Is Hell for Ever?

Douglas C Spanner

The purpose of this paper is to discuss a question which has re-surfaced recently among biblical conservatives, though its roots go far back in church history. It is the question of whether the conscious torment of the finally impenitent is to be never-ending or everlasting (in the usually understood sense of that word), or whether their fate is to be one of ultimate annihilation. I intend to discuss it not by way of re-examination of the biblical evidence (which has been very well reviewed lately[1]) but in what I think may be quite a novel fashion – in terms rather of the insights into the nature of the physical world of relatively new and well-evidenced scientific advances. I imagine that stating my intentions in this rather bald way may raise eyebrows among many of my biblically-conservative readers. It may look like some sort of appeal to human wisdom to make up for deficiencies in revealed truth, and so be under suspicion from the outset. I hope it will not prove to be that, and to encourage the reader to give it at least the benefit of the doubt I will attempt a brief biblical justification for my approach.

The Biblical Attitude to Nature

For the biblical writers what happens in nature represents on the physical level the never-ceasing activity of God. 'He *sends* the springs into the valleys', ' He *causes* the grass to grow for the cattle', 'He *makes* darkness and it is night', and so on (Ps 104:10,14,20). The verbs are all in the present tense, as they are also in our Lord's incomparable words 'Look at the birds of the air ... your heavenly Father *feeds* them ... Consider the lilies ... if God so *clothes* the grass of the field ...will he not much more clothe you, O you of little faith?' (Matt 6:26ff). Unless these latter sayings speak of what God is *presently and continuously* doing in nature they are, in their context, really quite pointless. For to reduce them to merely stating what God once, in the beginning, established as a pattern for nature to follow autonomously (with himself thereafter 'hands off') is to evacuate them entirely of their clearly intended meaning. Perhaps this is never so forcefully apparent as in Matthew 5:44, 45: 'Your Father in heaven *makes*

1 Nigel M de S Cameron ed *Universalism and the Doctrine of Hell* (Carlisle: Paternoster 1992) pp 161-224, 281-312

Edward W Fudge *The Fire that Consumes* (Carlisle: Paternoster 1994) 2nd rev edn p 226

Tony Gray 'Destroyed for Ever: An Examination of the Debates Concerning Annihilation and Conditional Immortality' *Themelios* vol 21 2 1996 pp 14-18 his sun to rise on the evil and on the good, and *sends* rain on the just and on the unjust'. It deprives this of its power as immediate imperative to take it as a statement about an autonomous order of nature[2] established at creation (before there were any human beings, good or bad) and which God merely continues now to maintain in being. No, our Lord is declaring God's gracious purposeful present activity, nothing less. I am labouring this point because it is often played down, and because it is vital to my argument in favour of the significance of *contemporary evidence which can be actually observed*, a matter to which I shall return later. There is every reason to regard many other biblical pronouncements in the same way. On a different scale, leaving the familiar world of birds, flowers, sunshine and rain for the mind-boggling immensities of the stellar universe, we have such a passage as Isaiah 40:26. It is set in the middle of a moving chapter opening with the tenderest of entreaties and closing with the strongest of encouragements. Yet the strength of its appeal is centred on the spectacle of the most impressive natural phenomena which human eyes can see, visible to the uplifted eyes of the fainthearted! The God who watches over his despondent people is at this very moment (note again all the present tenses) handling all the vast and far-off events of the cosmos; and doing it so skilfully, that of all those mighty orbs 'not one is missing', nor its name out of mind! The thrust is inescapable: what is happening in nature is God's doing, here and now.[3]

In all this we can see that revelation is employing the phenomena of nature (which after all have the imprint of the divine wisdom and power on them: Rom 1:20ff), to draw out lessons which will build God's people up in the life of faith. But the biblical attitude to nature goes further. A point we need to remember is this. God has given man (Gen 1:28) dominion over the living world, and commanded him too to 'subdue' the earth. (His arrogance now seems to be inciting him to contemplate subduing the whole of space as well. But that is not our subject.) To do so needs to a very considerable degree the kind of understanding we now call *scientific*, and God has clearly given man the faculties to achieve this. There is however in this connection an additional significance in many biblical

2 It is not being denied that the Bible sometimes speaks as if nature had been given a certain autonomy; see for instance Gen 1:22; Job 28:25,26. But its emphasis is definitely on the aspect stressed here. The two indications are not mutually exclusive.

