

## **God and the Universe**

### **Panel Discussion**

#### **St Paul's Cathedral**

**Tuesday 14 October 2008**

### **Transcript**

#### **Panellists:**

David Burrell, Professor Emeritus in Philosophy and Theology, University of Notre Dame

Eric Priest, Professor of Theoretical Solar Physics, St Andrews University

Christopher Isham, Professor of Theoretical Physics, Imperial College London

Frances Young, former Professor of Theology, University of Birmingham

#### **Chair:**

Edmund Newell, Canon Chancellor, St Paul's Cathedral

#### **Graeme Knowles**

Good evening ladies and gentlemen, and on behalf of the Chapter may I welcome you to St. Paul's Cathedral this evening. My name is Graeme Knowles, I'm the Dean of this cathedral which means I'm in charge really which is why there are five people sitting down and I don't have a chair. (*Laughter*) It's very good to welcome you here this evening for the second panel discussion in the St. Paul's Institute series *Seeking Truth: Science, Mystery and Human Identity*. It's also very good to welcome the distinguished panel - they're the people who do have chairs - and my colleague Ed Newell, who's sitting in the middle, who will introduce you to them in a minute.

This evening's discussion is called 'God and the Universe' and asks 'is there a purpose to the universe?' The cosmological argument for the existence of God, or a first cause, goes back at least to Greek philosophers such as Plato and Aristotle. In recent decades, new discoveries and theories in astronomy and astro-physics have reawakened interest in what's called the 'cosmological argument'. We gather tonight under our own cosmological thing, the dome. Some of you will have noticed that domes are quite spectacular to look at, they're quite spectacular to worship in, and they're absolutely appalling to hear in. If you have any difficulty, the advice is to move towards the edges. If you spot a speaker go and sit near it. From the sound of what's happening this evening, we've tuned up a bit on last week. But if you can't hear, please do feel free to move out a little from the centre. It's

lovely to be in the middle, but you can't always hear. I'm now going to hand over to Ed Newell, the director of the St. Paul's Institute, who's chairing the debate and who's going to introduce the panel to you.

### **Edmund Newell**

Thank you. For those of you who have not been to one of our debates before, let me just explain the format. In a moment I'm going to ask each of our speakers an opening question, after which we will move into a panel discussion. Then for the last part of the evening we will take questions from the floor. If you have a question, please write it on your leaflet, hold it up, and it will be collected. We will take questions until about 7.20pm, and please try to keep your questions brief; there's a better chance of them being taken if they are shorter. We will then end promptly at 8 o'clock, but before you leave please do visit the book store at the back of the cathedral; and please do give generously to the retiring collection for our education department which works with over twenty-five thousand children who visit St. Paul's each year. You'll have been given a Gift Aid envelope, if you make your donation in that please fill in the details on the back that enable us to reclaim tax on your donation. There's other information about the evening, and the whole programme, in your white leaflets - including how you can hear a recording of it on Premier Radio this weekend, and also how to get a transcript from our website. If you'd like to find out more about this series, which includes more debates and study days, please fill in the form on the leaflet and hand it in with the retiring collection or hand it in when you submit a question. I'd also like to take this opportunity to thank the Templeton Foundation for their generous sponsorship of this programme.

And now it gives me great pleasure to introduce our panel.

Starting on my right, Eric Priest is Professor of Theoretical Solar Physics at St. Andrews University. A Fellow of the Royal Society, he's also been honoured by the American Astronomical Society. He is currently running a series of public lectures on science and religion at St. Andrews University, which I understand is attracting very large audiences, so tonight's a bit of a busman's holiday for you.

Frances Young is Emeritus Professor of Theology at Birmingham University, where she was pro-vice chancellor and she's a Methodist minister. A Fellow of the British Academy, she was awarded an OBE in 1998 for services to theology. As well as her work on the New Testament and the early church, she has written on suffering and disability and is involved with the L'Arche community.

David Burrell is Professor of Ethics and Development at Uganda Martyrs University, Nkozi, Uganda and Professor Emeritus of Philosophy and Theology at the University of Notre Dame in America.

He has also taught in Jerusalem and Bangladesh, and his field of study is the medieval exchange between Jews, Christians, and Muslims - which has a particular resonance for our times as well.

Chris Isham is Professor of Theoretical Physics at Imperial College London and a specialist in quantum gravity and quantum theory. A practising Christian, he's been involved in dialogue between science and religion for over twenty years which has led him to participate in seminars in the Vatican.

Would you please welcome our panel.

*(Applause)*

The first question is for Eric. Eric, can you explain to us what the 'Big Bang' is and is it the only scientific theory about the creation of the universe?

**Eric Priest**

Well if you give me a few billion years maybe I could answer that question. But I need to make two points before I address that. The first is that there are different worlds. There is a physical world of mass and energy, space and time. There is also a mathematical world, in which we discover mathematical truths. There's a world of consciousness; my own consciousness, the consciousness that I share with communities that I'm part of. Then there is also a cosmic consciousness -- a world where ultimate questions can be addressed which for centuries have engaged philosophers -- such as the nature of reality, and also the origin, the purpose and the destiny of human kind. All of these different worlds are important to me as a human being, and to me they interact with one another. I need all of them to go anywhere towards a full understanding, an answer, to the kinds of questions we are addressing this evening.

The second point, though, is that the world of modern science is quite incredible. It's a wondrous world, it's very much stranger than fiction. There's a mainstream of science, a core of science, which is very well established and which is very unlikely to change; and which you should all accept unless you have good reason not to. There's also though a speculative part to science; the newer parts where we are in the process of discovering: they are very tentative and are wide open to debate, and are very much less certain.

Now, the Big Bang. Well, I prefer to call this the 'expanding' or the 'unfolding' universe. I think that's a much better description than 'The Big Bang'. We know that the whole universe is expanding and cooling from a point about 13.7 billion years ago. At the very early stages, and I mean very

early - not a thousandth, or a millionth, or even a billionth of second (a billionth of a second would be one divided by ten with nine zeroes) - but very much smaller than that; one divided by ten with perhaps thirty zeroes. If you can imagine such an incredibly small time, that is the time about which many cosmologists are pondering; where there was just pure energy, there was one unified force and as the universe expanded from that very early time the different forces separated out. First of all quarks were created, and then protons were created, and very much later by perhaps a trillionth of second - if you can imagine that, one divided by ten with twelve zeroes - the universe that we now see filled a sphere that is roughly the size of the solar system. The temperature at that time was about ten thousand, trillion degrees. Anyway, the universe carried on expanding and cooling; and by three minutes, most of the hydrogen and helium nuclei that exist in the world today had all been created. Later on, by a third of a million years, all the atoms of hydrogen and helium had been created and the universe became transparent. We can see back as far as that, we can see the universe glowing at 2.7 degrees; that's the glow of the Big Bang that we can view with space instruments as the cosmic microwave background. Later on, by 1 billion years, the first stars and the first galaxies were formed. Inside these stars, the other elements were formed of which we are made; carbon and nitrogen and so on. Then by nine billion years, that's 4.7 billion years ago, the Earth was formed. Very very recently, a million years ago - a twinkling of an eye on the scale of the universe - humans were formed; consciousness was born -- at least human consciousness.

