only then that the development of modern, 'non-Aristotelian', science had its beginning. It is known, from the studies of scholars such as P. Duhem, Dijksterhuis, P. Rucker, and A.C. Crombie, that the roots of modern science reach far back into the Middle Ages, and there may even be much truth in the opinion of such authors as R. Eisler and A. Frenkian, who place the origin of certain number of fundamental conceptions of modern science and philosophy in times far beyond Greek antiquity. It is not until 1600, however, that non- and anti-Aristotelian conceptions took scientific forms which could successfully rival and even supersede the solid edifice of peripatetic [i.e. Aristotelian] science.
>
> "From then onward, it became customary to recognise two different types of science, one of which conforms to the postulates of deductivity and evidence, whereas the other answers to the requirement of an empirical foundation. Rationalism, as defended by Descartes, has a preference for the first type of science which I shall call rational science, whereas empiricism, typically represented by Locke, fosters empirical science, as the second type is called. The opposition between the two schools of

> rationalism and empiricism should not, however, be overrated, as these schools have their origin in the same historical situation and present quite a number of common features in their doctrines."

Indeed the two opposing errors would have the same origin. The important thing is not the particular error that is propagated *but that there should be errors*. And once an error has been proposed, which will inevitably be attacked as demonstrably untrue, *it is vital to set up another error in opposition to it*, because otherwise the first error will be opposed only by the truth - leaving little doubt about which the victor will be. Provided two ideas in opposition to each other are both wrong, those responsible for propagating the errors do not mind which side we join; and the fact that two ideas are in opposition to each other carries the insidiously seductive implication that *one* of them must *surely* be right. In other words each confers a spurious legitimacy on the other.

> "Leaving Kant aside, we may sum up the outcome of the development of the theory of science during the l7th century as follows. There are two types of science:
>
> "(a) Rational science, which starts from principles, accepted as self-evident, and proceeds by rigorous logical deduction and so conforms to Aristotle's postulates of deductivity and evidence, but not necessarily to his reality postulate.
>
> "(b) Empirical science, which starts from experimental data and proceeds by analysis; it conforms to the reality postulate, but not necessarily to the postulates of deductivity and evidence.
>
> "Consequently, speculative philosophy has to make a choice between being either a rational or an empirical science, and it accordingly splits up into the currents of rationalism and empiricism. Kant, by bringing together rational and empirical science, made an attempt to restore, as far as possible, Aristotle's unitarian theory of science; in my opinion, however, he was not successful."

He certainly was not. Far from restoring Aristotle, which he could have done very easily simply by returning to Aristotle, he was advancing yet another error; but that is another story, outside the scope of this appendix.

> "On the contrary, rational science turned farther from Aristotle's ideal, by dropping his evidence postulate also. The development of non-Euclidean geometry constituted the first move in this direction; the decisive step was taken as a result of contemporary research into the foundations of logic and mathematics, Each of the modern schools in this field - logicism, cantorism, formalism, and intuitionism - attempted, initially, to maintain the postulates of deductivity and of evidence; *they were all forced to drop the one or the other of these postulates*.
>
> "An equally significant development can be observed in empirical science. Here, in spite of Mach's phenomenalism, the reality postulate had to be attenuated in order to preserve the ability to construct suitable deductive theories. *Modern physical theories do not conform to the evidence postulate, and, recently, the transition to quantum logic has even necessitated a revision of the postulate of deductivity.*
>
> "It is easily understood how these developments have alarmed the representatives of the various schools of speculative philosophy, which, as we have seen, derives its origin, and even its right of existence, from Aristotle's theory of science. This accounts for the violent protestations of speculative philosophers against the developments in modern science which gave rise to the establishment of such theories as non-euclidean geometry, mathematical logic, the theory of relativity, and quantum mechanics, each of which, in one respect or another, implies an infringement of the postulates underlying Aristotle's theory of science; the unanimity of these protestations is,

indeed, in a peculiar contrast to the common discord among speculative philosophers."

In other words, putting it into nice simple language, the scientific system of Aristotle, which required equal weight to be given to both logic and what one could experience through the senses, was supplemented by *either* logic without the need to test it against experience *or* experience without logic. Rational science, on the one hand, denied the need for evidence, and empirical science, on the other, denied the need for reason. Thus, to point out only the most fundamental limitations: rational science said that if a thing could be shown to be mathematically true it was true even if common sense showed it to be false, examples of which we saw earlier on in the main body of this essay; while empirical science limited its discoveries to what could be directly perceived, and no matter how demonstrably true something that was outside the range of the senses might be, it could not be accepted.

And, funnily enough, once sufficiently unhinged from reality, both erroneous systems of science eventually ended up by denying their own foundations; *so that rational science, as Dr. Beth has just stated and as we had already seen, ceased even to adhere to the rules of logic and empirical science ignored empirical evidence*. The wheel has turned full circle and unity has been restored; but this time it is not Aristotelian unity but a unity of universally self-contradictory madness.

APPENDIX 5

Nuclear Physics

Although the examination of Einstein and modern physics that I have undertaken in the previous pages does not deal directly with the application of modern physics to the development of the atom and hydrogen bombs, nevertheless, because there is an indirect relationship and because the topic of nuclear bombs is dealt with in detail elsewhere in my writings [*Nuclear Bombs, the Nuclear Deterrent, and all other Nuclear Matters: The Most Fantastic Hoax of All?*], I thought that some readers might find a short and easily understood description of the theory of nuclear physics as set out by establishment scientists useful.