3 The Bible does not attribute only the 'pleasant' aspects of what happens in nature to God. It attributes *everything* to him. He feeds the carnivores (Lk 12:24 – ravens eat carrion and the young of others; Ps 104:21 – lions). Famine (2 Kings 8:1; cf Ruth 1:6), earthquakes (Num 16:30), plague (1 Sam 5:6ff; 2 Chron 21:12ff; Ex 15:26; Deut 32:39), and mountainous storms at sea (which he both raises and stills: Ps 107:25f, 29f; cf Mk 4:39) are all so attributed. He forms the locust swarms (Amos 7:1f), and lovingly also the foetus in the womb (Ps 139:13ff; Jer 1:5). This emphasis is *passim* in the Bible. Of course the whole subject is many-faceted; Job 1:12ff indicates this, but Job is never rebuked for his bitter complaints (9:24 and 12:9) and for 'not having spoken of me what is right' (42:7); his friends are.

passages that is easily missed. Consider Isaiah 28:23-29 for instance. It deals with the value of know-how in the cultivation and harvesting of food crops. How does man get this know-how? A simple answer would be 'By trial and error'. Translated into more up-to-date language this is equivalent to 'By the scientific method, experiment and observation'. The latter answer is no doubt no truer than the former, but for our present purpose it is much more to the point. For undergirding his agricultural know-how, Isaiah declares, is a deep truth, '*His God* teaches him'. Now the Bible cannot mean in this that God teaches these things to the godfearing, but leaves other men dependent on their own wits! For the ungodly, it records elsewhere, are apparently quicker than the godly in acquiring them (cf Gen 4:2; 4:16ff; 10:8ff; 11:6; Lk 16:8). Evidently Isaiah is speaking of what Calvin called 'common grace', God's help graciously given to all men without distinction in support of their (now-fallen) earthly life.[4] If that be accepted, it suggests something very significant: that scientific insights, when arising from the true instincts of science, are to be regarded as taught by God.[5] What then are the true instincts of science? I would reply, To accept nothing as fact except what can be supported by *evidence of a sort which is in principle accessible at will to all.*[6] Now in this connection it is my conviction that although Einstein believed only in the pantheistic God of Spinoza, and although he was not himself an experimentalist, his Theory of Relativity (to which I shall be referring later) comes into this category. For unlike Darwinism (which initiated another great upheaval in human thinking) its key ideas are supported by a substantial and constantly increasing body of *experimental* evidence, evidence provided by observing

4 Deut 8:17,18 is another case in point. The subject is the ability given to men to succeed in ordinary business. Such ability must clearly be a gift of God's 'common' grace; for again, godly men do not seem to be preferentially endowed with it – see Lk 16:8. Similarly, Ex 35:30ff is not meant to imply that artistic and teaching skill is *in this special case* a divine gift to a godly man, while in others they may derive from more ordinary sources! All are instances of Calvin's 'common grace'.

5 This is a point on which I am particularly concerned to be understood. Isaiah means that God teaches men in the way a parent teaches a child a practical skill (cf Hos 11:3; 2 Sam 22:35). Accepting this, *there is no guarantee that the child gets it right first time.* The parent's constant aim in teaching is to keep the learner on the right track; 'keep watching me; it's like this' the parent says. In a very similar way, God (in 'common grace') teaches the genuine scientist. 'Watch what I am doing', God (unrealized, Hos 11:3) says to the experimenter, 'and build your understanding on it.' (Again, there is no implying that he will get it right first time.) Compare with Is 28:23, 26, 29 the words in Matt 6:26 and Job 35:11. Birds do not 'sow and reap', but God teaches man to. Highly instructive is John 5:19, 20, though here the learner never falters, and the subject matter is rather different; but the principle is the same.

That science's discovery of the rule of law in nature (for instance) is to be attributed to God as teacher is surely a fair inference from Rom 1:19b (see REB). The genuine scientist is the learner who 'observes' (pays attention) and 'experiments' (asks questions). He does not ultimately commit himself in vital matters to more than this allows. That is precisely why in the end he proves to be on the right track.