Now, most of that is very well understood. But what about the more speculative parts? Well, the standard theory of Big Bang cosmology is based on general relativity which suggests that at the moment of the Big Bang space and time were created from nothing. But, the problem is that at those extremely early times general relativity and quantum mechanics break down and we need to have a new theory that unites quantum mechanics with gravity, with general relativity. There are two main candidates that have been proposed for that. One is "super-string theory", which suggests that elementary particles are not points but are tiny strings - very tiny strings - and that space has six or seven extra dimensions. Another candidate for this new unified theory is "loop quantum gravity"; indeed, at the other end of the table here you see Chris Isham, who is one of the world experts on this subject of loop quantum gravity.

What about the possible implications though, of this more speculative side? One possible implication is that maybe the Big Bang is not the beginning of time. Maybe there was a before in which the universe collapsed, and then bounced and so maybe it's really a Big Bounce rather than a Big Bang that we're seeing. Another possibility is that our universe is actually a three-dimensional membrane floating in, cruising through, a higher dimensional space - and that the Big Bang is actually the collision of two of these three-dimensional membranes. Another possibility is that

maybe the universe is not just expanding but is oscillating, it's expanding and contracting. Yet again another possibility is that there are many other universes, not just our own, many other universes that are spawned inside black holes. Well all these four possibilities that I've just mentioned are highly speculative. There is no evidence whatsoever at the moment for them, but in future perhaps they will be ruled out by observations: for example by the Large Hadron Collider in Geneva; or by the new Planck space satellite. Many of the ideas will certainly be ruled out, but maybe some of them will become part of mainstream science -- we don't know.

### **Edmund Newell**

Thank you very much indeed. It's given us a few things to think about; maybe we'll get a few more things to think about. Turning to Frances Young; Frances, Genesis contains two stories of creation that are woven together - the first one, the seven days of creation focuses on the creation of the cosmos; what does this account of creation convey?

### **Frances Young**

I want to suggest that the story as told in Genesis conveys four things, and then I want to make a general comment about the interpretation of that particular section of scripture.

So the first, and most important, thing - that I'm not going to enlarge very much - is that this story tells us that everything issues from God's will to create and the whole thing is very good in God's eyes. That's first. I want to underline it because I'm not going to expand it. Everything results from God's will to create and the whole thing, in God's eyes, is very good.

The second thing which this account suggests is the absolute priority of God. Now, there is a certain element in the story which might suggest a kind of struggle between cosmos and chaos. Cosmos, the original Greek word cosmos, means an ordered reality which is beautiful; and chaos means a great abyss, a depth, of nondescript goodness knows what, probably dark, very dark. Probably, this kind of tension in the story between cosmos and chaos was a kind of rationalisation of ancient Near-Eastern mythologies in which a creating God struggled with a monster of the deep. In other parts of the bible we find reference to Leviathan. We find reference in ancient mythologies to a kind of sea-dragon, and the struggle with this monster of the deep is what enabled the God to create. If you look at the first chapter of Genesis, all such sea monsters have been reduced to creatures. Verse 21 of Genesis, chapter 1: 'God created great sea monsters'. The priority of God is thus established. I want to add two more comments. It is probable that when verse two talks about the spirit of God moving over the chaos creatively, it doesn't mean a single one-off event; it does imply that the spirit of God is constantly at work bringing cosmos out of chaos, good out of evil. That's the first point, and there

are other parts of the bible that suggest a kind of constant creativity. The second point is that the earliest Christian apologists identified that chaos with the unformed matter, or material substrate, of Platonic philosophy. Creation out of nothing emerged probably in the second century after Christ. It is not explicit in the Genesis text. Once the question was posed, the alternatives were set out as follows. God did not create out of the divine self or everything would be divine. God did not create out of *something*, some substrate or matter, or else there would be two eternal divine first principles; and God's 'monarkia' would be threatened. I use the Greek word 'monarkia' because it has a double meaning. It means 'monarchy' or 'sovereignty'; but it also means 'single first principle'. So, if God did not create out of *something*, God must have created out of no thing - nothing. This was seen to be the appropriate implication of Genesis' emphasis on God's priority. It isn't explicit in the text, but it seems to be the right implication of the text.

The third thing the story is about I think, is the position of humanity within the natural order. Humanity is created at the end of the six days as a kind of steward, caretaker, or gardener. When the authorised version translated 'have dominion over' it was actually translating a word which means 'shepherd'. Exploitation of the natural world was not what Genesis understood. Genesis understood humanity's place among creatures, part of the natural order and so did early Christians who noticed that humanity is the crown of creation and had a kind of double nature. The potential to be bestial, like the animals, or to be angelic. Now since Darwin we've had the question 'apes or angels?', there are many texts in the bible which acknowledge that human beings are no different from the animals - there is in fact a classic in Ecclesiastes chapter 3: 'the fate of humans and the fate of animals is the same, as one dies so does the other. They all have the same breath, and humans have no advantage over the animals.' I wish somebody had noticed that when arguing with Darwin. In the Genesis narrative, God creates humanity - human kind - as a kind of vice regent, in God's own image and likeness. That phrase is accounted to idolatry, the word for 'image' is the word that was used for idols or gods made in human or animal form. Genesis is saying, the only image and likeness of God is the human person and human beings are set in creation as gardeners, shepherds, caretakers to act on God's behalf.

The fourth thing that is built into this story is an explanation or justification of keeping the Sabbath. That is the shape of the text. For six days God created, on the seventh day God rested. Now I think it's very important to realise that those six days were never taken literally in early Christian exegesis. People asked questions like 'how could there be days before the sun was created?', or they pointed to that text 'a thousand ages in thy sight are like an evening gone'. Augustine, one of the great early expositors in the 4th century, suggested that time was created with the creation and creation was one simultaneous event as stated in the first verse of Genesis; and the sequence and order of the days

points to other truths, they point to God's purposes, they point to moral and spiritual development. They are not to be taken literally, but they point to spiritual realities. The text points beyond itself.

