
A CHRONICLE

Prof. George F. R. Ellis
2004 Templeton Prize Laureate



TEMPLETON PRIZE

For Progress Toward Research or Discoveries About Spiritual Realities

including research in love, creativity, purpose, infinity, intelligence,

thanksgiving and prayer.

Templeton Prize Press Conference | New York City | March 17, 2004

Templeton Prize Luncheon Media Briefing | London | May 4, 2004

Buckingham Palace Prize Presentation | London | May 5, 2004

TABLE OF CONTENTS

PRESS CONFERENCE STATEMENT	1	John M. Templeton, Jr., M.D.
PRESS CONFERENCE STATEMENT	5	Prof. George F. R. Ellis
CLOSING STATEMENT	10	John M. Templeton, Jr., M.D.
PHOTOS	11	Presentation of the 2004 Templeton Prize
LONDON MEDIA BRIEFING	12	Prof. George F. R. Ellis
LONDON MEDIA BRIEFING	16	Prof. John Cornwell
LONDON MEDIA BRIEFING	17	Prof. George F. R. Ellis
PRINCIPALS	20	
JUDGES	20	
LAUREATES	20	

STATEMENT BY

John M. Templeton, Jr., M.D.

AT THE TEMPLETON PRIZE PRESS CONFERENCE, NEW YORK CITY, MARCH 17, 2004

Good morning. As President of the John Templeton Foundation, it is my privilege and pleasure to welcome all of you to the annual news conference for the announcement of the 2004 Templeton Prize.

Please let me take the opportunity to thank each and every one of you for attending this morning. I would also like to express a very special welcome to the 2004 Templeton Prize Laureate, Professor George Ellis of South Africa. It is a great honor for us to have Dr. Ellis with us to share some comments and to answer your questions. Our format this morning is as follows: First, I shall share with you some of the perspectives of my Father, Sir John Templeton, when he established the Templeton Prize program and when he spoke with us here last year. Because my Father is now 91 years old, he finds that the rigors of international travel, including long waiting lines at the airports, are overly taxing on him. He sends his sincerest apologies, therefore, for his not being able to be with us this year, but he also wants to express his joy in the wisdom of the judges in selecting Professor George Ellis as the 2004 Templeton Prize Laureate.

After a few comments about the vision of the Prize program, I shall present some of the accomplishments of Dr. Ellis, which clearly guided the judges in their selection of him as the winner of this year's award. After this introduction, Dr. Ellis will share with us some of the perspectives of his life-long work in the growing field of Science and Religion. Then, after his remarks, we shall open the floor to questions.

The Templeton Prize continues to be the world's largest annual prize given to an individual. This year's award is in the amount of £795,000 Sterling, which as of yesterday's market close equals more than \$1.4 million.

You may recall that a few years ago the name of the Prize, which is now in its thirty-second year, was changed to the Templeton Prize for Progress Toward Research or Discoveries About Spiritual Realities. For many years we have been looking for ways to draw greater and greater attention to the idea that progress in spiritual information and spiritual discoveries is just as feasible as progress in medicine, science and cosmology. In fact, spiritual progress may be more important than all of these other areas. Therefore, the name of the Prize was changed to inspire greater attention to research or discoveries of a spiritual nature. Spiritual realities refer to matters of the soul that are universal and apply in all cultures and to all peoples. Examples would include subjects like love, purpose, infinity, prayer, and thanksgiving. These realities are non-material, transcendent or metaphysical areas about which many people have intuitive perceptions.

The Prize is given each year in honor of a living person who represents through his or her work a remarkable spirit of inquiry to understand not only the nature of these realities, but also the nature of the divinity which gives life to these spiritual realities. The inquiry can come in many forms, including scientific research or other methods of discovery by which knowledge might complement ancient scriptures and traditions in opening our eyes more fully to our growing understanding about God's nature and purpose. This spirit of inquiry may involve a lifetime of scholarly commitment to the growing field of Science and Religion as demonstrated by the life's work of Dr. George Ellis.

Last year, my Father shared with us some of his perspectives that crystallize the meaning of this Prize program. He said, "Let me go back to some examples. Until three centuries ago, spiritual information and scientific information were regarded as one unit. But then a divergence took place. Science began to advance strongly into experimental science research, and as a result, we have witnessed the most glorious race ahead.

In his comments last year, my Father went on to say: "I think I can convince almost anybody that there has never been a human being who knew even one percent of what might be known about God. Almost everybody in the Western world believes there is a God but the amount of high quality scientific research done on the aspects of divinity is tiny."

Therefore, what we are trying to do through this Prize program and many of our other programs for the John

Until three centuries ago, spiritual information and scientific information were regarded as one unit. But then a divergence took place. Science began to advance strongly into experimental science research, and as a result, we have witnessed the most glorious race ahead.

"Let's take medicine: We know at least a hundred times as much about your body as we knew just one century ago. Unfortunately, this has not happened in regard to spiritual information or spiritual realities.

Templeton Foundation, is to change that attitude so that everybody, including theologians, becomes as enthusiastic for new discoveries just as people are in chemistry or medicine or physics or anything else.

"Or take any one of the other sciences: There is no major science that has not just raced ahead. So we live in the most glorious, rapidly improving time in all of the world's history — except in our knowledge of divinity.

"Why is such a vision of progress not true in spiritual matters? It's because of an unintentional attitude. Nobody planned it; nobody even realizes it's there. But it is the idea that, when you are trying to do research of a spiritual nature, you must look back hundreds if not thousands of years ago, and not into current discoveries.