6 Michael B Foster *Mystery and Philosophy* (London: SCM 1957) pp 60, 61

what God is actually doing in the world of nature here and now. Further, its theorists have been eager and forward to test by critical experiments, repeatable at will and potentially capable of falsifying it, whether it is on the right track or not (*falsifiability* being Karl Popper's famous criterion of a truly scientific theory). Orthodox Darwinism on the other hand functions much more as presupposition: its insistence for instance on the *randomness*, the *purely chance character* of mutations, and on their *adequacy* to mediate the vast changes involved in moving from one major group to another, are almost pure presupposition, quite incapable of being either verified or falsified by experimental evidence. Accordingly, if a plausible explanation for a biological phenomenon can be devised in the terms built-in to his thinking, the modern Darwinist regards that as quite satisfactory and as finally closing the matter![7] To me therefore the Darwinist's overall conviction cannot be entertained as a God-given insight. It cannot be said of him 'His God teaches him', for the characteristic signs of divine instruction (convincing evidence of how nature now behaves) are absent. This follows from the biblical teaching that what happens in nature now is God's doing. Experimental observations come into that category; human speculation does not. Einstein's insight is on a different footing therefore from the Darwinist's; that is my defence for the view I am putting forward.

The Classical or Newtonian World-view

The world-view of Newton is probably the one which well-educated people today unconsciously accept (usually quite satisfyingly). Space (uniform everywhere) and time (everywhere flowing uniformly) are absolutes, things given to start with. Material objects are thought of as occupying positions in space. As time flows on they move or get moved about in it, and of course they interact interestingly. Space may however be emptied of whatever objects it contains, and all fluid matter may be pumped out, leaving it featureless – but still space. It is a sort of arena, a theatre in which material objects play their parts as time gives them opportunity. But even if nothing happens, time still continues to flow on – as time.

Within space, all material objects attract one another with a universal force called 'gravity'. It is this which gives common objects what is called 'weight', and keeps them firmly on the ground. It is related to another property called 'inertia', the resistance they have to being pushed around, even when on perfect ball-bearings! Both weight and inertia depend (in the same way) on what the physicist calls 'mass', the amount of material stuff or matter which makes them more or less heavy. Mass is in fact usually measured by 'weighing'. Finally, space is believed to follow the rules of

7 See, for instance, Richard Dawkins *The Blind Watchmaker* (Harlow: Longman 1986) and, much less aggressively, Ernst Mayr *One Long Argument* (London: Allen Lane 1991).

the geometry learnt at school (known as Euclid's), of which one famous rule (now questioned!) is that two parallel straight lines never meet however far they are extended.

The World-view of Einstein's Relativity

Newton's world-view serves quite adequately (as mentioned) for all ordinary situations, even for flying in supersonic airliners. But it breaks down badly when speeds approach the speed of light, and finally the breakdown is complete. It fails to reconcile two of the greatest and most successful physical theories ever put forward: Newton's theory of gravitation, and James Clerk Maxwell's electromagnetic theory of light. (The latter theory was once described as 'the greatest theoretical edifice ever erected by the ingenuity of a single man'. Maxwell was incidentally a devout Christian believer.) How does Einstein's world-view differ from Newton's? Very profoundly.