So to conclude, I want to underline this point. The Genesis text was never taken as scientifically literal. Early Christians noted the silences of scripture; they noted it never speaks about the creation of matter, it never speaks about the four elements which were then the current scientific orthodoxy. The point of the text is not to encourage speculation about origins, but to signal God's purposes. And so, in a way, protology - that is the study of beginnings - reflects eschatology - the study of ends - it's what it is all leading up to that is really important, and on a Christian reading this was seen to be anticipated in Christ. The phrase in this story, 'God said let there be', was interpreted according to Psalm 33:6 'by the word of the Lord the heavens were made'. In early Christianity they then pointed to John 1:1 'in the beginning was the word. All things were made through him.' And so the word of God incarnate in Jesus is already present at the beginning in creation. As is the spirit of God, moving on the face of the waters - of the chaos waters - as we mentioned earlier. So the word of God incarnate in Jesus later but pre-existing, and the spirit of God are the two hands of God through whom God created. The Trinity was read into the first verse of the chapter of Genesis. Genesis was read theologically, not literally.

### **Edmund Newell**

Thank you very much. David, just to pick up on one theme that was mentioned by Frances. Christianity, Judaism and Islam share the view that God creates *ex nihilo* - that is, out of nothing - would you like to expand on this please?

### **David Burrell**

I'd be happy to. Two summers ago I was privileged to assist Janet Soskice and Bill Steiger at the Vatican Observatory, gathering representatives of Jewish, Christian and Muslim faiths - we call it collectively the Abrahamic faiths - to reflect on creation *ex nihilo*. Our consummately collegial in that fabled place above the city of Rome has helped me to begin, even to begin, to reflect on a topic as daunting as the origin and destiny of the universe. Now the undeniable fact that any human inquiry is animated from the outset by a quest for the good and the true fairly encapsulates what these three traditions have to say about the origin of the universe from a free creator. Indeed, even to reflect on the origin and destiny of the universe - our title for this evening - presumes a giant step beyond the Greeks; whose originary reflections on the world in which we live as the universe could blithely presume its very existence, and understandably so since things that normally capture our attention are the things that move. Sitting in a garden where bushes and trees are titillated by a light breeze, we're attracted by the glint of changing colours. We can then be brought of course to

recognise that living things are always growing or decaying, and so will ever be marked by an imperceptible yet vital movement. That recognition can motivate a child to become a scientist; what is really going on? Yet how ever sophisticated the explanatory hypotheses we employ to try to understand what really is going on, we will remain this side of the Abrahamic faith's insistence that God creates all this *ex nihilo*. Because, as Frances has reminded us, the intellectual traditions associated with these faiths - Judaism, Christianity, and Islam - elaborate their terse revelational statements, 'in the beginning God created heaven and earth' or the Qur'an even more lapidary 'God said be and it is' as the divine agent granting things their very existence instantaneously. So without that process of coming to be which we associate with everything we know. Indeed, that is what *ex nihilo* comes to; no pre-existing conditions, so no traceable process. To be sure, the existence granted will have to be an ordered existence since there can be no brute facts; and that is a presumption underlying all scientific inquiry.

So sophisticated enquiries into what is really going all will all concern themselves with the dynamics of the movements we notice, seeking to formulate the regularities which help us to understand what is going on in these movements - and that is what scientific enquiry is about. But what impels us to go on with it? An abiding hope of discovery, a hope continually nourished to be sure by progress and understanding, yet can we ask where that hope itself comes from? And I shall suggest that that is what we really mean by creation *ex nihilo*, and it is this reflective step that makes all the difference. Asking ourselves where the hope of further understanding comes from, identifying it as we must with an intelligibility always in front of us and asking us where it comes from. One need not to take that step of course, enquiries can simply be propelled by field specific concerns or even by career goals; and this would be as natural as our noticing the movements of the bushes and trees while overlooking, or simply presuming, their very existence. For it is what is going on that initially fascinates us, and what hope we have of understanding what is really going on will have to rest in hypotheses that we can formulate and test while the origins of the ordered existence which admittedly undergirds all this enquiry will quite escape us; and that is all to the good the Abrahamic traditions say, which elaborate creation *ex nihilo*, for the one God bestowing ordered existence cannot leave any traces. There can be no way of finding the creators footsteps in creation, for existence is not a discernible feature of things - it's not a feature we can explain like a problem to be solved - but rather a mystery which gradually insinuates itself into our awareness. Emerging, as we have seen, in reflective moments like asking ourselves where this hope of understanding comes from. We know we have stumbled onto a mystery when we realise we are faced with a question we must honour but cannot answer. Yet this all-important distinction is crucial to a proper understanding of what the Abrahamic traditions call creation *ex nihilo*. For if we could find traces of a creator in creation, as the Intelligent Design devotees presume they can, then the creator would be

a cause like other causes in creation; and that we know, and Frances has reminded us, cannot be the case.

### **Edmund Newell**

Thank you very much. Chris Isham, do you think there is a divinely determined meaning and purpose embedded in the universe?

### **Christopher Isham**

*(Laughs)* Let me repeat this question back to you. Do *I* think there is a divinely determined meaning and purpose embedded in the universe? When I got sent this question I almost sent it back at once and said ask me another. However, I thought why not, let's answer the question seriously. But the question is why ask *me* the question? I'm a theoretical physicist, am I the person who has authority to speak on this question. I'm reminded of Socrates' famous discussion about who was the expert on goodness. He would have said if you want to ask about how shoes are made you'd ask a cobbler, but who do ask about goodness? And in the same way, who is qualified to answer this question? Is it me? Is it my two theologian friends? Well three actually, on the right...is it Eric? Well it's an interesting question to think about. I mean I'm a theoretical physicist and as Eric has said I specialise in things to do with the quantum creation of the universe, and especially actually the way in which modern scientific theories do remarkably interface with the theological concept of creation *ex nihilo* - it's actually quite fascinating that, how it works. I've also lectured a lot on Jung's ideas on modern physics, and I expected to be asked one of these things but no...I was asked do I think there is a divine purpose.

