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The Townes Perspective

Charles H. Townes '35

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To best understand science or religion, we must use all of our human resources.

I feel very humble at being thought to have contributed to such critically important fields as spirituality and the purpose of life. I am enormously honored by this award, and deeply thank the Templeton Foundation.

I want to thank even more Sir John Templeton for his work and emphasis on better understanding spirituality and religion, and towards bringing science and religion into productive interactions. His efforts have in recent years indeed produced an atmosphere of open and helpful discussions between scientists and theologians. I believe there is no long-range question more important than the purpose and meaning of our lives and our universe, and Sir John has very much stimulated its thoughtful consideration, particularly encouraging open and useful discussion of spirituality and the meaning of life by scientists.

Science and religion have had a long history of interesting interaction. But when I was younger, that interaction did not seem like a very healthy one. For example, when I was a graduate student at the California Institute of Technology, even my professor who was directing my research jumped on me for being religiously oriented. I myself have always thought that science and religion are not unrelated, and should be honestly and openly interacting.

Later, in the early 1960s, I was at Columbia University and the men's group of Riverside Church, near Columbia, asked if I would talk to them about my views, since I was one of few scientists they knew who attended church. Surprisingly, a week later someone telephoned to ask if he could publish my talk he had heard on the relation between science and religion. Of all things, he wanted to publish it in *THINK* magazine of IBM, of which he was editor.

Shortly after that, the editor of the MIT alumni journal read it and also wanted to publish it in his journal, and did. But a prominent MIT alumnus wrote him that if he ever published anything like it again on religion, he would never have anything more to do with MIT. This, of course, only encouraged me to provide many other talks and articles on the subject as I was invited, but it reflected a common view at the time among many scientists that one could not be a scientist and religiously oriented. There was an antipathy towards discussion of spirituality.

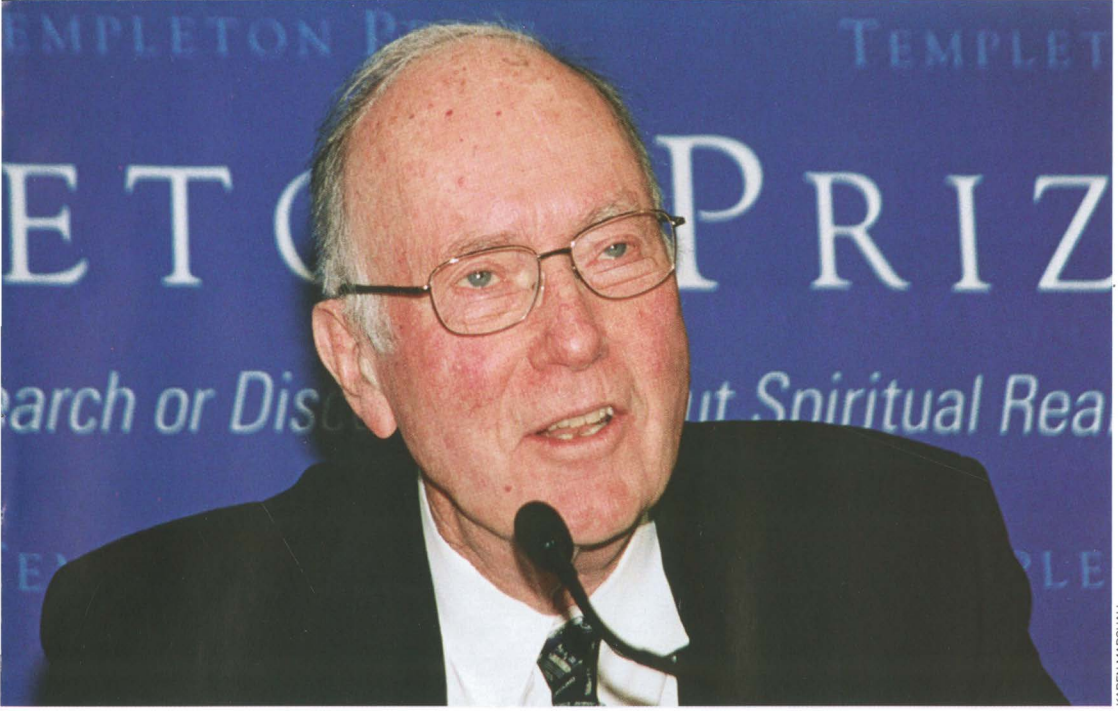
Not long afterwards, Templeton began his creative and constructive emphasis on better understanding of religion, and by now I believe he has made a major change in openness of the public and of scientists to such discussions.