The main differences are these. Relativity gives up the ideas of absolute and independent space and time and replaces them with a four-dimensional 'continuum' of space-time. This means that there is no such thing as a universal clock-time, valid throughout the cosmos. Except when they are at the same locality two events therefore cannot be said to be simultaneous; where they are widely distant their time and space cannot be disentangled. Further, as Einstein himself once said, if matter and energy were to be abolished, space and time would vanish too. This is all very different from Newton, and it leads to some startling conclusions like the 'twin paradox' which will be discussed below. Again, if an everyday object is thrown at someone, the speed with which it strikes him will obviously depend on whether he is running towards the thrower or away from him, and how fast. But in a formally similar situation, when a beam of light is directed at him the speed (vastly higher of course) at which he receives the light is *entirely independent* of any relative movement between him and the source, however fast either is moving! This surprising result, well supported by experiment, Einstein took as a universal postulate, and it brings some striking conclusions with it. One is that mass and energy are equivalent, so that an addition to one means an addition to the other. Thus a body accelerated to a high speed increases its mass (measured before it started off) by its energy of motion. Ultimately, as its speed nears that of light *in vacuo* its mass approaches infinity, and this inevitably puts a stop to any further acceleration. Nothing therefore can travel faster than light *in vacuo*. (Incidentally, light here means all forms of electromagnetic radiation, including X-rays and radiowaves). Again, Einstein's treatment of *gravity* is quite different from Newton's. The latter had pictured this as a universal force of attraction between material objects. In the case of the earth and the other planets it is the sun's gravitational attraction which swings them round in their orbits. Einstein replaced this conception by one, at first, quite strange. Space is susceptible of being 'warped' by the presence of matter, pushed locally out of shape like an elastic rubber trampoline on which a heavy lump of rock has been dumped. A solid ball (representing the earth) rolled a little tangentially towards such a lump of rock (representing the sun) would under the right (rather tricky!) conditions 'go into orbit' around it because of the depression made in the rubber sheet. This is Einstein's picture. Rather less easily visualized is the case of time. This too can be warped or perhaps better (because it is only one-dimensioned) 'dilated' or 'stretched'. The process can be visualized as follows. Imagine two scales side by side. One is of boxwood, the other is printed on thin very extensible latex strip. Their zeros are anchored to coincide, and initially all their other marks are level too. But now the latex scale is stretched to several times its former length while still remaining parallel. What transpires is this: a distance of say ten units on the boxwood scale finds itself level with one of three units on the latex scale. Take the units as years. The effect of the stretching or dilating is to indicate that an individual who lives where 'latex time' (or rather space-time) holds sway has aged only three years while the other in 'boxwood space-time' has aged ten! This visualization does not of course prove that nature behaves in this way. That has to be established by observation or experiment; but it familiarizes the idea somewhat. Einstein's answer to the question of what puts something noticeably out of boxwood- and into latex- space-time is twofold: it is high *speed* and intense *acceleration* or *gravity*. Before we discuss how these factors enter the picture however let us summarize the main distinctive features which relativity theory presents in its world-view. First, it insists that space and time must be considered together as a single continuum. Then, the measured speed of light *in vacuo* is always the same, and nothing can exceed it. Finally, space is 'warped' by massive material bodies, and time is 'dilated' by high relative speed and by gravity (or what amounts to the same thing, acceleration). How these influences manifest themselves will be apparent in a moment. The results are quite startling!

The Interpretation of Relativity

Einstein himself early noticed a very strange consequence of relativity theory. It is known as the 'twins paradox'. Suppose there are two twins Ann and Betty, and Betty, the more adventurous, takes a journey by spacecraft to a distant star and then returns twenty years later (by *Ann's* diary).[8] If she travels at sixty per cent of the speed of light (actually a very tall order) when she returns she will find she is *eight years younger* than her twin sister! For more practicable speeds the shortfall in age will be greatly less, but it is the fact that there is any difference at all that upsets people when it is first pointed out. However, experiments have uniformly suggested that the prediction would be in fact realized. For instance, we

8 The female names are from Paul Davies, a male physicist. His fine book *About Time* (London: Viking 1995) is strongly recommended. The quotation is from p 125.

now have caesium atomic clocks as standards greatly surpassing in accuracy the earth's rate of rotation. World timekeeping is now based on such clocks which can measure time to one thousand-millionth of a second. In 1971 at a US Naval Observatory four of these clocks were carefully synchronized with a set of similar clocks on the ground and then flown by commercial airliner round the world, once east and once west. From the first flight they came back averaging 59 *thousand-millionths* of a second slow; from the second flight they averaged 273 fast. When the effect of the earth's rotational movement (which affected the ground-based clocks too) was allowed for, the speeding up of the airborne clocks amply confirmed Einstein's prediction of the time-dilation effect of speed. Gravity also, he had predicted, causes time-dilation. In 1976 two American workers used extremely accurate hydrogen maser clocks to measure any possible effect. One clock was put in the nose of a rocket and launched to a height of 6000 miles, from whence it returned to earth. They monitored its readings by radio and compared them with those of a similar clock on the ground. At first the effect of the speed on time-dilation predominated. Then the rocket slowed, and the effect of the reduced gravity at that enormous height became dominant. Not only, says Paul Davies, did time really run faster at higher altitudes (where the gravity is less), but it did so at just the rate that Einstein always said it would (he had in fact said so nearly 70 years earlier).