"So why can we not get all of the world's people to be enthusiastic rather than resistant to new concepts in the field of spiritual information and discoveries about spiritual realities?"



John M. Templeton, Jr. at the Templeton Prize Press Conference.

If we can do that, the benefits are likely to be even greater. If we can get the world to spend even ten percent as much on spiritual research as the world does in scientific research, more will be discovered. With such an investment, it is possible that by the end of this century, humans will know perhaps one hundredfold more about the nature of divinity, and the nature of creativity, than anybody ever knew before. The benefits, therefore, are likely to be even greater than the benefits that have come from medicine or chemistry or physics.

Cosmology, for example, is a field that holds great promise in regard to this vision of discovery. It is useful to reflect on the fact that discoveries in all of the sciences, including cosmology, have contributed to our understanding of how large is God, thereby suggesting what we can learn about God. As noted, some fields like cosmology can especially contribute to helping humanity understand aspects of divinity. In highlighting this vision, my Father said: "All of this points toward tremendous blessings for humanity and that is what I am devoting my life to. My challenge to you is that if you want to be happy, if you want to be of benefit to humanity, you will not come up with anything more beneficial than new discoveries about spiritual realities including the nature of God and his purposes for us."

That line of thinking explains why we are here today. Years ago my Father looked at the work of Alfred Nobel and discovered that by giving five Prizes in Chemistry, Physics, Medicine and so forth, he had persuaded the most brilliant people on earth to devote a huge amount of attention to discovery — discoveries in physics, medicine and so forth. Brilliant people who might not otherwise have made these discoveries were inspired by the fact that other people had discovered something important and were recognized by winning one of his distinguished Prizes.

Nevertheless, my Father, Sir John, felt that Alfred Nobel had a blind spot when it came to spiritual discovery. He said: "I, therefore, established this Prize program to encourage an attitude of progress in the domain of religion and also a spirit, even an enthusiasm, for a quest for discovery regarding spiritual realities. I feel that this quest will have the most powerful and beneficial impact in the whole realm of research and discoveries — an impact that will advance the well being of each individual and the world as a whole."

As I explained, my Father regrets very much that he is not able to be with us today to share in our recognition of this year's winner, Dr. George Ellis. In my Father's absence, I would like to briefly share with you some of the extraordinary background and lifetime work of Dr. George Ellis. His is a career of remarkable accomplishments, which clearly guided the judges in their selection of him as this year's winner.

Many of the details of his accomplishments are highlighted in the press packets which you have received. Let me take a few moments, however, to highlight some of his remarkable life's work.

George Francis Rayner Ellis was born in Johannesburg in 1939. After receiving honors with distinction in Physics at the University of Cape Town, he then was awarded a Ph.D. in Applied Mathematics and Theoretical Physics from Cambridge University in 1964. Professor Ellis' life's work has led him to distinguished accomplishments in the field of Physics and Applied Mathematics, and particularly in Theoretical Cosmology, which is his specialty. Dr. Ellis enjoys an international reputation in that field. It would be impossible to overestimate his influence in Cosmology and in Physics in general. Currently, he is Professor of Applied Mathematics at the University of Cape Town, South Africa, where he has served for many years.

Dr. Ellis specializes in general relativity theory, an area first broadly investigated by Albert Einstein. He is considered to be among a handful of the world's leading relativistic cosmologists, including luminaries such as Stephen Hawking and Malcolm MacCallum. His most recent investigations question whether or not there was ever a start to the universe and, indeed, if there is only one universe or many.

In his very busy and extraordinarily productive life, Dr. Ellis has written, co-written and/or edited twelve different books.

His first book, *The Large Scale Structure of Space-Time*, written with Stephen Hawking and published in 1973, immediately became a standard reference work on the subject and continues to sell steadily today.

In spite of his professional work and leadership in some of the most critical issues in Science and Religion, Dr. Ellis decades ago also became an active and unrelenting critic of the Nationalist Government of South Africa and its brutal system of apartheid. It was around this time, in 1974, that he joined the Religious Society of Friends - The Quakers. In 1977, he and three colleagues wrote *The Squatter Problem in the Western Cape*, a scathing review of the plight of homeless people under the Nationalists.

While deeply involved in such issues, Dr. Ellis was elected in 1983 as a Fellow of the Royal Society of South Africa. His writings and these distinctions led to his numerous invitations as a visiting professor and lecturer in Italy, Corsica, Hamburg, and at the University of Chicago and Boston University.

Dr. Ellis has also been a regular participant in the Vatican Observatory/Center for Theology and Natural Sciences Workshops on "Scientific Perspectives on Divine Action." In conjunction with these workshops and many other activities, he authored numerous

papers and articles. His growing engagement as a world leader in Science and Religion was deeply affected by his perspectives as a Christian and, more specifically, as a Quaker. For example, Dr. Ellis has authored a number of important and provocative articles on the Anthropic Principle in Cosmology, which has important implications for the interaction between Science and Religion. In one particular paper, he expands that principle very imaginatively and perceptively in the direction of a more adequate theology of creation.

In nominating Dr. Ellis for this year's Templeton Prize, the Rev. Dr. William Stoeger, an Astrophysicist with the Vatican Observatory Research Group, notes that Dr. Ellis has sparked significant insights into the workings of the physical universe. "He has demonstrated how genuine, religious and theological perspectives can help us understand the constitution and character of our universe in terms of 'kenosis,' or self-sacrifice in love." Dr. Stoeger also added that Dr. Ellis has shown "that our universe seems to be particularly suited for fostering that attitude and practice, and to require it for its harmonious functioning at every level."