My own view is that, while science and religion may *seem* different, they have many similarities and should interact and enlighten each other. They certainly can appear quite different, but basically I believe they are closely related.

Science tries to understand what our universe is like and how it works, including us humans. Religion is aimed at understanding the purpose and meaning of our universe, including our own lives. If the universe has a purpose or meaning, this must be reflected in its structure and functioning, and hence in science. In addition, to best understand either science or religion, we must use all of our human resources — logic, evidence (observations or experiment), carefully chosen assumptions, intuition and faith. A former scientist-philosopher, when asked to define the "scientific method," said, "It's to work like the devil to get the answer, with no holds barred." I believe the same is true for our understanding of spirituality.

Many people don't realize that science basically involves assumptions and faith. But nothing is absolutely proved. For example, the mathematician Gödel showed logically that to prove something, there must be an overall set of assumptions, but that we can never prove that the assumptions are even self-consistent. We must make the best assumptions we can envisage, and have faith. And wonderful things in both science and religion come from our efforts based on observations, thoughtful assumptions, faith and logic.

There are many mysteries in science. We seem to know only about five percent of the matter in our universe. This is such a small fraction, and what is the remainder? We are convinced the other matter is there, but it's not stars, light, or gas. What is it? It's clearly there



KAREN MARSHALL

Townes addresses the media at the Templeton Prize announcement in New York.

according to cosmological behavior, but we don't know what in the world it is.

We assume the laws of physics are constant, and have faith in that, but could they suddenly change? And if not, why not?

Quantum mechanics and general relativity are wonderful and tell us a lot. But it appears they are not consistent with each other. What is it we are missing?

Another mystery facing us in human life is free will. According to present science, individuals really can have no freedom of choice, yet we think we do. And there is the question as to what really is consciousness, or a conscious being. Intuitively we think we can make some free choices and know what consciousness is, but our present science and logic simply do not fit our ideas very well. Are there completely new phenomena and laws of science to be discovered, or can we never understand fully?

Recently, scientists have become more and more aware of the special nature of our universe, a special nature that allows us to exist. And we are wondering more and more about why. If relations between electromagnetic and nuclear forces were not very close to what they actually are, then the wealth of chemical elements — including carbon, oxygen and nitrogen, which humans depend on — could not exist. If the gravitational and nuclear forces were not very close to what they are, the generation of heat by stars and our long-lasting and steady solar source of energy could not be.

Why did the laws of physics turn out to be so special that we can be here? We can assume it was just accidental, but that seems extremely unlikely. Another possibility is that there are an almost infinite number of universes, each with different laws, and ours turned out to be just the right one. But we can't test this assumption, and even if there are a multitude of universes we do not know why the laws of physics would vary in such a way from one universe to another.

Increasingly, science is showing how special both our universe and we are, which has raised questions about whether it was indeed planned or influenced — one of many examples where science and religion naturally interact. Fred Hoyle, the British physicist who was skeptical that there was any creation of the universe, nevertheless wrote, after he discovered how remarkable nuclear properties produced important chemical elements, "Would you not say to yourself, 'Some super-calculating intellect must have designed the properties of the carbon atom?' Of course you would. A common-sense interpretation of the facts suggests that some super intellect has monkeyed with physics — and there are no blind forces worth speaking about in nature."

We must continuously pay deep attention to such basic questions — the meaning of our universe, of life, and how to fulfill it. And we need to be open-minded. I believe our present views have an important reality. But they may be modified, just as classical or Newtonian physics was radically modified in principle by the advent of quantum mechanics. And yet, classical physics is still remarkably close to many realities, and we rely on it in many ways. As we progress, I'm hopeful that new understandings will deepen our perceptions. And they may well change our views, but I believe present understandings will still be important.

The Templeton Foundation has been creative and importantly helpful in stimulating new thoughts, efforts and insights towards our understanding, in particular towards open and useful discussion between science and spirituality, which I deeply appreciate. And I am hopeful we will in time understand much more.

— Charles H. Townes

These remarks, delivered by Townes at the March 9 Templeton Prize press conference, were provided by the John Templeton Foundation.