

## Charles H. Townes

### “The Convergence of Science and Religion”

Episode 7 of The Advent of Evolutionary Christianity

EvolutionaryChristianity.com

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**Charles Townes** was awarded the Nobel Prize in physics in 1964 for his invention of the laser. He received the Templeton Prize in 2005 for contributions to the understanding of religion, especially his notion (published in 1966) of the “convergence of science and religion.”

#### HIGHLIGHTS

Of all the audios in this series, this one presents **the most in-depth (yet fully understandable) look into the process of major scientific discovery**—including serendipity, imagination, creative musings, persistence, collaboration, and the courage to carry on despite what others may think. Several listeners have commented on how much they appreciated hearing this distinguished elder tell his story in such an open and engaging way. It is a special delight for anyone under the age of 85—because Townes is 95 and he speaks of **his direct contact with legendary physicists of the World War II era**, such as Robert Oppenheimer. Another highlight is that Townes very clearly and succinctly speaks of why, while remaining completely within the realm of mainstream science, **he believes that “God planned” this universe** and why, in contemplating his own mortality, **he believes that “as our bodies give up, I think there will be something remaining. And I look forward to that.”** Finally, because he regards **questioning one’s beliefs as a “positive” thing**, the Study Guide questions for this interview encourage listeners to probe into their own life experience of questioning and reformulating childhood beliefs.

#### SUGGESTED AUDIENCES

Highly recommended for all audiences—not only for what the speaker has to say about his understanding of the science-and-religion issue, but especially for the delight of its narrative storytelling, which will help everyone grasp both the rigor and the humanity of scientific pursuit. Because of his forthright statements of belief in God, that God “planned” this universe, and

that something of the human individual carries on after death, theological conservatives will enjoy this dialogue, although they may be challenged when Townes is asked, “What would you say to someone who fears that embracing evolution will have negative consequences?” His response:

I don't see why in the world it has negative consequences. I don't see why that would be. Now, of course, if they have certain beliefs that disagree with evolution, then this will change their beliefs. But changing their beliefs can be a *positive* thing. I think understanding more and more is always positive, and understanding evolution is positive.

**Note:** Instructors in educational institutions or of religious training programs may wish to **supplement this audio** by directing participants to access online the 1966 paper that established Charles Townes as one of the foundational contributors to the understanding of science-and-religion issues.

“The Convergence of Science and Religion” was published in the March-April 1966 issue of IBM’s *Think* magazine. You can access it in PDF at

<http://www.ocf.berkeley.edu/~jmcbray/happy/documents/THINK.pdf>

## BLOG COMMENT

**Don Smith says:**

You have to love the brevity and directness of Dr. Townes. Another great conversation.

## KEYWORD TOPICS

**Nobel Prize in physics, laser** (invention of), **Templeton Prize, religion-and-science** (as parallel, convergent endeavors), **Robert Oppenheimer, Robert Millikan, meaning-making** (religion as for), **Albert Einstein, Big Bang, anthropic principle, initial conditions, design of Universe, purpose of Universe, meaning of life, interpretation** (necessity of), **God’s will, science** (as technologically valuable and religiously meaningful), **beliefs** (importance of openness to change), **origin of life** (as unknown), **death** (and belief in afterlife), **free will** (as real)

## BIOGRAPHY

**Charles H. Townes** was awarded the Nobel Prize in physics in 1964 for his pioneering work on the laser. He was born in Greenville, South Carolina in 1915. At Columbia University, where he was appointed to the faculty in 1948, he conducted research in microwave physics, particularly studying the interactions between microwaves and molecules, and using microwave spectra for the study of the structure of molecules, atoms, and nuclei. In 1951 Dr. Townes conceived

the idea of the maser, which is an acronym for microwave amplification by stimulated emission of radiation. In 1960 the first ruby maser, or laser, was constructed, paving the way for a technology that would revolutionize engineering, medicine, and communications.

In 2005 Townes was awarded the Templeton Prize, for contributions to the understanding of religion, based largely on his influential essay, “The Convergence of Science and Religion,” originally published in IBM’s *Think* magazine in 1966.

Charles Townes Wikipedia page: [http://en.wikipedia.org/wiki/Charles\\_Hard\\_Townes](http://en.wikipedia.org/wiki/Charles_Hard_Townes)

## SUPPLEMENTARY WEBPAGE

Listener comments to this audio can be found (and new ones posted) at:

<http://evolutionarychristianity.com/blog/general/charles-townes-science-and-religion-converging/>

## QUESTIONS FOR REFLECTION AND DISCUSSION

1. **An inside look at scientific discovery.** Of all the audios in this series, this one presents the most in-depth look into the process of major scientific discovery.