Alright. So, what type of answer is expected? Now I could just say yes, I mean go off and just come back for the free dinner that we get later on but I'm not going to do that. My hero Jung very famously towards the end of his life there was a very famous interview on the BBC where the interviewer said to him 'do you believe in God?' Which after-all is not dissimilar to the question I'm being asked actually, and Jung said 'I don't believe, I know.' This was very much quoted and there was big impact on people interested in these things at the time. Later on however, Jung said what he really meant was that in his psycho-analytical study of his patients - which was many many people - he often found the image of God embedded deeply in his clients' psyches. Now actually he believed more than that, but that's what he said he meant by the answer. Now that, you see, is a rather, in a sense, a bit of a cheat. Because what he has done is he has turned a question about belief, you could say the most profound question of belief you could ask, into actually a scientific question. Because you could do a statistical analysis, I suppose, of Jung's patients to see how many actually did have

the image of God in their psyches and how many didn't. So it becomes a psychological, scientific question.

So, can I do the same trick here? As a well-experienced academic, can I slide around the question and turn it into something that I can answer? But what does the question actually mean? Let me split it into two. The first bit of the question says; is there a meaning, slash purpose, embedded in the universe? If so, is it divinely determined? So it's two different questions really. Now meaning and purpose are of course very human concepts, and if I may I would like to slightly finesse that and change it to 'is there a structure in the universe?' Now the answer to that is, yes there most certainly is; in fact it's extraordinary how incredibly structured the world is, and it's mathematics that at a fundamental level seems to underpin everything. It is quite extraordinary, but it seems to be true. So yes there is a structure. If so, is it divinely determined? Let me finesse this slightly and say 'if so, is it compatible with theism?'

Now, if I'm allowed to make these two slightly slippery moves I've turned it into a scientific question with theological overtones. As a matter of fact, I've been to many conferences and workshops on science and religion and actually they are always about this; is there a structure in the universe, and if so is it compatible with theism? What sort of theological school is perhaps most consistent with modern science? That's the question you can ask and has been asked. The best answer to that is that - I think in all honesty - the theological school that is most consistent with modern science is actually atheism. Now, I'm not an atheist I'm a Christian but, as far as I can see, the modern science matter is totally consistent with being just that. In that sense Dawkins has a point. However, of course I don't believe that and the last twenty years particularly have seen intense discussions amongst people who work in this sort of field to try and find a view - in a sense a common philosophical position - for discussing both theology and particularly modern physics, which is one of my big interests. A friend of mine, a very good friend of mine John Polkinghorne who's very well known for his work in this area has with others developed what they call 'critical realism', which is a kind of philosophical view which they think allows you to talk about both science and religion at the same time. I always say to John, if he's a critical realist then I am a mystical idealist, which is a half joke and half not joke. In fact, the answer to the question - which I'm going to give right at the very end with the chairs permission - is actually based on that.

You see, if you are not allowed to change meaning to structure - now I ask this question to you now very seriously - what can a scientist possibly say? It comes back to what I said at the beginning, scientists have no qualifications whatsoever for answering the question about divine purpose. As a matter of fact many of you in the audience may be better qualified than me, if you have a more

spiritual perception of the world you may be better qualified than I am. I'll just say this one thing and then, of course, discuss this more later, is that this type of a question has lead me very much to a fundamental question which actually rises in all of these discussions and includes also modern science, modern physics particularly. Which is, what are the appropriate categories of thought with which to study the world? You just cannot imagine how much people don't think about this when they should. There is an enormous tendency to take for granted that what works over *here*, is this realm of reality, is going to work over *there*. Now, a philosopher Kant very famously warned against this - what he called category errors - but we do it all the time. My colleagues particularly, the theoretical physicists, are absolutely terrible at that. I think if you are ever going to ask these questions seriously then you have to address this; when we ask about divine purpose what do we really mean? Anyway, let me stop at this point and say right at the end if you're interested I'll answer the question; if not, we'll leave it. Thank you.

### **Edmund Newell**

Thank you very much. Chris you used the word 'compatibility', and I think that's something I'd just like to tease out a bit. The compatibility of the concept of the Big Bang, or whatever we want to call it this evening, and the concept of creation *ex nihilo*. Because I think what we are trying to do is bring theology and science together this evening; that seems to be something we ought to focus on. So can I start by asking a question, and beginning with Professor Young on this, whether a theologian saying that God creates out of nothing is equivalent to a scientist saying that a universe emerged say out of a quantum vacuum? Is a vacuum nothing, or is a vacuum something? Or are these completely different ways of looking at things?

### **Frances Young**

Well I can certainly say a little more about what I think creation out of nothing means for us as theologians. Which might then relate to the other half of your question, where I am less qualified. In the early church, I've indicated the eventual series of logical arguments that were used to suggest that creation took place out of nothing. But there was also another argument that kept being brought out. When a human being creates, say a sculptor creating some great sculpture, then the matter; the material; the stone; the wood is already there and what the human craftsman does is to shape matter or material that is already there. Now the first argument we find for creation out of nothing is that God shows how much greater God is than a human being by not only creating the *thing*, but also creating the *matter* out of which the thing is constituted. It seems to me that, when you actually start thinking about creation out of nothing, you have to go further than that, that that is a kind of extension of what I would call the 'craftsman analogy'. But, if you think about God as being infinite, if anything is to exist which is other than God, God has to as it were voluntarily withdraw - I'm using

a spatial analogy because we have to use what we know about to talk about what we don't know about. If God has to withdraw in order for something other than God to exist at all, then Simone Weil [Vey] the twentieth-century mystic said 'creation is an act of abandonment'; and it seems to me that that is actually a teasing statement which we need to think very seriously about, because one of the things that is clear is that creation out of nothing desacrilises the universe. If you like, the Gods or God is no longer intertwined in the universe, God is absolutely transcendent and other and that means that any God-talk is an analogy, a parable, it can't absolutely correspond with a God who is totally other than anything created - and everything we know is created. In the early church they were very careful to say that, if you think you can comprehend God you have reduced God to the size of your own mind. So, I want to throw these out as teasing thoughts which actually make us realise that creation out of nothing means that we can't use the craftsman analogy anymore at all; and God's creativity is something quite beyond us.

**Eric Priest**

Two points about "Creation out of nothing". First, I agree that Creation is something completely beyond us and it's something much more mysterious than we would normally mean by creation. Normally creation is an activity in time, you start out with a canvas and then you create a painting as time proceeds. But, here we are talking about something that is beyond time - that is outside time. Secondly, what do you mean by nothing? Because normally you think of a vacuum as being nothing, but Chris on the end of the table (who is our expert in quantum mechanics) may well tell you that a vacuum with quantum fluctuations - a seething volume of potentiality - is not exactly nothing. Is that right Chris?

**Christopher Isham**

Yes. I'll speak in a minute.