Finally, Dr. Stoeger, in his nomination, said, "Professor Ellis is a person of deep faith and convictions and has for many, many years exemplified in a very distinguished and outstanding way, how a person can integrate all aspects of his life and interests with his religious commitment and beliefs, expressed in generous, courageous and innovative service to his brothers and sisters."

It is from this framework of Dr. Ellis' deep understanding of the reality of love in our lives and, indeed, in all of existence that I would like now to ask Dr. George Ellis, the 2004 Templeton Prize Laureate, to come forward and share some remarks with us.

Prof. George F. R. Ellis

AT THE TEMPLETON PRIZE PRESS CONFERENCE, NEW YORK CITY, MARCH 17, 2004

I am simultaneously humbled and delighted at the award of the Templeton Prize. I feel greatly honoured by the choice the judges have made.

I am a scientist by profession, specialising in general relativity theory (that is, Einstein's theory of gravity) and its applications to cosmology — the study of the origin and evolution of the universe. After doing my undergraduate training at the University of Cape Town from 1956 to 1961, I did graduate studies on this theme in Cambridge, obtaining my Ph.D. degree there in 1964, and after teaching there returned to Cape Town in 1973. I have been mainly based in Cape Town ever since. I am also a Quaker, having joined the Religious Society of Friends in 1974, and have been involved in social activism of various kinds over many decades.

Despite being of retirement age, I am still actively working in cosmology. I have recently, with various colleagues, been revisiting the question of whether there was a beginning to the universe. We have developed a cosmological model which is both observationally viable and eternal — it has existed forever, and so never had a beginning. We are still exploring whether it can meet all observational constraints. So far, it has passed these tests. With other colleagues, I have been examining the issue of multiverses: is there only one universe, or is our universe but one of many, as some have suggested? Cosmology is at a very active and fruitful stage, and there are still many fascinating puzzles to resolve.

I first became involved in science and religion issues about fifteen years ago through my good friend Bill Stoeger, a Jesuit priest and astronomer with whom I have done technical work on cosmology. He invited me to write a paper for a book responding to a major Pontifical statement on science and religion issues, and from there I became increasingly involved in the

topic. Now there is a cost to this involvement, because it takes valuable research time away from my professional work in cosmology. So why, you might ask, have I spent so much time engaged in this pursuit, which some might say is a somewhat esoteric debate?

I have done so because I believe the science and religion dialogue is one of the most important issues we can engage in at the present time. It fundamentally shapes the way we see the universe and how we understand our own existence. Furthermore, the time is right to engage in this study. We are at a stage in human history when, as we gaze with amazement and appreciation at the incredible progress of science in the last century, we can also start to see clearly some of the limits to what science can achieve. The way in which science and religion by and large complement each other is becoming ever clearer, as are the natures of the various points of tension between them, and some possible resolutions of those tensions. It is a good time to look at these issues.

Here I wish to pay tribute to the role the John Templeton Foundation has played in the resurgence of this debate, driven by the extraordinary energy, vision, and philanthropic generosity of Sir John Templeton. Through sound vision and careful strategic use of resources, the Foundation has facilitated development of this important topic as a recognised academic subject in many universities and colleges. It has enabled development of science and religion courses, local societies, conferences, and other initiatives that have profoundly supported both the widening and deepening of the debate. Whatever our religious or

philosophical persuasion, we should all be grateful for that intervention.

For my own part, I have taken part in a series of very focused workshops run by the Vatican Observatory (Castel Gandolfo, Italy) in conjunction with the Center for Theology and the Natural Sciences in Berkeley, California, leading to a series of excellent books on topics such as the origin of the universe, evolution, complexity, quantum theory, and the human mind. This participation led to my writing the book *On the Moral Nature of the Universe* with my colleague Nancey Murphy, and to taking part in various other workshops, including one leading to a book I edited called *The Far-Future Universe*. I have undertaken various lecture tours on science and religion topics in the USA and Canada, and am on the Templeton Advisory Board and the Metanexus Institute Board. I am also a founding member and on the executive committee of the International Society for Science and Religion, having co-chaired the series of meetings that set that Society up, and have been nominated as its second president.

My own particular studies in this area have been on five major themes.

1. The limits of science and of the scientific method. In the face of some who claim that the powers of science are limitless, it is important to try to understand what aspects of existence science in fact can and cannot comprehend. As I mentioned above, I believe the boundaries here are becoming clear, for example, science cannot and never will be able to handle issues of aesthetics, ethics, metaphysics, or meaning. However there are some areas where the answer is unclear: it is unresolved, for example, whether science will or will not succeed in solving the hard problem of consciousness. I have extensively written and talked on this important



George Ellis at the Templeton Prize Press Conference.

theme of the limits of science, for it sets the parameters for much of the rest of the discussion.

2. The way that complexity can arise through physics, and alternatives to reductionist viewpoints that demean humankind. It is true that physics and chemistry underlie our existence and functioning as human beings, but that does not mean we are “nothing but” atoms, molecules, chemicals, or whatever. That phrase always hides an attempt to deny the true complexity and autonomous existence of vibrant living beings. We are much, much more than implied by hard reductionists and their favourite phrase “nothing but.” I have written extensively on why it is that these reductionist viewpoints miss out on the true nature of the complex reality that emerges from the underlying physics and chemistry. And one should note here that reductionist viewpoints emanate equally from the social and human sciences as from the natural sciences, and are equally fallacious in those cases too.