**Question 1A:** *What was your response to getting a chance to hear, from the inside, how top-level science is actually carried out?*

**Question 1B:** *Did Charles Townes’s personal narrative enhance your regard for science as a process? If so, in what ways?*

**Question 1C:** *What are **the character traits** that seem to have been crucial for Charles Townes to make his discovery?*

2. **A universe that “God planned.”** The central theological reflection that Charles Townes gets into—and for which his training as a physicist lends him depth insight into—is his sense of God’s involvement in structuring the very foundations of this universe. He says,

Well, I think for one thing, science makes us realize more and more what a fantastic universe this is. **It’s a very special universe.** Firstly, we recognize that the universe had a beginning, of all things! Now Einstein thought the universe couldn’t have a beginning. He said, of course it can’t have a beginning. But now we know scientifically: yes, it *did* have a beginning. It began about 14 billion years ago. How could it possibly have a beginning? That shed some light on religion and creativity. In addition, **the laws of science have to be almost exactly the way they are for us to be here.** The relation between electric forces and nuclear forces have to be just right for all the nuclei to exist that make all the chemicals of which we’re made, and so on. It just goes on and on. The more we understand, the more we recognize how very, very special this universe is. It’s not only fantastic and beautiful; it’s also very special. **It has to be very specially planned exactly the way it is.**

Now, if people don't want to think this was a *plan*, well, [they say] there has to be an infinite number of universes—each one is a little different, and this one just happened to turn out right. Well, in the first place, why would each universe be different? And it has to be so very special: there have to be billions and billions and billions of different universes. But we can never test that. That's just a postulate that people like to make if they don't want to believe this was specially planned. It's just a postulate. **We can never test it, we can never see if there are any other universes out there or not.** And I think that's kind of a wild postulate.

**Question 2A:** *Setting aside your own theological viewpoint for the moment: Did you appreciate **the logical process** that Charles Townes used to arrive at his conclusion?*

**Question 2B:** *Did Charles's statement on the question of **whether the universe was "planned"** affect the way you had previously been thinking about this issue? If so, in what ways? If not, when did your beliefs solidify on this matter—and can you discern what may be your root belief or commitment that brings you to your conclusion?*

3. **What happens after death?** Charles Townes is also very forthright on speaking about his own belief on what may or may not happen after death. He says,

Sure, I think about my own mortality. **I'm now 95 and a half;** I don't have many more years to be here in this body. On the other hand, **I do think the spirit is something special, and probably will remain.** For example, we don't really understand what a human *is*. Where is this human? We think of the human as being up here in the brain somewhere, but *where* is it? *What* is it? What is an individual? Why do we have consciousness? Do we have **free will**? Free will isn't allowed by science, and yet we *think* we can do this and that. Well, I believe there's something here **beyond our present knowledge of science.** I believe there's a spirituality there, and that as our bodies give up, I think there will be something remaining. And I look forward to that.

**Question 3A:** *Setting aside your own viewpoint for the moment: Did you appreciate the logical process that Charles Townes used to arrive at his conclusion? Please elaborate.*

**Question 3B:** *Did Charles's response to this question about **his beliefs in an afterlife** affect the way you had previously been thinking about this issue? If so, in what ways? If not, when did your beliefs solidify on this matter—and can you discern what may be your root belief or commitment that brings you to your conclusion? And, if you don't really have beliefs one way or another about this question, can you discern why that may be the case? Or, perhaps are you hesitant to think about the question because of fear? Or are you perhaps so grounded in your faith that you don't need to have a belief about something that cannot be known—you just trust that all will be well in the end and that **whatever happens on the other side of death is just fine?***

4. **Childhood Sunday school teachers.**

**Question 4:** *Perhaps because Charles Townes is not trained as a theologian or scholar in the field of religion, his responses to big theological questions are very brief and easy to follow.*

*What would it have been like for you to have had him as a Sunday school teacher when you were a child or young adult?*

**5. Changing beliefs as a positive thing.** The host, Michael Dowd, asks Charles Townes, “**What would you say to someone who fears that embracing evolution will have negative consequences?**” Charles responds,

I don't see why in the world it has negative consequences. I don't see why that would be. Now, of course, if they have certain beliefs that disagree with evolution, then this will change their beliefs.

But **changing their beliefs can be a positive thing**. I think understanding more and more is always positive, and understanding evolution is positive.