**Eric Priest**

No, why don't you carry on and tell us what a vacuum is just now?

**Christopher Isham**

At this point do my bit? Right. As you've kind of picked up already, historically there are two kind of quite different perspectives which the ancient philosophers and theologians evolved. One is the creation out of a pre-existing something, in modern scientific terms we would probably say pre-existing space and time. The sort of thing you have in Newtonian physics actually. So space-time was always there and the universe suddenly pops out in the middle; by some act of some craftsman, some demiurge, something that is already there. So this is creation out of the potentiality of being.

Now, that's the Babylonian view actually - which the Christian church doesn't like at all - and actually if I may gently chide our chairman, if you really created out of a quantum vacuum that would be Babylonian, not Christian. That's actually creating out of something that is already there. Now how can you truly create out of nothing? Well the word nothing of course means no *thing*, obviously. So, there's no things there. How could you do this? Can you really talk about the creation of time for example? Is that really possible? Yes, the answer is that it is. For reasons that sound perhaps a bit surprising; for you see the word 'create' is a verb. Now English language, like all languages, has tensed verb; the tense to do with time. So built into our very language is some *prima facie* view about the nature of time. But it's the wrong category of thought to use here. This is one of the hardest things to do when you are working in this area is to realise that the ordinary way we talk about the world simply doesn't apply. In fact, once you get round of all that, you can talk about the creation of time and people always ask me, what was there before the Big Bang? The answer is, well, 'there wasn't a was' you see, because there wasn't any time at all. The verbs break down.

The whole thing mathematically works on the equation  $0 = 0$  actually. You see, you might think how can you create the world out of nothing because look 'I jump up and down, all that energy'...all you people with masses and masses of energy, where does it all come from? The intriguing answer is yes, although it's true there *is* lots and lots of energy, there is also a negative energy caused by the gravitational field. The reason why things fall is because the energy is negative, and if you do the calculations guess what they exactly count to? So the total energy of the universe is actually *zero*. Now, what's the energy of nothing? Well, could it be zero? So actually you have conservation of energy, so  $0 = 0$  - so no universe is zero, universe is also zero. I'm not actually joking with this and this is why in fact it is possible scientifically to try to talk about scientific versions of the things my two theological colleagues here have been discussing. It's quite intriguing. But I'll stop because I could talk like this for hours.

### **Edmund Newell**

Let's just pick up a bit about space and time, and perhaps have a theological perspective on this from David. When we talk about God being beyond space and time how do you understand that?

### **David Burrell**

It picks up a number of the themes here that what we really mean by creation *ex nihilo* is 'no pre-existing conditions' - we all know what those are, right? The fact that God creates the universe means it does not do it as a process, but if it is done at all it has to be instantaneous and immediate. One of the ways of expressing this is the wonderful metaphor of my friend Jim Ross - a philosophical theologian at the University of Pennsylvania - who said that the universe is like the

song on the breath of a singer; so God's creating is itself non-temporal because God is not in time, but at each instant as it were the being of things - the very existence of things - emerges from, as Frances reminded us, the divine intellect and will.

**Edmund Newell**

Thank you. Eric, would you like to pick up on that?

**Eric Priest**

We're talking here about space and time, but space and time are both much stranger than we think at first sight. For example, we have the feeling that time is flowing in three-dimensional space; there's a flow of time. Yet, that's really just a subjective feeling -- is it what's really happening? The relation between space and time is actually much more complex than that. We have the feeling that space and time are both continuous and that events are determined in time. But that's not quite true either, because space and time may well be granular at a very fine scale rather than continuous. Also, there's a random element to the nature of reality. In the seventeenth century, Descartes talked about a mechanistic universe; a universe which was running almost like clockwork. You set it up and then everything is determined thereafter. But that's not the modern understanding of the nature of reality - the nature of matter - because in a sense there are intrinsic probabilities present, there's a statistical nature to reality. As well as on a very fine scale, on a quantum level, there is also uncertainty on the much larger macroscopic scales that we are aware of here. For example, it will never be possible for weather forecasts to predict the detailed weather more than a week or two ahead because, however big our computers are, there are little unpredictable eddies which can grow into massive storms which you can't predict in advance. This is an aspect described by modern chaos theory. This element to reality is not as determined as we used to think it was.

**Edmund Newell**

Thank you. Picking up on that, you were talking about the mechanistic universe, there's this huge difference between the Newtonian view of the universe - fixed, well ordered, regulated, harmonious - and one which is expanding, changing, possibly with a beginning, possibly with an end. How do we respond to that sort of cosmology theologically, what sort of implications does this have for our understanding of God? Perhaps we could start with you Frances on that?

**Frances Young**

I think I want to go back to what I was saying before, that there is a real sense in which we have to almost conceive of God letting go in order to allow something to be which is other than God. If we look at - to move into another area of science - things like evolutionary theory and so on, it is clear

that there is a very considerable amount of randomness in the universe. At one level the universe works according to a kind of in-built rationality, at another level that rationality is not fixed and determined; the universe has a kind of life of its own which we can't actually predict. Now, it seems to me that this idea that somehow God has to withdraw in order to allow something other than God to exist helps us at this point because...you know we sometimes sing 'he's got the whole world in his hands' in some Christian gatherings - but if you wanted to hold a butterfly, how would you do it? If you took hold of the butterfly you would damage it, and the only way to hold it is to do this (*cups hands*) and have the butterfly free within that. Maybe that is a kind of parable of how we have to think about God's relationship with his creation; that God has, as it were, allowed the creation to be what it will be.

### **Edmund Newell**

Chris, would you like to pick up on any of those points?

### **Christopher Isham**

Yes, can I make a couple of remarks? It's actually worse than you think, about space and time. One thing one has to get used to in science, particularly physics, is the understanding that a way of describing the world at one scale will break down at another - it not a uniform, homogenous sense of concepts. I would guess that most people who work in this field would actually agree with me that, as far as time is concerned, the concept of time that we are talking about here - which is the ordinary notion of time - is very much like temperature. You can talk about the temperature of something, but where does temperature come from? Why is something hot? The reason why it is hot is that all the molecules in there are zipping around at high speeds, and if you touch it they bang you and energy is communicated to you. Now, if you start asking about temperature at the individual molecular level it doesn't mean anything anymore. So temperature is a concept that only works if you look at things in the large. There is a fairly widespread belief that time is like that too, so when you are talking about the origins of the universe it is a great mistake to use concepts of time that actually come from Newtonian physics. For example, what was said about 'instantaneous', but you see the word 'instantaneous' is a temporal one. In fact, I'm not saying that these scientific theories are right of course - they may well be wrong - but the way they deal with that is that time itself doesn't exist at that point, so you don't have temporal concepts at all. They emerge later on, just as temperature emerges. So these are really tricky waters that you get into if you really start taking these things seriously and scientifically. As far as Newton is concerned, I've noticed in all these various meetings I've been to that there is a tendency amongst the theologians who work in this field to say that Newtonian physics is consistent with classical theism or deism, the traditional view of the relation of God to space and time. That God stands completely outside the fabric of space and time.