I emphasise most strongly that my purpose in this appendix is not to attempt to inform the reader as to what he can or should believe, but merely to tell him, in a historical context, what the theory is.

The following excellent summary is from *Tragedy and Hope - A History of the World in Our Time* by Professor Carroll Quigley (pp.848ff.)

"As late as the fall of France in 1940, all countries were equal in their scientific knowledge, because science was then freely communicable, as it must be, by its very nature. Much of that knowledge, in physical science, rested on the theories of three Nobel Prize winners of 1918-1922. These were Max Planck (1858-1947), who said that energy did not move in a continuous flow like water but in discrete units, called quanta, like bullets; Albert Einstein (18791955), whose theory of relativity indicated that matter and energy were interchangeable according to the formula $E=mc^2$; and Niels Bohr (1885-1962), who offered a picture of the atom as a planetary structure with a heavy, complex nucleus, and circumrotating electrons in fixed orbits established by their energy levels according to Planck's quantum theory. At that time (1940) all scientists knew that some of the heavier elements naturally disintegrated and were reduced to somewhat lighter elements by radioactive emission of negatively charged electrons or of positively charged alpha particles (helium nuclei, consisting of two positively charged protons with two unchanged neutrons).

"As early as 1934, in Rome, Enrico Fermi (Nobel Prize, 1938) and Emilio Segre (Nobel Prize, 1959), without realising what they had done, had split uranium atoms into lighter elements (chiefly barium and krypton) by shooting neutrons into the uranium nucleus. (Such neutrons had been isolated and identified in 1932, by Sir James Chadwick, Nobel Prize winner in 1935.) Although Ida Noddack at once suggested that Fermi had split the atom, the suggestion was generally ignored until Otto Hahn, Lise Meitner, and Fritz Strassman in Germany, in 1937-1939, repeated Fermi's experiments and sought to identify the bewildering assortment of lighter radioactive elements which emerged when uranium was bombarded with a stream of neutrons.

"By February 1939, it was established that the heaviest element, 92 uranium, could be split in various ways into lighter elements nearer the middle of the atomic table and that large amounts of energy were released in the process. For example, 92 uranium might be split into 56 barium and 36 krypton. The reason for the release of energy was that the nuclear particles (protons and neutrons) had smaller masses in the nucleus of elements near the middle of the atomic table than they had in the nuclei of elements nearer the top or the bottom of the table or than the particles had alone outside any nucleus. This meant that the nuclear particles had the least mass in the elements near 26 iron and that energy would be released if heavier elements could be broken into lighter ones nearer iron or if lighter elements could be built up into heavier elements nearer iron. Now that scientists can do both of these things, at least at the very top (hydrogen) and the very bottom (uranium) of the table, we call the splitting process 'fission' and the building-up process 'fusion' of nuclei. As explosive forces, they are now represented by the 'atomic' bomb and the 'hydrogen', thermonuclear, bomb. The amount of energy released by either process can be calculated by Einstein's equation, $E=mc^2$, where c is the speed of light (30 billion centimeters, or about 186,000 miles a second). By this equation, if only an ounce of matter is destroyed, 5,600,000 kilowatt hours of energy would be released."

If you ever meet a physicist, ask him how the validity of this calculation can be independently checked.

"In 1939, of course, no one could conceive how lighter elements could be fused into heavier ones, as scientists had just revealed uranium could be fissured.

"To the historian of these events, the months of January and February 1939 are of crucial significance. On January 2nd, Fermi, self-exiled from Mussolini's Italy, reached New York, with his wife and children, from Stockholm, where he had just received the Nobel Prize. Four days later the Hahn-Strassmann report on uranium fission was published in Germany, and Otto Frisch, sent by his aunt, Lise Meitner, from Sweden (where they were both refugees from Hitler's Germany), dashed to Copenhagen to confer with Bohr on the real meaning of Hahn's report. Bohr left the next day, January 7th, to join Einstein at the Institute for Advanced Study in Princeton, while Frisch and Meitner, in Sweden, repeated Hahn's fissure of uranium and reported on the results in quantitative terms, in the English journal *Nature* on February 11 and 18, 1939. These reports, which first used the word ‘fission,’ introduced the ‘Atomic Age’ and showed that, weight for weight, uranium fission would be twenty million times more explosive than TNT.

“Such a burst of energy would, of course, not be noticed in nature if only a few atoms of uranium split; moreover, no large number would split unless the uranium was so pure that its atoms were massed together and unless the stream of splitting neutrons continued to hit their nuclei. Immediately, in February 1939, a number of scientists thought that these two conditions, which do not exist in nature, might be created in the laboratory. It took only a few minutes to realise that this process would become an almost instantaneous chain reaction if extra neutrons, to serve as fission bullets, were issued by the splitting process. Since the uranium nucleus has 146 neutrons, while barium and krypton together have only 82 plus 47, or 129, it is obvious that each split uranium atom must release 17 neutrons capable of splitting other uranium atoms if they hit their nuclei with the right momentum.