An important point in the present connection is that high speed and gravity (or acceleration) seem to affect all different sorts of clocks[9] equally when these are *local* to *each other*; that is why it is proper to speak of *time itself* being stretched (in their vicinity) rather than *clocks* made to run slow or fast. Of couse, trees and human beings and other unconventional 'clocks' cannot easily be experimented upon like this, but all the evidence so far is consistent. It seems safe therefore to conclude that if Betty had with her in her space cabin her watch ticking away on her wrist, a cup of hot tea cooling at her elbow and a pot of African violets blooming on her table, as well as her own thoughts, time would have seemed to her to be behaving no differently from what it would have done had she been in her semi-detached home. Only when she had arrived back there and compared things with their opposite numbers which had not been accelerated, rushed through space and returned would the strange effect on time be revealed.

9 All common objects can be considered as 'clocks'. They change with time, and so can be used to estimate it. Not all are equally accurate; trees can hardly be used to measure minutes; decades and centuries are their line. The human body can serve; Galileo used his pulse. Older civilizations had hour glasses and candles; we use devices (we call these 'clocks') specially designed to behave with great precision. Radioactive elements like C14, very short-lived elementary particles like the muon (which has confirmed Einstein's predictions for speeds approaching that of light) can all be included too. Finally, there is our 'stream of consciousness', a sort of psychological clock, no doubt linked with the activity in our brain cells.

The Structure of Atoms and the Fate of Stars

It is fairly familiar ground now to many that atoms are made up of three sorts of particles: electrons, protons and neutrons. The first and second, present in equal numbers, have electric charges similar but of opposite sign (the electron is negative, the proton positive). These charges thus balance one another out, and as the neutron has no charge the whole atom is electrically neutral. The proton and neutron are both heavy and very nearly equal in mass; the electron has a mass of only about one two-thousandth of the others. The heavy particles are all packed tightly together to form a central massive *nucleus*, while the electrons form a sort of planetary system orbiting at a distance around it as the earth and the other planets orbit round the sun. Atoms can in fact usefully be pictured as minute 'solar systems'. Now if our entire solar system to the outermost planet were to be closely embraced by a gigantic sphere, most *by far* of what was inside the sphere would be empty space. With the atom it is the same; experiments long ago showed that the actual volume of the particles inside is exceedingly small relative to that of the atom as a whole; nearly all again is empty space.

In a shining star there is a huge internal pressure due to its fierce nuclear fires. This pressure opposes the inward pull of gravity, much as the pressure in a hard-inflated balloon offsets the inward pull of the tough skin. It thus prevents the star collapsing. But its fuel cannot last for ever; eventually it will run out. As it does so gravity begins to take over. The star shrinks and gravity rises threateningly; halve the distance between two bodies and their gravitational attraction goes up four times! Ultimately the star collapses under the gravitational forces to a small fraction of its former size. During this process the empty spaces in the atoms of its core progressively disappear and the protons and electrons may be forced together to become neutrons. These may join with the original neutrons and the whole star may shrink to a solid ball of the latter. It is not surprising that when all this happens it results in a quite phenomenal increase in density, perhaps a thimbleful of star material, loosely speaking, weighing billions of tons! But still more may happen. The exact extent of the whole process depends on the size of the original star, for as the star collapses there come several occasions when a new resistance to further collapse is called into play and may call a halt. Imagine a lightly-held fistful of small inflated spherical rubber balloons. If the fist be clenched the balloons will distort and squeeze out the air spaces between them until there are no more left and the balloons have lost their spherical shapes and become polyhedra, everywhere in close contact. Further clenching of the fist becomes harder; it means having to compress the air inside the polyhedra to higher and higher pressures. Finally if the balloons leak their air further reduction of volume means a compression of solid rubber!

Something roughly like this occurs with dying stars; the smaller stars cannot muster the same high gravitational pressures as the larger ones and do not go 'the whole hog'; they become 'white dwarfs' the size of a small planet, intensely hot but too small to be seen without a telescope. Rather larger stars become 'neutron stars', shrinking to a few miles diameter and to even greater density, compact masses of neutronic material. But when the star is still larger (say several times our sun's mass) the gravity in the final collapsed state is too tremendous to allow it to exist even as a solid ball of neutrons. The core just cannot stand it! Something more awesome and catastrophic than even the explosion of a large supernova occurs. 'The core of the star continues to collapse and in less than a millisecond it creates a Black Hole and disappears into it' (Paul Davies).[10] But what is a black hole like?