It is crucial also that despite the fact that the functioning of our brain can be understood by neuroscientists in terms of action potentials in the brain and flows of chemicals across synapses, nevertheless personal choice is real. Furthermore, the ethics that underlie the direction and nature of our choices is causally effective, and strongly shapes the nature of what happens in the world around us. It is not possible to reduce ethics to statements about neuroscience (or evolutionary history, for that matter), for it has a real normative nature; I return to this later.

I believe the science and religion dialogue is one of the most important issues we can engage in at the present time. It fundamentally shapes the way we see the universe and how we understand our own existence.

3. The natures of existence that flow from all this. Those pursuing a hard reductionist line associate it with a strongly materialist viewpoint: the claim that all that really exists are just particles with specific forces acting between them, and there is no other kind of reality to contend with. This too is deeply mistaken, and I have been developing further a line of argument of Karl Popper, John Eccles, and Roger Penrose on the multiple natures of existence. Here I emphasize that even hard-headed physicists have to acknowledge a number of different kinds of existence as well as that of the particles that constitute matter. In particular, human thoughts, emotions, and social constructions are causally effective, and cannot be encompassed by present day physics. Consequently even the most advanced physics today is unable to give a causally complete account of the factors that are effective in shaping the physical world we see around us, for example it cannot even explain the existence of as simple a thing as a pair of spectacles, because it is unable to encompass human thoughts and intentions. Furthermore, by its very nature it is unlikely to ever do so. This realisation strengthens the arguments I have already mentioned regarding the limits of science.

4. The nature of the tensions between rationality and faith and between emotion and reason in human life and affairs. Much of our life can be thought of as a struggle between emotion and rationality — the calm analyst deciding on a logical basis what we should do, versus the emotional hot-head who rushes into action and just does things. A common view is that evidence-based science represents that calm rationality which exemplifies to us how we ought to behave, and we should try to avoid basing our lives on faith and hope rather than rationality and reason.

However this is also a bad misunderstanding. In facing our individual and communal lives, we always need faith and hope as well as rationality, and indeed the real issue is how we can best balance them against each other. Take the case of my own country: there were very many times in the past when it was rational to give up all hope for the future — to assume that the nation would decay into a racial holocaust that never happened. It did not occur because of the transformative actions of those marvellous leaders Desmond Tutu and Nelson Mandela, confounding the calculus of rationality. This is a really important practical issue that I have only recently begun to consider. It is in a sense the theme of the book, *The Far-Future Universe*, that I edited.

However as well as being a highly practical issue, this also relates to the issue of reductionism and the way the mind functions. The reading and writing I have been doing on that topic have led to a very interesting appreciation: the fact that the rational mind is in a profound developmental sense based in the emotional mind. This is true both functionally and in evolutionary terms. So one of my latest projects is looking at this fascinating theme, and even writing about it in

association with Judith Toronchuk of Trinity Western University. So I am now happy that though I am a cosmologist by trade, I have just had a paper on this theme accepted for publication by the journal *Consciousness and Evolution*. This paper shows that the tension between emotion and reason has a deep grounding in the neurological mechanisms underlying brain function.

5. The science-religion-ethics triad, and the true nature of deep ethics. Finally, a theme in my writing, set out in detail in the book with Nancey Murphy, is the importance of including ethics in the science and religion debate. This is because ethics is causally effective, as outlined above, and provides the highest level of values that set human goals and choices. Consequently, a crucial issue is the origin of ethics on the one hand, and the nature of ethics on the other. With Nancey I am a moral realist, that is, I believe that we discover the true nature of ethics rather than inventing it, hence the title of our book: *On the Moral Nature of the Universe*. Indeed it is only if ethics is of this nature that it has a truly moral character, that is, it represents a guiding light that we ought to obey. I am fascinated that Stephen Pinker, too, has been suggesting moral realism in his recent book, *The Blank Slate* — he, too, realises this must be the case if it is to have the normative status that true morality must have. If true, this is a very important feature of the nature of the universe.

But then the issue is what is the nature of true morality? Nancey and I have argued that it must be kenotic in nature, that is, it must be a kind of ethics involving letting go of one's own interest on behalf of others, being ready if necessary to sacrifice one's own interests for them, even on behalf of an enemy. This is of course very controversial, just as it was when Jesus in essence stated it in the Sermon on the Mount. However I am convinced it is a deeply transforming principle of fundamental importance, which is universally recognised by the non-dogmatic branches of all the great religions: it is held up in all

of them as behaviour to aspire to. Indeed this is the theme of one of Sir John Templeton's books, called *Agape Love: A Tradition Found in Eight World Religions*. Furthermore this is the only basis for true security, for the deep foundation of security is based in transforming your enemies into friends. That can in the end only be achieved by the kind of sacrificial practices exemplified by Mahatma Gandhi, Martin Luther King, and Desmond Tutu, for this is the only way to touch the hardened heart. What seems rationally impossible can indeed become possible through the generosity and hope underlying and enabling kenosis and forgiveness: and this we experienced in South Africa. Nancey and I suggest this principle is deeply imbedded in the universe, both in ethics and in other aspects of our lives, and will thus be discovered by deeply moral beings in the vicinity of Alpha Centauri or the Andromeda galaxy, just as it has been discovered by all major religions here on Earth.