“This idea was tested at once by Frederic Joliot-Curie (Nobel Prize, 1935) in Paris, and by Fermi and another refugee, Leo Szilard, with their associates, at Columbia University, New York. The three teams submitted their reports to publication in March 1939. Bohr and others had already suggested that large-scale uranium fission does not occur in nature because natural uranium was widely dispersed atomically by being overwhelmingly diluted in chemical combination and mixture of three different kinds, or isotopes, of uranium, all with the same atomic number 92 (and thus with the same chemical reactions, since these are based on the electrical charge of the nucleus as a whole) but with quite different atomic weights of 234, 235, and 238. These isotopes could not be separated by chemical means, since their identical atomic numbers (or nuclear electrical charges) meant that they had the same chemical reactions in joining to form different compounds. They could be separated only by physical methods based on their slightly different mass weights.

“As uranium is extracted only with great difficulty, and in small amounts, from its ores, 99.28 percent of it is U-238, 0.71 percent of it is U-235, and only a trace is U-234. Thus, natural uranium has 140 times as much U-238 as U-235. It was soon discovered that U-235 was split by slow or very fast neutrons, but, when it split, it emitted very energetic neutrons travelling at high speeds. These fast neutrons would have to be slowed down to split any more U-235, but since U-238 gobbles up all neutrons which come by at intermediate speeds, chain-reaction fission in uranium cannot occur in nature, where each atom of U235 is surrounded by atoms of U-238 as well as by other neutron-absorbing impurities.

“From this it was clear that a chain reaction could be continued in either of two cases: (1) if very pure natural uranium could be mixed with a substance (called a ‘moderator’) which would slow down neutrons without absorbing them or (2), if a mass of U-235 alone could be obtained so large that the fast neutrons emitted by fission would slow down to splitting speed before they escaped from the mass. The former reaction could probably be controlled, but the latter mass of U-235 would almost certainly explode spontaneously, since there are always a few slow neutrons floating around in space to start the chain reaction. Even in 1939 scientists guessed that ordinary water, heavy water (made of hydrogen with a nucleus of a neutron and a proton instead of only one proton), or carbon would make good moderators, for a controlled reaction. They also knew at least four ways in which, by physical methods, U-235 could be separated from U-238.

“At the very end of 1939, scientists had worked out what happened when U-238 gobbled up intermediate speed neutrons. It would change from 92 U-238 to 92 U-239, but almost at once the U-239, which is unstable, would shoot out a negative charge (beta ray or electron) from one of the 147 neutrons in its nucleus, turning that neutron into a proton, ind leaving the weight at 239 while raising its positive charges (atomic number) to 93. This would be a new element, one number beyond uranium, and therefore named neptunium after the planet Neptune, one planet beyond Uranus as we move outward in the solar system. Theory seemed to show that the new ‘transuraniac’ element

93 Np-239 would not be stable, but would soon (it turned out to be about two days) shoot out another electron from a neutron along with energy in the form of gamma rays. This would give a new transuraniac element was called plutonium, with symbol 94 Pu-239. At the very end of 1939 theory seemed to indicate that this plutonium, like U-235, would be fissured by slow neutrons, if a sufficiently large lump of it could be made. Moreover, since it would be a different element, with 94 positive charges, it could be separated from the 92 U-238, in which it was created, by chemical methods (usually much easier than the physical methods of separation required for isotopes of the same element)."

Let me close with an observation of religious interest. Uranus, Pluto and Neptune, after which uranium, plutonium and neptunium are called, are the names not only of planets but also of Greek gods. And it has always been traditional Christian belief that the Greek gods were not figments of imagination but very real demons. Doubtless it is not coincidence that as the world is being de-Christianised the demon-gods are being honoured once again.

APPENDIX 6

The Myth of the Atom

Atomic theory is far from being a fresh product of the genius of modern science. Indeed, as has already been mentioned in a footnote on page 2, it was being advanced nearly two and a half thousand years ago by two Greek scientists, Leucippus and Democritus. As Professor Sir William Dampier wrote in his *A History of Science* (page 25): "In science the Democratean atomic theory is nearer to the views now held than any of the systems which preceded or replaced it." And Democratean theory was discarded and abandoned for over two millennia for very good reason. The scientists of genius who lived subsequently, such as Aristotle, found no evidence to support it, nor any use they could make of it that would advance their knowledge of the material world.

As may already be evident, I for one do not believe that modern "science", demonstrably so divorced from reality on so many other matters, can be shown to be in touch with reality on this one. In other words, I believe that the overwhelming likelihood is that the object referred to today by the term "atom" has no existence whatever and that atomic theory is yet another example, like the heliocentric theory and evolution, of mankind, led by its "deep thinkers", falling back into errors of the distant past.

This does not mean that I am suggesting that physical substances are not divisible into very small parts, of course; for obviously they are. The view that I am advancing is simply that, as far as the composition of those very small parts is concerned, your wildest guess is *far* more likely to be valid than the dogmatic but insane beliefs of today's so-called scientists.

"But, *surely*, it is *known* that atoms exist, *and* electrons and protons and the rest. *Surely* they have

> been detected under microscopes, and measured; and what is more, they have been split..." These are the sort of objections that the assertions I have made are likely immediately to provoke. And they only go to demonstrate the extent to which what is actually classified in language as a mere *theory* is presented as an established and fully demonstrated *fact*.