They tend to say that generativity is compatible with process theology, I've noticed that people tend to say that, that God is part and built right into the very nature and evolution of the world. So that's my comments on that...

**Eric Priest**

Yes, so just what is the relationship between God and the universe where we live? What's His relationship to space and time? The old idea was that God is in a sense outside space and time and is looking down on the whole of space and time, so He can see everything everywhere that ever was and ever will be. This was the old idea of a kind of Block Universe. But, to me that isn't completely satisfactory because what happens to free will? Do I decide to raise my arm or not? Does God know I'm going to decide to or not? I feel that I do have free will, and so maybe God is partly in time and partly outside time. Maybe He partly knows what is going to happen, maybe He knows the general trends of what is going to happen, but not the actual particularities. I don't know, it's a mystery to me.

**David Burrell**

It's good not to know that, because just as Chris called me on 'instantaneous' - which is of course a temporal term, we have no other choice - all that kind of speculation about God is short of idolatry it seems to me. Because the fact is that the relationship between God and the universe has to be sui generis because God and the universe are not two separate things. The universe comes forth from God in such a way as to be non-duality with God; that is God is not separate from the universe - cannot be because God keeps it into existence - yet, as Frances used the image, God so lets it be that the universe is distinct from God. How we can explain that in terms of the relationship between you and me? We can't. So it's a relationship which is sui generis.

**Eric Priest**

And yet God has given us minds to think, and he wants us to think about his universe; He wants us to ponder; He wants us to discover. This is an urge that we have, it's a creative urge, and I think this comes from God. God wants us to learn more about the wonderful nature of his universe, and He wants us to wrestle with our minds over these questions.

**David Burrell**

Sure, but as we keep reminding ourselves we can't engage in the kind of imaginative projections that take place within the universe when we are thinking about the relationship of God and the universe.

**Eric Priest**

Ultimately it's a mystery I agree, and we have to look at it with great humility.

**Edmund Newell**

I think I know what we are going to be talking about over dinner. In a moment we are going to move into questions from the floor, but just one final question for our discussion. Really to pick up on a term that Frances used when she talked about 'protology' leading into 'eschatology'. The Book of Revelation talks about end-times and science suggests very clearly that the world will come to an end by one of a number of mechanisms. How might the image of the new creation in the Book of Revelation relate to this? Perhaps, Frances, you'd like to kick off on that?

**Frances Young**

Perhaps I could say a little bit about the biblical and early Christian debates about some of these issues which sets a bit of a context for understanding it in a different kind of scientific universe, if I can put it that way. You see, the classical philosophy that was around tended to assume either that the universe was eternal *or* that there was a kind of cyclical going round and round and round. So that, in some long term rerun of everything I will be sitting here doing this in front of you all over again and this will happen time and time and time again. So we have these two views of the whole thing being eternal, or of being cyclical. The Christians found themselves having to argue against this in saying that everything had a beginning and, of course, if everything has a beginning it will also have an end. They challenged the current philosophy about things on that basis. The interesting thing is how in thinking about creation out of nothing - and thinking about the purpose of the universe - they would then see in the creation story pointers to that purpose and that end. That, if you like, God calls things - us, the universe - into being out of nothing, which is a process of change, and then there is an ongoing process of change and maturing through the kinds of things we do; the mistakes we make; the risks we take; the outcomes. We learn and mature and eventually, given that things something seem to go wrong in all of that process, God will actually bring this current world as it were to an end and his full purposes will be worked out in a new creation which, for Christians, is anticipated in Jesus Christ. How exactly that relates to current scientific understanding of the universe I think is a teasing, interesting problem. But I think at the heart of Christianity there is this sense of hope. Because God is creator, God can also be the one who recreates and enables what has been created to reach its full fulfilment; even though that fulfilment involves going through a kind of end and a reconstitution.

**Edmund Newell**

Thank you. David...

**David Burrell**

I've been quite fascinated with the way the Qur'an handles this business of creation out of nothing on the one hand, and of course the resurrection on the other hand and it does it in a wonderful way. It says 'you don't believe the resurrection?' Can the one who created the universe out of nothing not resurrect it, the entire universe, at the end? Or, it says, 'you don't believe in creation *ex nihilo*?' Can the one who resurrected the universe at the end not create it? So, in other words, it stands and falls together.

**Ed Newell**

Thank you very much. We're now going to move into questions from the floor. Here's one for our scientists from either side, it's clearly a question that a lot of people have asked in various ways. How can a scientist also be a Christian?

**Eric Priest**

For me that's very easy and it's very natural, because being a scientist is very important to me; it is what I am in my core. But being a scientist is probably quite different from what you think it is. It's not a matter of being coldly logical; being in a white coat; being like a robot; being arrogant. That is not what science is about, and if you see a scientist looking like that - looking arrogant or closed in their thinking - then you know they are not a real scientist. To me, being a scientist is all about openness; being creative, using imagination -- expecting that your ideas are going to change in time. So, that in a sense is very similar to me to the life of faith - to being a Christian - and it has huge implications on my life as a Christian. From science I learn to wonder about the world, and that takes me outside my self; it makes me appreciate that there is a lot more to the universe and to life than purely scientific things. There are many things that are really important to me as a human being such as beauty and love and relationships, but science can say very little about those things.

**Edmund Newell**

Chris, would you like to respond to the question?

**Christopher Isham**

Well I agree with everything that Eric has said. Except one thing. In my experience, many scientists are actually extremely arrogant. Now maybe that's just Imperial College, I don't know (*laughter*). I assure it's true there! In fact, it's a curious thing, in our physics department where I work we have a staff of about eighty and I suppose about six of those are Christians. There aren't any Muslims as it happens, or anything else. So it's six people out of eighty; and I'm the only one who has gotten

involved in the debate about science and religion in a professional sense. As far as I can see, they live a total schizoid life. Unlike what Eric was saying actually, and okay maybe this is Imperial College ethos, but they may have quite different religious beliefs but they separate them quite completely in their minds from their scientific world. Part of my answer to the question I was recently asked actually was I only became a Christian when I was forty years old - in fact I was simultaneously baptised and confirmed on my fortieth birthday. Now if you ask, what was I doing the rest of the time? Well I was having mystical feelings is the answer. But I did finally decide I could authentically call myself a Christian, and I thought I must do something about this. Because my students, who kept asking me how can you a theoretical physicist be a Christian; it doesn't make any sense you see...So I thought, well rather than just saying what I am - I feel mystical and there you are - I should try to address the issue, and that is what started me personally on this last twenty years when I've been working on science and religion on the side. It's a very difficult question actually, because - and I know Eric is deeply religious and probably has been all of his life, since he was a boy? I guess...a long time anyway.