John M. Templeton, Jr. with George Ellis at the Templeton Prize Press Conference

Overall, in these studies I have been working on developing a comprehensive integrative view of the world and the universe, in contrast to the simplistic reductionist views that so many hold from one standpoint or another; this view endeavours to take into account the most recent achievements of science as well as relevant philosophy and ordinary human experience. I believe that although these issues may at first seem somewhat abstract, they are in fact foundational in the ongoing science and religion debate, and have the capacity to help change the way we view things and to help develop a worldview with rich foundations and outcomes.

I have been much helped in thinking on these things by many colleagues, but particularly Bill Stoeger (Vatican Observatory), Nancey Murphy (Fuller Theological Seminary), Phil Clayton (Sonoma State University), George Coyne (Vatican Observatory), Bob Russell (Center for Theology and the Natural Sciences), Billy Grassie (Metanexus Institute), and Charles Harper (John Templeton Foundation); without them I would have blundered much more than I have. I thank them all for having encouraged me to travel on these risky paths. I am delighted that this work has been assessed by the judges as a useful contribution.

As regards the use I intend to make of this very generous prize: I will be following Sir John in trying for maximal strategic advantage. In South African terms the prize is about ten million Rand, which sounds a great deal (it could be a bit more or less, depending on the tax situation and the exchange rate). After much thought, rather than giving it to a single beneficiary, I am planning to split it in two major portions:

Half to go to a trust fund, whose interest will support me in retirement and in my work for the rest of my life. On my death the capital of this fund will go towards a major project at my alma mater, the University of Cape Town — one of the great

educational beacons in Africa, which has been a main focus of most of my life; its best strategic use is to be discussed with the University. A further strategic aspect of this donation will be that I will use it to try to help leverage a greater willingness of alumni of my university to support their alma mater — a tradition that is strong in the USA but weak in South Africa.

The other half will be used to support a varied set of excellent projects in South Africa. Substantial grants (about R1m each) will go to:

BIG: The Basic Income Grant Campaign. This is the project with potentially the greatest impact of all, for it will be used to try to persuade our government to implement a universal basic grant of R100 per month to all South Africans. This is the only project in sight that could wipe out all destitution in our country in the next few years.

ASSET: The Association for Educational Transformation, an enormously effective project providing bursaries and extra lessons to black youth in the Cape Town area, and making a very substantial difference to the life prospects of many hundreds of them.

Quaker organisations in South Africa: the Cape Western Monthly Meeting (CWMM) and Central and Southern African Yearly Meeting (C&SAYM), to use for their own needs or for developmental projects.

Smaller gifts will go to some excellent local organisations where they will make a substantial difference, in particular:

- The Michael Oak Waldorf school, our excellent neighbourhood value-centred private school;
- The Cape Town Life Training Centre of the Kairos Foundation, running transformatory Life Training weekends in Cape Town;

- ASTI: the African Summer Theory Institute, an annual theory school for African physics and science students, organised by a coalition of overseas professors and some of my enthusiastic graduate students;
- The Imagine Cape Town project that has invigorated several local communities in the Cape Town area with a transforming new vision of what developmental possibilities may achieve;
- A computer laboratory for an agricultural high school in the farming area of Viljoenskroon, Free State;
- Hurdy Gurdy House: a home for autistic children near Cape Town; and
- Some individuals in need.

By spreading the prize money in this way, I believe I will achieve excellent advantage in developmental terms. It is a delight to be able to assist wonderful people who are doing so much for others. They do not do it for recognition, but they fully deserve our recognition for what they are doing, and whatever support we can give them. I am delighted to have the opportunity to use the award in this way, and it is with gratitude that I thank the John Templeton Foundation for this generous prize.

CLOSING STATEMENT BY

John M. Templeton, Jr., M.D.

AT THE TEMPLETON PRIZE PRESS CONFERENCE, NEW YORK CITY, MARCH 17, 2004

Again, I would like to warmly thank each and every one of you for attending this news conference this morning and for sharing your thoughts and questions.

I would also like to close with a special request from my Father. Specifically, he would first like to suggest that anyone here, or anyone who learns about the Prize and this year's winner, Dr. Ellis, to please contact us with any ideas or suggestions you might have for improving the Prize program and its outreach and impact.

Secondly, my Father would like to urge you or anyone you know to submit new nominations of individuals who have made singular accomplishments in the broad area of research and discoveries about spiritual realities. You can learn more about the Templeton Prize program and the criteria for applications by going to our Website, www.templetonprize.org.

On that note, please join me in giving one more round of applause and our expression of gratitude to our 2004 Templeton Prize Laureate, Professor George Ellis.

We look forward to seeing you here in New York City for our next Templeton Prize Press Conference in 2005. Thank you very much.

PRESENTATION OF THE

2004 Templeton Prize

AT BUCKINGHAM PALACE, LONDON, MAY 5, 2004



The Duke of Edinburgh with George Ellis and his family and friends at the Buckingham Palace ceremony.



George Ellis receives the 2004 Templeton Prize from The Duke of Edinburgh at Buckingham Palace.

STATEMENT BY

Prof. George F. R. Ellis

TEMPLETON PRIZE LUNCHEON MEDIA BRIEFING, LONDON, MAY 4, 2004

When I was training in cosmology at Cambridge, I worked on rather technical problems using Einstein's general relativity theory to study the evolution of the universe, where it was essential to get all the technical details right.

In particular we were examining whether the universe had a start or not. However later I also started to look at the big picture — I spent a lot of time looking into the philosophical side, and drifted into thinking very carefully about the limits on what can actually be observationally proven in cosmology, rather than making unprovable philosophical assumptions.