Now, I cannot physically prove that atomic theory is nonsense, of course - to prove a physical fact about something that is out of the physical reach of any apparatus of detection is manifestly impossible. *But nor, in my submission, do I need to.* The onus cannot possibly be on me to prove the non-existence of a hypothetical object which cannot be detected and which, if it does exist, does so in defiance of all the laws of commonsense and of every conception that ordinary people have as to what reality consists of. And that atomic theory suffers from these defects I have surely adequately demonstrated in the essay to which this appendix is attached. The onus must be on the teachers of the theory to show that it has a greater probability of being correct than the most outrageously far-fetched fairy-tale that human imagination can devise.

I *can*, however, prove two things that many readers may not already be aware of. The first is that, when I claim that there is no objective proof that atomic theory represents fact, I am not making a wild assertion, but merely stating what physicists - anyway those physicists who have not lost *complete* touch with reality - do not hesitate to admit. And the second is that it will *never* be established that an atom, as defined by science today, exists. "*One* of these days, when a sufficiently powerful microscope has been developed, it will be possible to *see* an atom," the naive layman may suppose. This is not so, as we shall see.

The first thing that I have undertaken to show is that there is no proof that atomic theory is true. For some readers, quotations from Arthur Koestler and Professor Dingle included in the chapter (e.g. paragraphs 143-151 and 77, 78 respectively) may have already provided sufficient evidence. But even more explicit statements than those have been published by scientists clearly in a position to know, and the one I shall select could hardly spell the facts out more clearly. It comes from a book called *Science is a Sacred Cow* by Richard Standen, a professional chemist and entomologist who, as he tells his readers in the Introduction, "after a number of years of professional work found myself in a quiet interlude of teaching,...after [which], upon resuming my regular work in science, I was able to *look* at science, as if I had never seen it before. The result was indeed astonishing..." He is a useful witness for our purposes, because, although he states bluntly what the *facts* are as to the extent of the knowledge of scientists about the hypothetical atom, he regards it as "in the highest degree improbable" that what the scientists believe is fallacious. He is, in other words, far from being prejudiced in favour of what I argue is the correct position. The quotations are from pages 57-64 of his book (my emphases added).

> "Chemists have a habit of beginning in the middle of things, and then making little excursions backwards. The class in Chemistry 1, meeting together, three hundred strong, for the first time, may

hear the Great Man announce in a booming voice, 'Now a hydrogen atom is made up of one electron and one proton.' Only later do they find out what is meant by 'atom', 'electron' and 'proton', and only much later still, if at all, do they find out any of the facts that justify scientists in believing in these things. Later on, the class may embark on a project of building, out of wood and wire, an exceedingly complex model of what an atom is supposed to be like. Needless to say, only a very few students who go on to be specialists will find out, after years of study, the experimental evidence on which all the complexities are based, and by the time they have got there the whole theory of atomic structure may be quite different. Completely gone is any pretence of inculcating the virtue of reserving judgement until all the facts are in...

"If the idols of scientists were piled on top of one another in the manner of a totem pole, the topmost one would be a grinning fetish called Measurement. Both chemists and physicists fall down and worship before Measurement.

"Instead of explaining what a thing is, they say how many times bigger it is than some other thing, for that is all that measurement really is. Thus, for a physicist, the means of measuring a thing is the thing; light is just so many lumens, noise is so many decibels, and a magnet so many units of magnetic moment. And so their way of explaining any of the more abstruse concepts of physics is to have the students measure them at once, although it can easily come about that the victim of a physics course can go through the operations perfectly, produce exactly the right measurement, and still not have any idea of what he has measured.

" 'When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science.' Thus did Lord Kelvin lay down the law. And though quite wrong, this time he has the support of official modern Science. It is not true that when you can measure what you are speaking about, you know something about it. The fact that you can measure something doesn't even prove that something exists. This may seem strange, but it is true, and there are plenty of examples to prove it in physics... To take an example, in astronomy, and going back some considerable time: the ancient astronomer Ptolemy and the Renaissance astronomer Copernicus (and all astronomers in between) explained the movements of the planets by what they called 'epicycles,' which were arrived at by a strict application of the modern scientific method. These epicycles were measured, and their size was recorded with very great precision. Yet they have completely disappeared, and, for three hundred years and more, no astronomer has used an epicycle or anything like one.[111]

"If you look at, say, the edge of a table, you know that it is there, and you can measure it by getting a ruler and laying it off so many times along the edge of the table. But you do not know that it is there because you are able to measure it; it is the other way round, you are able to measure it because it is

[111] What Standen says here is not in fact correct. As Professor Charles Lane Poor, a professor of celestial mechanics, wrote in a passage which I quoted more fully in *Galileo versus the Geocentric Theory of the Universe*: "The deviations from the 'ideal' in the elements of a planet's orbit are called 'perturbations' or 'variations'. In calculating the perturbation the mathematician is forced to adopt the old device of Hipparchus and Ptolemy, the discredited and discarded epicycle. It is true that the *name* 'epicycle' is no longer used... The name has been changed, but the essentials of the device remain the same..." (*Gravitation Versus Relativity* by Professor Charles Lane Poor: p.32. My emphases added) Where this example chosen by Standen is entirely valid, however, is in the fact that in measuring an epicycle one is not measuring something which has any physical existence. The notion of the epicycle is simply a convenient means of making calculations.