**Eric Priest**

Well, I came from a family that was not Christian. In fact, my father wanted to have a quiet Sunday afternoon so he shoved me off to the local Sunday school on a Sunday afternoon. Then, while I was at university I became much more interested in Christianity and was the first person in my family to be confirmed. Then later on my mother and several other people in my family were confirmed, so I certainly didn't grow up in a Christian environment. But I did grow up in a loving environment. I think many people, actually, who do not call themselves Christians, nevertheless are experiencing without realising it the love of God.

**Edmund Newell**

I'm intrigued to ask this question Eric, but is St. Andrews as 'Godless' as Imperial?

**Eric Priest**

I don't think quite so Godless, No.

**Christopher Isham**

We pride ourselves on it actually. *(Laughter)*

**Eric Priest**

I moved up to Scotland about forty years ago and I absolutely love it up there. To some extent it is a more conservative society, so I think there is a bigger attendance at church and so on, and family and

relationships are important -- having time to stop in the street and chat. It's a very vibrant Christian society with many scientists who are Christian, and there is lots of questioning. I should also just reinforce what I said earlier, that science answers many important questions but not all of them. There are many aspects that it does not consider, such as what is my purpose in life? What should my aim in life be? How can I love my wife better? How can I love my children better, and my friends? It doesn't answer these questions.

### **Edmund Newell**

Thank you very much. This is a question that is directed to Frances, but I hope that David will also come in on this one. If everything God creates is good, how would Frances Young explain the problem of evil and suffering?

### **Frances Young**

I anticipated that somebody might come up with that question, and I congratulate the floor for fulfilling my prediction. I can assure you that this is a question that I wrestled with at a personal level for a very long time. My first born son, now in his forties, was born with profound disabilities as a result of the placenta being insufficient and he was deprived of oxygen in the womb and nourishment. So he was a full term baby but premature weight. In his forties he still needs total care, and has probably the intellectual understanding of about a twelve-month old baby. He has no language, no self-help skills etc. We still support him at home. So you can imagine that the question about this has been one that has exercised me very considerably. I think that there are two things that are important. One is this sense that God doesn't directly arrange everything. You see, my big question was; how can something go so fundamentally wrong in the creation of a new human being if human beings are created with some kind of moral purpose? I exercised myself over that for a very long time, and it wasn't so much *why me?* as why at all? Gradually, I came to realise that one of the really important things that we find in the Bible is an absolutely realistic acceptance that all flesh is grass, we are part of the natural order, things go wrong. In the autumn the leaves change colour, whither, and come off; and in the autumn of our lives we go through something somewhat similar. Just as accidents happen, so accidents can happen even while the embryo is in the womb.

This vulnerability; this frailty; this being a creature as part of the created order is something fundamental about our being as human beings. Which, I'm afraid, our society is in danger of forgetting and hence the pressures on the NHS. Then there is a further stage. Not only do we have to accept that we are part of a created order, which has these frailties built in. This experience has, it seems to me, been a kind of sacrament in which I have increasingly found that I have privileged access to the deepest truths of Christianity. Let's start with a simple one. St. Paul speaks of the

fruits of the spirit; their love, joy, peace, patience, goodness, kindness, faithfulness, etc., and self-control. Somebody once said that if you can recite the list you are halfway there. Well you can see I'm not even halfway there. But, what I would say, it is that in relationship with my son and with other persons with learning disabilities; and through the life of the L'Arche communities where people commit themselves to living in communities where people have these kinds of disabilities. It's in those contexts that I have discovered the truth about the fruits of the spirit. In one of the meetings held in the L'Arche communities over the past decade or so, in which we have reflected on these things, someone said...you know the Descartes thing 'I think, therefore I am'? Well this one was 'I smile, therefore you are.' When my son smiles it just takes away all the stress and the pressures of the kind of professional life I have lived at a very profound level. But, I said the deepest truths of Christianity. It seems to me that one of the things that Christianity says is that strangely, and in a way that we find very difficult to understand, it was God's own self which in Jesus came and took responsibility for all the, what I call, 'gone wrongness' in the creation. The fact that we do wicked things; that things go wrong; that there is suffering and hurt, and all kinds of terrible things that happen. That somehow, in Jesus, God took responsibility for that and through that we can know that at heart, even though he dared not damage it by grabbing it like that butterfly, the whole world is in the hands of God.

**Edmund Newell**

Thank you. David would you like to add anything to that?

**David Burrell**

I think everyone here would agree that we can't improve on that.

**Edmund Newell**

Here's a question for everyone, and perhaps starting with you David on this one. What contributions have religion made to science?

**David Burrell**

Well, as I tried to say, the very fact that people are drawn to enquire about the universe, and the very fact that we continue to trust and believe that we will find some intelligibility as we continue to go through the various obstacles that stand in the way of understanding a particular enquiry, that it seems to me is where the belief in a creator actually sustains, encourages, and inspires scientific enquiry. As it began in the Muslim world, two or three centuries earlier than it did in the Western world, the development of science was indeed a response on the part of human beings whom the

Qur'an calls 'God's stewards' or 'vice gerants' of creation. It was a response on our part to understanding the gift that we have been given.

**Edmund Newell**

Thank you. Eric would you like to add anything?