This is an ongoing argument that is very active at the present day, because of the fact that in cosmology there is an observational horizon. The universe has only been in existence for 14 billion years. Light can only travel a certain distance in that time and because of that you can't see anything further out. And so there is a whole mass of stuff out there in the universe we know nothing about. Furthermore, realistically speaking, we never ever will know anything about it, because the light will never get to us in time for us to know anything about it.

And this got me thinking of the limits of verification in cosmology. I have various disputes with some of my colleagues about some of the claims currently being made about cosmology, because these claims sometimes go quite a long way beyond what can actually be probed through observation. But then we get on to the broader theme of science and its limits, and there are many ways in which this comes up. Perhaps it's useful to just put on the plate immediately some important areas of human interest which I claim science not only cannot deal with now, but never ever will be able to deal with because of the very nature of science. These areas are: ethics, aesthetics, metaphysics, and meaning.



George Ellis and The Guardian science editor Tim Radford at the Templeton Prize Luncheon Media Briefing.

We can have long debates about each of these, in fact just the other day I was talking about this in South Africa on a platform with Professor Peter Atkins. As I named each one of those topics, he said, "No, no, no!"

But he's simply wrong.

One can for example write about the evolutionary biology origin of ethics, but of course there is a competing literature from the sociology side, each version claiming to give the whole truth. One of the interesting things regarding the people who write from each of these viewpoints is that when you talk to the people from the other side, there is this gap:

the social scientists on the one side and the evolutionary biologists on the other disagree with each other, and deny what the others say. But of course each is giving us a partial explanation. The problem is when each of them claim that they have the total answer.

But more than that, none of these approaches actually tells you what is right and what is wrong: they do not actually tackle the essential issues in ethics. To do so is in fact beyond the scope of science, for there is no relevant experiment to determine what is good and what is evil, and there are no associated units of good and bad. In my view, when people say that science can underlie ethics, they aren't taking seriously the real issues facing us

...one of the major problems facing us in the present age is fundamentalism, and its manifestation in reductionism... taking a partial truth and claiming it is the whole truth. And this occurs in the sciences, in the humanities, and in religion.

from the development or political side. They are treating it as an academic issue without following through to real issues where decisions are needed. And as I've said before on various occasions, if science underlies ethics, then please tell me what science says about what should be done about Iraq today. There is a deafening silence in response, because science can say nothing about such topics. That is totally outside the boundaries of science, not only now, but forever. Science can help you understand the results of value choices, but it cannot underlie value choices themselves.

I am very pleased to see how more and more people are now realizing this. For example, Steven Pinker in his book, *The Blank Slate*, takes a moral realist position, meaning that he realizes this problem: that

evolutionary biology by itself cannot underlie ethics, there has to be another basis for morality. And so he turns out in a quiet sort of way to be a moral realist — the position that I advocate. For example, if you are going to say that what happened in New York on September 11th was evil, meaning it can be said to be evil in a way which applies across all cultures to all humans, independent of our evolutionary origins, then there has to be a moral realism.

What that leaves quite open is the nature of that moral reality, and there have been many competing visions on the nature of morality through the years. As was mentioned in the introduction to this meeting, I believe strongly in a morality of self-sacrifice, of giving up, of kenosis: that is, of letting go of one's own

interests on behalf of others. This is widely understood in the spiritual branches of all the major religious traditions. In fact I've had interactions with people from all the major traditions, Muslim, Jewish, Christian, Hindu, who have agreed with me about this. And Sir John Templeton has written a very nice book on this topic called *Agape Love*, making the case that it is in fact something which occurs in all the major religious traditions.

But returning now to the science, and the limitations of science. I've gotten involved through these discussions in the issues of emergence, complexity, and reductionism, and that little phrase "nothing but." Whenever anyone says "nothing but," they're going to make some demeaning statement about humanity, which is going to try to deny the fullness of humanity.

And this happens in all kinds of ways, and I've now come to realize that one of the major problems facing us in the present age is fundamentalism, and its manifestation in reductionism. Fundamentalism, as I now define it, is taking a partial truth and claiming it is the whole truth. And this occurs in the sciences, in the humanities, and in religion.

It attains its strength because each fundamentalism is based on a truth, but it is a partial truth. Because each of them is based in partial truth rather than the whole truth, they are simultaneously both very strong and very misleading. The thing is that each of these fundamentalisms, because they are desperately seeking to establish a partial truth as the whole truth, has to deny everybody else's understanding of what is important; they deny each other. But there's no need to do that, one can try to encompass the separate understandings of different people and weave them into a more or less consistent whole.

In terms of the emergence of complexity — and this is not the time or place for technical discussion — there are two key ideas I'd like to mention. One is the fact that in the biological hierarchical structure, whereby physics underlies chemistry underlies biology underlies psychology underlies community interactions, in that hierarchy, as well as bottom-up action, you get top-down actions; and they are both causally effective.

And I've spent a lot of time looking at that kind of phenomena. As soon as you realize that there are top-down actions as well as bottom-up ones, the whole structure changes from that exclusively considered by hard-line reductionists. Much of the discussion of this hierarchy considers only the bottom-up action, because it comes from physicists who never really think about the top-down actions, even though it occurs all around us. By contrast, biologists are far more aware of this feature, because they are more used to dealing with real complexity.



John Cornwell, George Ellis, and John M. Templeton, Jr. at the Templeton Prize Luncheon Media Briefing.