really there. You measured it by taking your standard of comparison, the ruler, and placing it alongside the thing to be measured, the table. This is genuine measurement, and only things that really exist can be measured in this way. Unfortunately there are many measurements in physics that are not made in this genuine way at all. When physicists say that the diameter of a hydrogen atom is two ten-millionths of a centimetre, do they mean that they took a ruler marked out in ten-millionths of a centimetre, brought it up alongside a hydrogen atom, and compared the two? Not a bit. They simply made one of their hypotheses; they reasoned that if the atom were that number of ten-millionths, then the results of a certain experiment would be so and so, exactly as it was actually found to be. The same indirect kind of 'measurement' was made in the case of the epicycles... A great many of the measurements of physics are of this indirect kind, which gives no proof at all of the existence of the thing that is alleged to be measured. It is not true that we know about atoms because atoms have been weighed, measured and counted, although physicists often make this implication. It is not true that we know there are atoms because certain kinds of work in physics are described as 'atom-smashing'; maybe the physicists are entirely deluded in thinking that the results they get from their cyclotrons are anything to do with atoms. It is not true that there must be atoms because there is an atomic bomb: the existence of the bomb is indisputable, but is it atomic? It is within the bounds of possibility that the physicist of a hundred years from now will look back with amusement to the days 'when they thought that the crude bomb of theirs had something to do with "atoms", as they used to say. Of course, we know better, now.'

"Have we any proof, then, that there are such things as atoms? The answer is that physics can never prove things in the way things are proved in mathematics, by eliminating all of the alternative possibilities."

As I have said, Standen himself believes that, even if it cannot be proved, it is inconceivable that atoms do not exist, and considers that physicists are justified "in going ahead, as they do, with an unshakeable faith in their atoms." Having made this clear, he then adds revealingly:

"And yet even at that, they overdo things. A physicist once said: 'One of the things which distinguishes our generation from all earlier generations is this, that WE HAVE SEEN OUR ATOMS.' " (*The Renaissance of Physics* by K.K. Darrow, Macmillan, New York - emphasis in the original)

Standen cannot bring himself to call Darrow a liar, but gently comments:

"He didn't really mean it. He knew that there is very good reason for thinking that we shall never be able to see atoms. The idea at the back of his mind, being translated, is the path of a single high-speed atom can be observed and photographed just as the trail of a shooting star can be observed.' He meant only that we can see the trail of an atom.[112] Now just suppose that a hunter were to

[112] In fact even here Standen is conceding something which is not true. The "trail" of an atom has no more been observed than an atom itself. What Standen has in mind is the cloud-chamber experiment invented by C.T.R. Wilson; but the reality is that what this experiment makes visible is merely a stream of liquid particles which are arbitrarily assumed to have coagulated around atoms which have been ionized by a jet of alpha-particles. ("To ionize" means "to alter the number of electrons in the outer ring of an atom, or molecule, thereby giving it an electric charge." The definition is of course not less spurious than the mythical process it denotes. An Alpha particle, which is also a figment of the "scientific imagination," "consists of" a neutron and a proton, that is, a helium atom deprived of its electron - or would be deprived if any of these "-trons" and "-tons" existed. They are allegedly emitted by radio-active substances. It should be made clear, incidentally, that laboratory experiments to "prove" the existence of these "particles" do indeed take place as reported, but their results are susceptible of interpretations which are vastly more probable than atomic theory.)

> announce, 'I saw a tiger on Long Island yesterday': if, on close questioning, he were to back down to 'what I mean is, I saw the trail of a tiger,' would he be believed in the clubhouse?"

My second task is to show that, short of a direct revelation from God on the subject, never, *never* will it or can it be shown that the atom of modern science exists other than in imagination.

How do we prove that a material object exists? It can only be done by a *physical* means, in other words by use of one or more of our senses; because if you wish to leave the senses aside and instead come up with a *metaphysical* theory which you maintain satisfactorily explains an effect, there is nothing to stop this being matched by any number of other metaphysical theories,[113] ranging from the logical to, as in the case of modern atomic theory, the ludicrously illogical; and what, other than a physical check which can be verified by anyone, can serve as arbitrator between the rival theories?

So the question is: what are the chances of developing an instrument sufficiently sensitive to enable us to see, touch, smell, or in any other manner *establish* that an atom is a reality?

As will now be shown, it is a sufficient answer merely to state what an atom is supposed to be. To do this in a manner which is comprehensible to laymen such as myself, I shall make use of an author of excellent credentials, Robert Jarrow, professor of Astronomy at Columbia University and of geology at Dartmouth University and director of NASA's Goddard Institute of Space Studies. His book, out of which I shall be quoting extracts from pages 27-33, is called *Red Giants and White Dwarfs*, a somewhat misleading title for what is written as a series book on science. And as you read what follows, please do not lose sight of the fact that he really believes what he is saying. (The emphases added are mine.)