Black Holes

When a rocket is fired from the earth it has to be given a minimum velocity if it is to escape from the earth's gravitational pull. This 'escape velocity' is about 25,000 mph. Light is much less susceptible to gravity than matter, and its speed is about 27,000 times this speed; but huge as this makes it, it is not enough to allow it to escape from a black hole! This is the origin of the name; and since *nothing can exceed the speed of light, nothing that falls into a black hole can ever come out again.* Nor of course can any news of it come out. What then happens to an astronaut say who ventures too near and is sucked in? To answer this we can only speculate on the basis of physical laws known to hold outside. Paul Davies thinks that he is almost certainly annihilated after being 'stretched lengthwise' and 'squeezed sideways' by the violent and infinitely escalating gravity as he approaches. But our biblical terms of reference are not tied to *speculation* but only to what can be learnt from *observational evidence*, so we shall leave the matter there. But what is the actual evidence for black holes?

Is it certain that black holes exist, although we cannot see them? Almost certain, for there is a great deal of evidence. For instance, many stars exist in association with another as a binary pair, the two visibly circling one another as the earth and the moon do. With this in mind, it is natural that where a single star with restricted periodic movements is spotted, the existence of a second (invisible) body should be suspected as the possible cause of these. From the careful observation and measurement of these movements the mass of the suspected partner may be calculated. If it turns out to be in the right range, and especially if there is other supporting evidence, the conclusion may well be that it is a black hole. And other supporting evidence is available. The placing of X-ray telescopes in space

10 Paul Davies *The Last Three Minutes* (London: Weidenfeld and Nicholson 1994) p 46

has shown matter being torn away from solitary stars and plunging violently towards invisible centres (causing the emission of X-rays). What is doing it? The answer may well be that each has a black hole nearby which is gradually 'gobbling up' its visible partner. Paul Davies[11] puts the whole matter like this: 'There is good evidence that at least one *million-solar-mass* black hole lurks at the centre of our own Milky Way. Though a single really convincing candidate remains frustratingly elusive, the accumulated evidence for black holes has become overwhelming in the last few years' (italics added).

What are the properties, physically, of black holes? For the purpose of this paper I shall mention two. First, they posses a critical 'edge' called the event or Schwarzchild horizon which marks the line of no return. Inwardly-directed gravity is too strong beyond for even light to break out. This means that no physical agency at all can ever transmit out a message about what it is like inside. Second, very near the critical edge (but still *outside* it) the enormous strength of gravity makes time run incredibly slowly; time is 'stretched' by an immense factor. It might take years for an observer at a distance to watch (by suitable telescope of course) a minute pass on the clock of an astronaut stationary there (assuming that observer could maintain his position). To the latter however his personal sense of time would seem normal; only, his muscles would notice his unbearable weight. This is very important for my argument, so I would like to quote Paul Davies on it:

> If the black hole has a mass of ten million suns – similar to the hole that may lie at the centre of the Milky Way – and is nonrotating, then the duration experienced by the astronaut in falling from the event horizon to the annihilating singularity will be about three minutes. Those last three minutes will be very uncomfortable...
>
> Although the elapsed time to destruction is very swift as experienced in the falling astronaut's frame of reference, the hole's time warp [s-t-r-e-t-c-h] is such that, viewed from afar, the astronaut's last journey appears to be in slow motion. As the astronaut approaches the event horizon, the pace of events in the vicinity seems to the distant observer to get slower and slower. In fact, it seems that it must take an infinite length of time for the astronaut to reach the horizon. So what amounts to eternity in the faraway regions of the universe is experienced all in a rush by the astronaut. In this respect, a black hole is a sort of gateway to the end of the universe, a cosmic blind alley representing an exit to nowhere. A black hole is a little region of space that contains the end of time.[12]

11 Paul Davies *About Time* (London: Viking 1995) p 125

12 Paul Davies *The Last Three Minutes* (London: Weidenfeld and Nicholson 1994) pp 64, 65

To these two physical points we can add an important reminder: the actual *observational* and *experimental* evidence for these extraordinary conclusions is well attested. No questionable and considerable human speculations seem to be built-in to them. If that is so, they would seem to come within the scope of what the Bible testifies in Isaiah 28:23-9. May we not therefore cautiously and reverently take them to heart in our thinking?