The other thing is the importance of information in the world around us: in particular, the causal efficacy of goals and of ethics. Because the goals we have shape things around us through our chosen actions, our ethical viewpoints — determining what goals are acceptable and what not — also shape things around us, and so are causally efficacious in the real world. And this is something that strong reductionists do not include in their worldview. At a certain level, saying this is kind of embarrassing, because what you're saying is something that is obvious to everybody on the street, except the scientists who focus so narrowly on their own themes of expertise, thereby severely restricting their viewpoint to exclude what everyone else knows.

The way I like to express it is this: take this pair of spectacles. Neither physics nor chemistry can explain the specific curvature of the glass of the spectacles. Why not? Because they have been designed by human beings, through their purposeful intentions, to properly focus light to fit my particular eyes. Now that interaction is beyond the scope of physics. Why?

Because in all the variables that present day physics defines and includes in its scope — momentum, energy, entropy, scalar fields, electromagnetism, and so on — there isn't a variable corresponding to human intention. Because there is no such variable in physics, physics can't explain the curvature of the glass in the spectacles. It can explain how we need to curve it to get the right focus, and how it keeps its curvature because of the molecular structure of the glass, but physics cannot explain the specific curvature of that glass.

It actually also can't explain anything else made by humans in this room, because they are all creations that depend on human intentions. It is conceivable that some day a greatly extended form of physics might be able to relate to these intentions. The point is that present day physics does not, and it won't do so even if we attain some kind of "Theory of Everything" describing in a unified way all the interactions of fundamental physics.

Because the goals we have shape things around us through our chosen actions, our ethical viewpoints — determining what goals are acceptable and what not — also shape things around us, and so are causally efficacious in the real world.

So I think what is really important to realize is that present day physics and chemistry give you causally incomplete descriptions of the world around us. They cannot, as they stand, explain the whole causal nexus of the processes that shape the physical reality we see around us.

Therefore what physics does — and I love physics and I really value it, and find it fantastic to understand — is give you a partial explanation: it gives you the bottom-up part of the explanation of what we see, but it does not give you the top-down part. And the full explanation requires the top-down part as well. So present day physics is, in fact, causally incomplete in relation to the real world, and we haven't yet faced up to this fact — that it doesn't give you a full causal explanation of what we see in the world around us. But any attempt to construct philosophies of existence on the basis of science must face up to this situation.

STATEMENT BY

Prof. John Cornwell

AT THE TEMPLETON PRIZE LUNCHEON MEDIA BRIEFING, MAY 4, 2004

First of all I'd like to thank the Templeton Foundation for this wonderful meeting and lunch, and congratulate you, George, on receiving the Prize.

I think the extraordinary thing about your work is not only the contributions you've made to science but also, parallel, what you've done in areas of social work with the homeless and anti-apartheid — it's a rare kind of contribution, that combination.

You've talked today about the limits of science. But I think one of the stories that interests the nonscientific public is whether there is in fact a convergence between science and religion. And of course the Templeton Foundation is associated with those kinds of interests.

Do you see some type of gradual interest in convergence between religion, metaphysics and science, or do you think they are in fact parallel and will never possibly talk to each other in the way that some people would like them to talk to each other?

Perhaps I could put a bit of flesh and blood on the question for you. In 1979, Freeman Dyson wrote an extraordinary book called *Disturbing the Universe*, and in the course of that book he said that he had been reflective on the miracle attributes that go into the making of the universe hospitable to life, and some people call that the Anthropic Principle. And that this has enabled him to move closer to a sort of deist position, the notion that the universe was contingent and therefore demanded a creator.

Not long after that, various scientists in this country, most recently, Martin Rees, have promoted the idea that perhaps there are an infinite series of universes, and that every time you get a new Big Bang you get

a new set of laws of physics and chemistry. And therefore that the account of the Anthropic Principle is invalidated.

What this suggests is another kind of story that you don't have a convergence between religion, metaphysics and science but you have two parallel lines where the two shall never meet. If you base your belief in God or any kind of religious belief on science then because of the variation of science, that this falsifies the nature of that theory, and you're going to be disappointed at some stage in the future.

So my question is, do you see some type of gradual interest in convergence between religion, metaphysics and science, or do you think they are in fact parallel and will never possibly talk to each other in the way that some people would like them to talk to each other?

RESPONSE BY

Prof. George F. R. Ellis

AT THE TEMPLETON PRIZE LUNCHEON MEDIA BRIEFING, MAY 4, 2004

When I'm working as a scientist, I work as a scientist and I don't introduce purely religious issues into it. In fact I talk about cosmology with a small "c" and a capital "C".

Cosmology with a small "c" being all the stuff about the Hot Big Bang, the expansion of the universe, the physical origin of galaxies, and the rest of it. The big "C" is Cosmology when you bring in the other issues: it's Cosmology in the anthropological sense, where you also talk about the meaning of life and what it has to say about humanity and so on. I think it's important as a scientist dealing in physical cosmology to keep the physical science separate from the rest and to be quite clear about this, and in that sense there's no convergence at all.