> "I once had occasion to testify before the United States Senate Space and Aeronautics Committee on the scientific background of the space program. My talk dealt with the manner in which all substances in the universe are assembled out of neutrons, protons and electrons as the basic building blocks. After I left the chamber a senior NASA official continued with a summary of the major space science achievements of the last year. Apparently my scholarly presentation had perplexed the senators, although they were anxious to understand the concepts I had presented. However, the NASA official's relaxed manner reassured them, and someone asked him: _How big is the electron? How much smaller is it than a speck of dust?' The NASA official correctly replied that *the size of*

[113] In theory, if the existence of a particular material object was the *only possible* explanation of a set of phenomena, this would be sufficient proof that the object existed, even if it had not been apprehended by the senses. (Thus, for instance, one can come to a certain knowledge that God - i.e. an omnipotent, invisible Creator - exists solely by deducing that such a being is the only possible cause which can adequately account for the universe and its contents.) But in practice this is hardly ever the case, and, as will become apparent, is certainly not the case with atoms.

> *an electron is to a dust speck as the dust speck is to the entire earth*.
>
> "The electron is indeed a tiny object. Its diameter is a one 10-trillionth of an inch, *a million times smaller than can be seen with the best electron microscope*. Its weight is corresponding small; 10,000 trillion trillion electrons make up one ounce. How can we be certain that such a small object exists? No one has ever picked up an electron with a pair of forceps and said, 'Here is one.' The evidence for its existence is all indirect. During the 150 years from the late eighteenth century to the beginning of the twentieth century a great variety of experiments were carried out on the flow of electricity through liquids and gases. The existence of the electron was not proved conclusively by any single one of these experiments. However, the majority of them could be explained most easily if the physicist assumed that the electricity was carried by a stream of small particles, each bearing its own electrical charge. Gradually physicists acquired a feeling, bordering on conviction, that the electron actually exists."

Naturally, as Mr. Standen has already made clear, the next thing a modern scientist will do with an object whose existence he has been unable to prove is to measure it! We shall omit Professor Jarrow's description of the means by which the "measurements" were made and move straight on to the results.

> "The tiny electron, and two sister particles, are the building blocks out of which all matter in the world are constructed. The sister particles to the electron are the proton and the neutron. They were discovered even more recently than the electron; the proton was identified in 1920 and the neutron was first discovered in 1932. These two particles are massive in comparison with the electron – 1840 times as heavy - but still inconceivably light by ordinary standards. The three particles combine in an amazingly simple way to form the objects we see and feel. A strong force of attraction binds neutrons and protons together to form a dense, compact body called the nucleus, whose size is somewhat less than one-trillionth of an inch. Electrons are attracted to the nucleus and circle around it as the planets circle around the sun, forming a solar system in miniature. Together the electrons and the nucleus make up the atom."

It is wonderful how much can be found out about objects that may not even exist, is it not? let us now "look" more closely at the atom.

> "The size of a typical atom is one hundred-millionth of an inch. To get a feeling for the smallness of the atom compared to a macroscopic object, imagine that you can see the individual atoms in a kitchen table, *and that each atom is the size of a grain of sand. On this scale of enlargement the table will be 2000 miles long*."

Do you still think that a microscope capable of detecting an atom will be developed? But even if the impossible be granted and it be supposed that an instrument capable of magnifying so small an object to a viewable size *will* one day be developed, the problem is scarcely any nearer to solution. As Professor Jarrow says next:

> "The comparison of the atom with a grain of sand implies that the atom is a solid object. Actually, *the atom consists largely of empty space*. Each of the atoms that makes up the surface of a table consists of a number of electrons orbiting around a nucleus. The electrons form a diffuse shell around the nucleus, marking the outer boundary of the atom. The size of the atom is 10,000 times as great as the size of the nucleus at the center. If the outer shell of electrons in the atom were the size of the Astrodome that covers the Houston baseball stadium, the nucleus would be a Ping-Pong ball in the center of the stadium. That is the emptiness of the atom."

Of course, molecules are bigger!

> "Atoms are joined together in groups to form molecules, such as water, which consists of two atoms of hydrogen joined to one atom of oxygen. Large numbers of atoms or molecules cemented together form solid matter. There are a trillion trillion atoms in a cubic inch of an ordinary solid substance, which is roughly the same as the number of grains of sand in all the oceans of the earth."

But even hypothetical molecules, supposedly composed of a number of atoms, are of the same *order* of size, and much too small ever to be seen by any optical instruments; and molecules too, like atoms, are allegedly not solid objects at all, but consist of 99.99% empty space, which, of course, will make their detection no more feasible.

At all events, I believe enough information has now been given about the conjectural atom to make it obvious that, no matter how much we are told about its size, weight, smell, colour or any qualities which may be given to it, those who tell us these things will be on safe ground, for we shall never be able to prove them wrong with the only evidence - that is, physical evidence - which has an real objective validity on such a subject. But, equally, we should not be able, without the assistance of Divine revelation, to prove them wrong if they gave us the same information about fairies.

APPENDIX 7

A Modern Scientific Periodical Unwittingly Confirms...

In August 1985, some time after this chapter had been completed, an American monthly magazine with a world-wide distribution called *Science Digest* published a remarkably revealing article which required only a very modest ability at reading between the lines to confirm several things stated in this chapter. The reader is invited to turn to the next page and read the article, called "Why is Math So Useful?" by Michael D. Lemonick, and then to return to this page for my comments. (The article is reprinted by permission of *Science Digest* (c) 1985 by Hearst Corporation.)