**Eric Priest**

I would like to add something as a postscript to the suffering question. I do agree that the answer of Frances was deeply moving, but there are one or two more aspects. I feel that much of the suffering that we see in the world, and there is so much around us, is actually our fault. It's the fault of humanity. There is a lot of suffering that we could relieve. If each one of us was kinder there would be less suffering in the world. We could do a lot more to help the huge suffering in Africa. In fact, one of my sons is devoting his life working out in Africa helping farmers with crops to grow them better. But there is other suffering that does not seem to be our fault, such as for example, the tsunami. A tsunami is due to the motion of tectonic plates; and the motion of these plates is amazing and it's all part of the vibrant activity of the Earth and the way in which the Earth has been formed. The way in which our atmosphere has been formed is deeply affected by the motion of these tectonic plates. If there were no such motion, life would not exist as we know it on Earth. Another example would be evolution, which gives rise to amazing complexity and vitality in life; and yet it can also give rise to cancer when cells go wrong. It's as if God has set up this amazing world, with its potentiality, but coupled in with that is the potential for suffering. The suffering and the joy are intertwined: they are an essential part of this world and we can't wrestle them apart. Suffering and joy are something that we all experience as human beings. We can't have just one or just the other, they are both there. To me, of all the religions, the one where suffering is right at the core is Christianity -- Jesus on the cross. What does that mean? Essentially to me, it means that in our suffering God is alongside us.

**Edmund Newell**

Thank you. Chris, any contributions of religion to science?

**Christopher Isham**

Yes, it's an interesting question that because if you think about it, in practice, the growth of science has been deeply linked obviously with the growth of society in general. In turn, the growth of society has been deeply linked in fact to the various major world religions that have existed - that's clearly true in the Western world. The interesting question is what would have happened if Mohammed had never been? If the Buddha had never been? If Christ had never been? How would

society evolve, and how would science evolve? Would it be that much different? These are interesting questions, you see people often say - people who talk about space and time and so on - that in fact the Western notion of time that Newton had which we have inherited is actually derived from the concepts of the early Christian church. That the old Greek notion of cyclical time, which was really the dominant paradigm, was actually changed to linear time by the early Christian theologians for theological reasons. We have now come to take that for granted. But you see, you have to be terribly careful about what you take for granted, as I said earlier. So I think in that sense there is a way that certain theological ideas are stamped irreducibly in our Western philosophy and hence in our science.

### **Edmund Newell**

In a moment I'm going to ask our speakers to give a little thought for the day to take away with us. But before I do that, there is just one last question I would like to ask all of them. Is prayer a wave, a particle, or something else? (*Laughter*) Anybody like to have a go at that one?

### **Christopher Isham**

I once had a debate with John Polkinghorne about more or less the same issue. This was serious, it was one of these Vatican meetings and it was to do with the nature of prayer and the theory of special relativity. Because I claimed to him that actually the concept of prayer violated relativity theory you see, and he said no and we had a big discussion about this and, although he never actually agreed with me, he almost did. That's my useful remark there.

### **Eric Priest**

Well, I don't think it is a wave or a particle. Surely, prayer is the way in which God communicates with us and we communicate with God. I think, to me, the most important part of prayer is just resting in his presence and being aware of his presence.

### **Christopher Isham**

I made a jocular comment, and I'll make now a dead serious one. For many years at Imperial College I was deeply involved with student welfare on a sort of one-to-one counselling basis, and many students came through my hands. Some of them were extremely disturbed, I had at least half a dozen people who were blatantly suicidal. Often I saw these students regularly, once each week or something like that; if I couldn't get them to go the doctor, which often you can't, it was all I could do. Sometimes, I know that a student is coming and that it was extremely difficult for me to do anything useful to help and on those occasions I used to always pray beforehand for help - and it was extraordinary how often it worked. In fact once, just once, I had a really very profound mystical

experience of actually - almost - seeing an image of Christ sitting there. These things happen and I can't say what they mean, but it was like Christ was present and helping me with these students. So, prayer seems to me - and actually what often almost always works is prayer for other people. If you pray for yourself, 'can I get the Nobel Prize?', it's not very effective.

### **Edmund Newell**

It's now time to ask for our final comments from our speakers. Beginning with Eric...

### **Eric Priest**

Yes, I'd like just to leave you with two thoughts. First of all, that science has revealed a universe of incredible beauty. Let's enjoy it and wonder at it. Secondly, to me the main division in society is not between different denominations; or between different religions; or between people with faith and without faith. The main division is between those who have a closed mind and those who have an open mind. The closed attitude cuts right across all faiths; fundamentalism is rife in all faiths - and also in atheism, where you find some fundamentalist atheists. So, to me, it's important to encourage this open attitude and to encourage dialogue with other people who have an open attitude to life regardless of what their faith is.

### **Frances Young**

If I, as a Christian, truly believe that in some sense God is the creator of everything that is, not as a craftsman but in some mysterious way I do not understand, then that means that everything belongs to God. And that means, that my husband - who is an Agnostic scientist - actually mediates God's love to me whether he acknowledges it or not. It also means that I cannot afford to turn my back on people who are different for whatever reason; because they have disabilities; because they are of a different religious faith; because they are of a different ethnicity. Whatever the reason, I cannot turn my back on someone who is also a creature of God. So, for the last forty-eight hours, I have been engaged in a conference between Christians and Muslims around a remarkable document produced by a hundred and thirty eight Muslim scholars and leaders a year ago called 'A Common Word'. The Common Word appealed to the Christian scriptures 'love God and love your neighbour', and we have been talking together about the Qur'an and about the Bible and about our common belief that we are creatures of the one God, who are called to love each other and to cross all boundaries in love towards one another.

### **David Burrell**

I think we've come to see that we cannot help but seek for what is good and is true in everything that we see, and therefore we will inevitably look for traces of the creator in creation. The fact that we

cannot identify those reminds us that creation is something quite other, yet quite fundamental to our life of enquiry. But if it is so fundamental, yet so preposterous, to believe; why should we believe it? One of the ways I have of trying to explain this to myself is that, if we do believe that creation is freely a gift - that the universe is a gift - then we have at least have a chance of seeing our life as a vocation, as a call. Without that, I am afraid that we are stuck with a career.

**Christopher Isham**

Would you like me Mr. Chairman to answer the question I was asked originally? Is this the point that I reveal all?

**Edmund Newell**

Yes, should I ask it again?

**Christopher Isham**

Please, ask me again.

**Edmund Newell**

Do you think that there is a divinely determined meaning and purpose embedded in the universe?

**Christopher Isham**

Ah, yes. (*Laughter*)

**Edmund Newell**

Thank you.

**Christopher Isham**

I could amplify if you want.

**Edmund Newell**

We'll stick with that. (*Laughter*) Before we thank our speakers, let me remind you about the bookstall; the retiring collection; and the broadcast on Premier Radio. Our subject next week is Stories of Evolution, and the speakers include Steve Jones who has hit the headlines over the last few days for his comments on evolution so do come along. Thanks to those who submitted such excellent questions, I'm sorry we couldn't ask all of them. Thank you all for coming, and thanks to our speakers this evening for such a stimulating discussion.

(*Applause*) END