What Do We Make of All This?

The biblically-informed reader will probably have noticed in this account resonances with the 'great gulf fixed' of Luke 16, the 'outer darkness' of Matthew 25 and the 'bottomless pit' or 'abyss' of Revelation 9, 11, 17 and 20. I am not suggesting that these latter should be even provisionally equated with the black holes and their Schwarzchild horizons (though black holes might perhaps serve as a physical analogy for anyone sophisticated enough). What I am concerned to do is rather to use the *temporal* relations of what happens near a black hole to help our understanding of some controverted points in the biblical account of the fate of the finally impenitent. This is a more subtle issue, and I cannot do better than reproduce Paul Davies' diagrammed account of an astronaut visiting a small black hole and falling into it.[13] (This should be compared with the complementary account previously given of a terminal visit to a

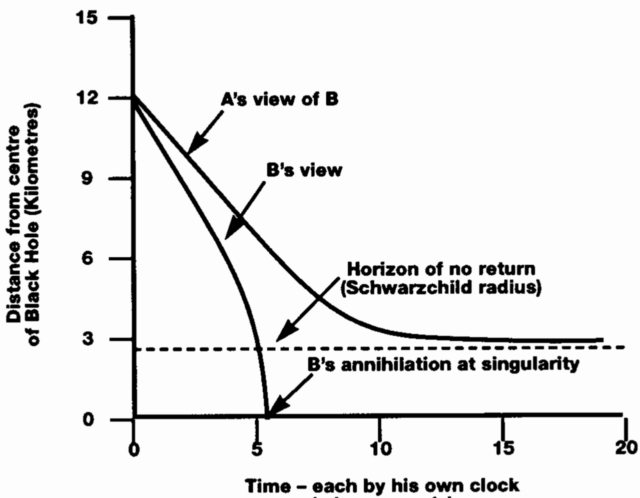

Figure redrawn from Paul Davies (*About Time* p 118). Two observers A and B stand together at point 12 until B takes off for a black hole. The curves trace B's timing of his movement and A's timing of it each using his own clock.

13 Paul Davies *About Time* (London: Viking 1995) pp 114-25

black hole ten million times larger.) Here two individuals A and B stand in company near a small black hole. B sets off towards it to explore while A watches by telescope. Soon, if B is not careful (in practice this would mean something beyond anything realizable), he will be in a free-fall and rapidly accelerating towards his target (see diagram). With his mounting acceleration as he nears his goal his time-dimension is progressively s-t-r-e-t-c-h-e-d and his clock runs slower and slower *as A sees it by telescope* (though to B it is ticking away as usual, his mental processes keeping step normally). The result is that after B has fallen a fair distance (say 6km on the diagram) the lapse of time from their 'good bye' on A's clock is greater than the indication on B's. As B gets nearer and nearer to the critical boundary (the Schwarzchild radius) the gravity rises with greater and greater rapidity, and with it the ratio between the time lapse on A's clock and that on B's. This can be clearly seen by drawing horizontal lines on the figure through points successively nearer the critical 'horizon'. Finally, as B reaches this horizon beyond which the 'gravity pit' is too deep for light to escape this ratio becomes infinite. A's time curve flattens out horizontally *and never crosses the horizon*.. (Were it to do so it would imply that A was seeing B who was *inside the black hole*, which of course is impossible). What in fact A does see is B's spaceship becoming redder and dimmer without limit as the rays from it struggle up to him against the mounting involvement with gravity, and losing energy as they do so, like a ball thrown upwards (red light photons having less energy than blue).

A brief summary therefore of what A sees is as follows. B moves at *increasing* speed (spaceship control being unrealizable) towards the black hole. As B approaches the invisible 'edge' his speed appears to A to *decrease* very rapidly until his craft becomes seemingly quite stationary and it remains so. All this time it has been growing redder and dimmer. How long it remains discernible to A depends on the power of the best telescope available to him but ultimately it must fade below the threshold of vision while still hovering motionless. But there is no *definitive* end.