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From this point onwards I am assuming that the reader has now read the article on the next page.

Those who recall what has been said in the preceding pages, and in particular the discussion about modern mathematics and its influence on modern "science", are likely to have little difficulty in seeing clearly the significance of some of the statements of Mr. Lemonick - who, it must be said, himself appears to be genuinely unaware that he is exposing the nakedness of one of today's equivalent of Hans Christian Andersen's emperor - and there is therefore no need for me to try and spell everything out in detail. There are, however, two features in the article to which I draw particular attention.

1. "The universe works in a way so far removed from what common sense would dictate that...the only way to describe what really goes on...is to speak in mathematics." In other words, if, on the one hand, modern mathematics, which - as we have seen - is now admitted by mathematicians to defy common sense, *dictates* that the universe works in a certain way, and, on the other hand, what we can see and what we can reason *indicate* (let us not be dogmatic!) that it works in another, it is non-commonsense, self-contradictory mathematics which is given the infallible last word.

2. "It is difficult to avoid the impression that a miracle confronts us here," writes a Nobel Prize winner; nor, we gather, is he the only distinguished scientist who holds this opinion. Moreover, on the face of it, there appears to be excellent reason for the rest of us to think the same. A purely theoretical system called matrix theory turns out to represent the reality of quantum physics; Bernhard Riemann's mind-blowing mathematical thought-experiments turn out to represent the reality of Einstein's General Relativity; Sophus Lie's far-fetched algebraic concoctions turn out no less miraculously to represent truth in the form of the quarks of which protons and neutrons are now "known" to be composed, the algebraic concoctions having been published before protons and neutrons were even thought of (having been "thought of", of course, being the only true reality that quarks have today). If we view modern scientific "discoveries" through the eyes and minds of modern scientists, and of modern writers on scientific subjects such as Mr. Lemonick, it is indeed difficult to escape the conclusion that, for some magically miraculous reason, the human mind is so constructed that even what appears to be its wildest and most unreasonable fantasisings cannot help being in fact exact representations of reality.

Yes, but... If one or two of us simple laymen can cling onto a few remnants of sanity for a moment, is there not an *alternative* solution that is worth considering? - a solution which does not even *appear* to depend on the miraculous in order to be credible? How about if Max Planck had read about matrix theory before giving quantum theory to the world? How about if Einstein had read Riemann before coming up with General Relativity? And how about if the producers of quark theory had been previously acquainted with the writings of Sophus Lie?

We *know*, after all, that, whatever theories any of the discoverers of relativity, quanta, quarks and the rest came up with, the mere fact that those theories were unverifiable by experiment and impossible according to straightforward logical principles was not going to hinder their acceptance by the scientific establishment (whose main criterion for judging a theory acceptable appears to be that the theory in question further divorces the human intellect from reality, from common sense, and thus from sanity).

So if one is seeking to come up with a new theory about matter and motion, what is the best way of doing it? After all, it cannot be a particularly easy task to persuade one's imagination to devise a theory that has no basis on reality and yet does have sufficient, albeit insane, coherence to make it attractive; since the human imagination, for whatever wild fantasies it may concoct, is restricted to the use of real experiences perceived by the senses as its "building blocks".

The answer is surely simple. Take some theoretical ramblings of some high-powered mathematician of the fairly recent past; invent some names to replace some of the mathematical symbols used by the mathematician; clothe these names with explanations which you admit and the scientific establishment will cheerfully accept are only *approximations* (see paragraph 2 of the article); regurgitate the result and make the claim that it is a representation of reality (however opposed to reality it may appear); conduct some experiments which cannot possibly either confirm or contradict your new theory and assert that they confirm it; and wait for the applause and for your theory eventually to be taught to school children as fact.

What can go wrong? One or two people "hung up" on old-fashioned logic will no doubt claim that the theory defies common sense; but everyone already "knows" that "the universe works in a way far removed from what common sense would dictate." The experiments supporting the theory may be shown to be not only irrelevant but also fraudulent, as were those which contributed to the triumph of General Relativity. But the fact will remain that *mathematics has "proved" the theory right.* And before mathematics all other evidence must give way: that your theory, written and understandable only in mathematical language, depends only on the same mathematical language to establish its validity is, in its circularity, a wonderfully invulnerable criterion of proof. And when some bring spark shows *that the mathematics themselves are incorrect* - no easy thing, because from Newton's day onwards the criterion used for selecting the mathematics used for such purposes has invariably been that maximum incomprehensibility - what then? Rejoice! The fact that your theory hangs on a mathematical *paradox* serves only to give it fresh beauty and greater lustre. As far as the scientific establishment is concerned, your theory is already <u>reality</u>; and <u>nothing</u> will alter this, other than, perhaps by the scientific establishment's dogmatic decree some time in the future, when a new and even more insane theory, looking uncannily - no, *miraculously* - like the manic scribblings of some recent mathematician, will have been found to replace it.

No, I do not exaggerate in even the slightest degree. There is nothing that I have suggested above which has not actually happened; nothing which does not underlie countless so-called scientific realities of our day.