And that is very much the accepted situation in physics, to deal with the mechanisms that underlie physical reality and make it all possible, and for religion to deal with the metaphysics and ethics and aesthetics and meaning. And these are basically separate features. There are a few places where there are either convergences or tensions. One of them is the anthropic issue that you briefly alluded to, and it is very striking. What is intriguing for example is Fred Hoyle's evolution. Fred Hoyle started his steady-state theory, as I understand it, as an anti-religious move because he didn't want there to be a start to the universe, because he didn't understand his theology too well and he wanted to avoid the issue of creation. But he then became aware of the difficulties underlying the existence of life and in fact he was one of the people who first developed this theme. One of the extraordinary discoveries he made was that if life was to come into existence, you needed a particular excited state of the carbon atom in order that the heavy elements could come into being, from which living beings are constructed; and this state was indeed then found to be there. And Hoyle became so struck by this

and other very special physical properties needed in order that life could exist that he actually became quite religious in the end, because he couldn't see how the coincidences entailed by all these physical properties existing simultaneously could have come about unless this was somehow intended.

As for the Rees argument for the multiverses, it is indeed probably the only scientific answer to this question of fine tuning. The only scientific answer is to postulate millions and millions of universes allowing you to do what physicists like to do, that is, apply statistical methods. And if there are enough such universes with varied enough properties, eventually there is a high probability that at least one will exist that has the special properties needed that allow life to come into existence. Thus you have the needed explanation. The only problem with this is that you haven't got the faintest knowledge of what these other universes are like, you have no causal connection with them, you don't actually even know if they exist.

And so he and I have this ongoing debate in which I say that as far as I'm concerned, the existence of these universes is a metaphysical rather than a scientific presupposition. Or to put it another way, you need at least as much faith to believe in these other universes as you do to believe in a God that created the one universe we do know exists. I see no difference in the amount of faith needed.

But from a scientific viewpoint it makes sense and it could be right. The only thing is you're never going to prove it's right.

Juts a little sideline on that, in this kind of view, I think by far the most interesting is Lee Smolin's proposal, where you have universes in which there are local collapses in the universe leading to black holes and subsequent re-expansion, and the new expanding universe region that thereby comes into existence has slightly different physical constants from the one where it originated; and then it again re-collapses, and so on. So you get a reprocessing of universes. Smolin's suggestion is that there is a Darwinian process happening amongst universes, where the successful universes are the ones that produce the most daughter universes, and these are the ones that produce the most black holes. Thus selection takes place to maximize black hole production.

...scientists and religious people can both wonder, how on earth can it be that physics can be structured in such a way that it allows us to exist, because almost all fundamental physics we can think of would allow us not to exist.

And that brings evolutionary biology ideas into cosmology. I think that's one of the least recognized and most interesting proposals in cosmology for a long time. It is certainly worth developing more.

Anyway, by and large I see science and religion as separate, but the place where there is a tension is in the issue of free will, of the human mind. But it's not a tension just between religion and science, but actually a tension between humanism and science. Because the way some scientists write, and the way even some neurobiologists and psychologists write, undermines the reality of consciousness, of free will. The way that some people are writing from the neuroscience side and from the philosophy side, they are saying that you don't have any real choices. But if free will doesn't exist, that undermines morality completely. It means that our choices are not real choices, they're just

apparent choices, and morality has no meaning in that context.

Now Daniel Dennett has written a book in which he makes this case and then he says it doesn't matter, don't worry about it. Well, I think it's a really serious problem and you can't just say don't worry about it.

But also I think it's a completely incoherent position and Anton Zeilinger has made this point. If you really believe that consciousness is just an epiphenomena, a fluff on the top, and all the real stuff is unconscious, then consciousness and free choice aren't real, as some of these writers suggest; but then science doesn't make sense either. Because there's no reason to believe in

scientific theories produced by anybody whose mind works in that way, because then it's not working in a rational way where you can analyze theories and conclude rationally that they make sense or not. So in fact, like some other theories, it's totally self-defeating. If some of those approaches on the mind were really true, then science itself wouldn't make sense as an occupation. And so one can slightly rudely say, if your mind works that way I don't have to take seriously what you are saying about science.

The convergence here is the understanding and appreciation of the way that physics is configured in such a way that nature self-constructs. It constructs the simple molecules, the bigger molecules, the galaxies self-construct, stars self-construct, and physics is structured in this extraordinary way in which life is almost inevitable given the universe as

we know it, with the particular laws of physics, constants, forces, and so on that we have investigated through science. And that is the convergence where scientists and religious people can both wonder, how on earth can it be that physics can be structured in such a way that it allows us to exist, because almost all fundamental physics we can think of would allow us not to exist.

A final comment I would make: there is a major movement at present attempting to show that there is a fundamental physical theory of everything, in which are united the strong, weak, electromagnetic and gravitational forces, and determining the different fundamental particles that can exist and their masses, all coming from this one theory. And this move is based on string theory at the moment, trying to say that there's just this theory of fundamental physics based on symmetry principles and variation principles, which will hopefully be shown to be the only self-consistent theory and will determine the nature of forces and particles that exist in the world today.

Now supposing there was indeed such a theory, with no adjustable parameters, some people would say that in that case the anthropic issue falls away, because this theory explains all the fundamental constants of nature and that's your final explanation. No more discussion is needed. But to me, this makes the problem ten times worse. Because then you've got this theory which uniquely produces all these constants, but you know that almost all variations of these constants wouldn't allow life to exist. However we do have life, so these constants must then all fit together in that precise fine-tuned way required in order that life can exist, even though their derivation does not give any reason to expect that this will happen. That would be even more amazing, the most extraordinary coincidence that one can imagine. The question of why this should be so would return ten times amplified: How could it be that the only possible consistent fundamental theory of physics also satisfies all the anthropic coincidences? Why should those variational principles and symmetry principles, of the most abstract kind, have embedded in themselves the pre-image of life?



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