Recapitulation

It may be well before drawing in the threads of our argument to summarize its stages:

1 God is the author of all that happens in nature; it expresses his goodness and wisdom. Secondary agency, or a certain autonomy for nature, are not denied. What is asserted (if the expression can be pardoned) is that 'the buck stops here' – and *now*.

2 The mandate 'to subdue the earth' requires man to seek *scientific* understanding and know-how. In his 'common grace' (Calvin), God teaches him this (Is 28:26,29).

3 God's method is to say 'Watch me' (John 5:19,20) and 'ask me' (Gen 25:22; Ex 15:25). This invokes the scientific method – observation and experiment.

4 Man rarely realizes in this that God is his teacher, and he may make many mistakes (Hos 11:3). But insofar as he *observes* (pays attention) and *thoughtfully experiments* (asks questions) he may be expected to get the answer right in the end, through 'common grace'.

5 God's ways in nature furnish analogies of his ways in the spiritual realm – this is the basis for parables.

6 Thus where unbridled *speculation* does not intrude (as it does in orthodox Darwinism), well-established scientific insights may be used cautiously as helpful analogies in difficult matters of a doctrinal nature; Relativity Theory seems to be allowable here.

Conclusion

What are the possible doctrinal lessons from this discussion? They might be expressed thus. Granted that Einstein's theory is firmly based on the true observational instincts of science, its account of what happens when a body falls into a black hole may be regarded as a parable (*not a literal description*) of the end of the finally impenitent (in the style of say Matthew 13:3ff, 24ff, 42, or Mark 4:26ff). The black hole (whose character inside can only be guessed at by physico-mathematical speculation and so must not be pressed) represents Hell or the Outer Darkness. The most likely outcome, according to Paul Davies, for what falls into a physical black hole is annihilation, and the sequence of events there may possibly be something like the Big Bang origin of the universe in reverse. This is conjectural, but with that proviso, it suggests that the fate of the wicked may be rapid extinction of being. However, that is not all that can be said. To the eyes of the heavenly hosts who witness the final act of divine judgment, the destruction (the probable annihilation) of the impenitent may be a spectacle *which never definitively ends* (as A's view of B's never does). Perhaps that casts light on what the Bible may mean by 'tormented ... *in the presence* [ie as observers] of the holy angels and of the Lamb. And the smoke of their torment rises *for ever and ever*' (Rev 14:10, 11). But it also suggests that this eternally observable judgmental conclusion recedes more and more into background unobtrusiveness with time. To the spiritual mind both of these suggestions may well commend themselves. The *annihilation* of the wicked does justice to our native sense of what is owing and equitable (a native sense to which the Bible appears more than once to refer).[14] Again, in a creation where rational and active created

14 See for instance Gen 18:25; Ezek 7:27 NIV; 18:25-29; Lk 12:57; perhaps Rom 2:1, 14, 15.

beings abound with independent wills of their own, the *never-definitively-ending evidence* that God will tolerate no defiance of his wise and sovereign authority does justice to the view that this is an inevitable need, lest the temptation to rebel occurs again. Finally, that the awesome descent into the black hole grows ever less and less a matter focusing the attention of the onlooker suggests (still viewing it as parable) that the stability of God's sovereignty depends not on continuing threat, but on steadfast love; for no doubt the bright vision of the 'Lamb slain' will never, ever, in the heavenly reality, similarly fade. Perhaps it may even be that the whole sad tale of our fallen world may have been necessary to provide such a vision; how else could the love of the Creator be adequately and eternally displayed to his creatures? But this is going beyond our brief.

Whether or not the scientific insights of Einstein's theory are suitable as a parable of the end, they do at least seem to indicate that *from different points of view* a real event may be both on-going and endless (A's view) and at the same time over and done with (B's). To hold both does not *necessarily* therefore involve inconsistency; every case has to be considered on its merits. If this be accepted, even the emphatic pronouncement of Matthew 25:46, with its double *eternal*, may not preclude the 'conditionalist' position. If (as we would expect it to be) the viewpoint is that of heaven (corresponding to A's), and if Einstein is right, this may be a true conclusion. The two opposing doctrines we set out to examine may not be irreconcilable.

DOUGLAS SPANNER is a Non-Stipendary Minister in the Diocese of Oxford and Professor Emeritus of Plant Biophysics, University of London.