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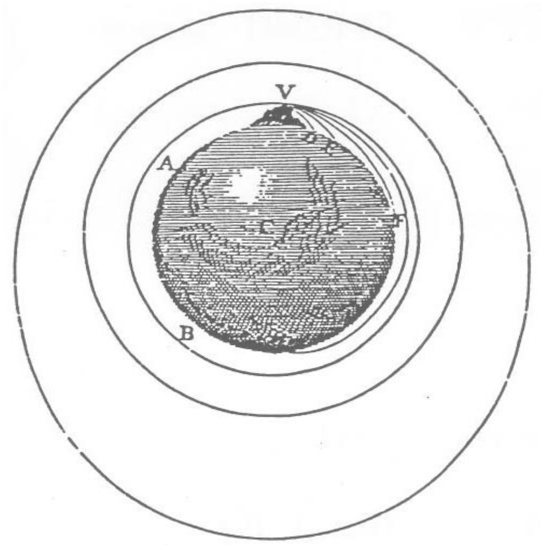
ASTRONOMY

Why Is Math So Useful?

What seems purely intellectual is often surprisingly practical

by Michael D. Lemonick

Isaac Newton was the first to realize that falling objects and orbiting planets are described by a single set of equations.



My father is a physicist, and I learned early on, sitting at the dinner table while he talked with his colleagues, that physicists speak a different language from the rest of us. They would fill the air with such phrases as "angular momentum" and "virtual particle" and "photon." while I sat awed by the thought of the mysterious ideas their conversations concealed.

I didn't realize at the time how deep the mystery went. As I grew old enough to ask questions, I found out that these exotic terms aren't part of the true language of physics at all, but only ap- proximations. The universe works in a way so far removed from what common sense would dictate that words of any kind must necessarily be inadequate to explain It. The only way to describe what really goes on, I was told, is to speak in mathematics.

I learned about photons, the smallest conceivable bit of light. Sometimes a photon behaves like a particle, some-times like a wave, depending on how you look at it. When it's a wave, it isn't a wave of anything. It's just a wave. If it ever came to rest, a photon would have no mass, but since it always travels at the speed of light, it does have mass. This didn't make sense to me; the reason. I was told, was that I didn't understand the math.

The speed of light itself turned out to be an equally baffling phenomenon. Imagine two photons, each rushing away from the same light bulb in exactly opposite directions. How fast are they moving away from each other? My answer: twice the speed of light. The correct answer: half that amount, as calculated with the equations of general relativity, which are yet to make an inaccurate prediction.

It always seemed curious to me that mathematics, so thoroughly a nonex-perimental science, should be so powerfully descriptive of the natural world. For example. Greek mathematicians invented ellipses purely as an intellectual exercise; they are, quite literally, figments of human imagination. It was centuries before anyone realized the planets move in elliptical paths.

It turns out that some physicists find this relationship curious too. In 1960, Eugene Wigner, a Hungarian émigré who would win a 1963 Nobel prize for his work on quantum mechanics, published an essay in the journal *Communications on Pure and Applied Mathematics*. Entitled "The Unreasonable Effectiveness of Mathematics in the Natural Sciences," it points out just how deep the mystery goes.

According to Wigner, some of the most important concepts in physics, including quantum theories and theories of gravitation, owe their success to mathe-matical systems devised without any idea they would some day be applied. "It is difficult to avoid the impression that a miracle confronts us here," he wrote.

Uncanny Predictions

The first case he cites is Newton's law of gravitation, which states that the motion of a freely falling object – say, an apple – and the motions of planets, satellites and stars are special cases of the same pheno-menon, describable by one set of equations. In this case, mathematician and physicist were the same person: He invented calculus, then applied it. (In the Greek tradition, Newton believed mathematics was too pure to be sullied by association with the real world. He wasn't entirely happy with his discovery.)

It happened again when physicists noticed similarities between the structure of quantum mechanics and a mathematical system called matrix theory. They made predictions based on the similarities, and the predictions were confirmed.

Other such serendipitous matchings have been noted as well. Writing in the October 1984 issue of the *American Journal of Physics*, William Pollard, of the Institute for Energy Analysis, in Oak Ridge, Tennessee, points out several**:** Einstein's equations of general relativity are based on the nineteenth-century, many-dimensional ma-thematics of Bernhard Riemann. The theory of quarks, the basic building blocks of matter, is based on a form of algebra concocted by a Norwegian mathematician, Sophus Lie, long before protons and neutrons were even postulated.

Can these all be coincidences? Neither Wigner nor Pollard thought so. Some--how the human mind seems to have a built-in capacity to deduce the structure of the universe without observing it first. It is nearly impossible to believe, and quite impossible to explain, but perhaps the physical laws governing the atoms in our brain tissues push our thinking in the direction of understanding those laws. As Wigner says, and Pollard repeats, "The miracle of the appro-priateness of the language of mathematics for the formulation of the laws of physics is a wonderful gift which we neither understand nor deserve."

The sense of mystery I felt at those long-ago dinner-table discussions put me, it seems, in very good company.

Editor / writer Michael D. Lemonick writes frequently about astronomy and related topics and welcomes your questions. Please send them to: *Astronomy*, Science Digest, 888 Seventh Ave., New York, NY 10106.