**Question 5A:** *Were you grateful for the way Charles answered this question? Or did you experience some resistance to it? Please elaborate.*

**Question 5B:** *Recall your own most difficult or painful experience when a change of circumstances, your own growth, a new learning opportunity, or some crisis, pressed you to make a shift in belief—perhaps a shift in religious belief, or about how something in the world actually works, or maybe about some aspect of history or human nature. Please share your reflections.*

**Question 5C:** *Now, thinking about that time of difficult change for you, was there someone who served as **mentor in leading you into that time of change**, and perhaps guiding you through it? If not, where might you have looked to find a mentor? How might you have generated the courage to open up your troubles and confusion to that person?*

**Question 5D:** *At what stage in a child's religious or worldview education is it important to let them know that questioning the beliefs one has been given may be a good thing?*

**Question 5E:** *When (if at all) did you begin to question what you had been taught as a **child**? Did the authority figures in your life (older family members, clergy) tend to encourage or discourage you in such questioning? What impact did their attitudes have on you then? What about now—do the impacts linger?*

**6. Getting through the down times.** One of the benefits of hearing a rather full version of Charles Townes's story of scientific discovery is we get to hear that **it was by no means a smooth process** from beginning to end. Because of an outer circumstance, World War II, he had little choice but to engage in engineering work for awhile, even though his heart was in pure science. Yet he now attributes his serendipitous training as an engineer as a vital part of how he came to **the breakthrough ideas that led to his Nobel Prize in physics** for an invention that has positively impacted countless millions (even billions) of people. He also had to persist with his research over a very long time in which the absence of progress in his lab, along with **criticism from his own superiors**, would have sorely tried the determination of many of us.

**Question 6A:** *Might there be value for yourself and others to **contemplate stories like that of Charles Townes**, when inner or outer circumstances push you into one of life’s inevitable downturns? What is your **take-home lesson** from this conversation in that regard?*

**Question 6B:** *When you are in a situation in which you choose to tell some aspect of your personal life story, do you tend to tell it in a **mythic, grateful way**? For example, do you make a point, as Charles does, of appending onto the “downturn” aspects of one’s story an interpretation that shows an ultimately good outcome that derived from those difficult times? Please reflect and then elaborate.*

**Question 6C:** *What difference might it make in your own attitude (and for how others regard you) if you consciously attempt to offer, from now on, interpretations of your life story that in some way evidence **gratitude for even the most difficult phases of your life**—recognizing, of course, that for most of us, a Nobel Prize will not be the result, but perhaps growth in one’s own character?*

#### **SUPPLEMENTARY QUESTIONS DERIVED FROM THE 1966 ARTICLE BY TOWNES**

*“The Convergence of Science and Religion” was published in the March-April 1966 issue of IBM’s Think magazine. You can access it in PDF at <http://www.ocf.berkeley.edu/~jmcbryan/happy/documents/THINK.pdf>*

S-1. **Faith in science.** Two years after receiving the Nobel Prize in Physics, Charles Townes published, what is still, **a classic article in science-and-religion**. Townes wrote about the sort of faith that scientists share. He wrote,

**Faith is necessary for the scientist even to get started, and deep faith necessary for him to carry out his tougher tasks.** Why? Because he must have **confidence that there is order in the universe and that the human mind—in fact his own mind—has a good chance of understanding this order.** Without this confidence, there would be little point in intense effort to try to understand a presumably disorderly or incomprehensible world. Such a world would take us back to the days of superstition, when man thought capricious forces manipulated his universe. In fact, it is just **this faith in an orderly universe, understandable to man, which allowed the basic change from an age of superstition to an age of science**, and has made possible our scientific progress.

**Question S-1:** *Recalling the personal story of discovery that Charles Townes already told, can you see how this depiction of the “faith” of a scientist is a natural outgrowth of his own experience as a scientist? Please elaborate.*

S-2. **Convergence of science and religion.** Although an extract cannot do justice to the whole article, here is a snippet of why Charles Townes regards the realm of science and the realm of religion to be in some sense “convergent.”

**The goal of science** is to discover the order in the universe and to understand through it the things we sense around us, and even man himself. This order we express as scientific principles or laws.

**The goal of religion** may be stated, I believe, as an understanding (and hence acceptance) of the purpose and meaning of our universe and how we fit into it. Most religions see a unifying and inclusive origin of meaning, and this supreme purposeful force we call God.

**Question S-2:** *Do you find this perspective useful or not? In what ways?*

S-3. **The role of revelation.** Charles Townes found another “convergence” in the realms of science and religion in the very **process by which big ideas are generated**. He wrote,

Another common idea about the difference between science and religion is based on their **methods of discovery**. Religion’s discoveries often come by great revelations. Scientific knowledge, in the popular mind, comes by logical deductions, or by the accumulation of data which is analyzed by established methods in order to draw generalizations called laws. But such a description of scientific discovery is a travesty on the real thing. **Most of the important scientific discoveries come about very differently and are much more closely akin to revelation**. The term itself is generally not used for scientific discovery, since we are in the habit of reserving revelation for the religious realm. In scientific circles one speaks of **intuition**, accidental discovery, or says simply that “he had a wonderful idea.” **If we compare how great scientific ideas arrive, they look remarkably like religious revelation viewed in a non-mystical way.**”

**Question S-3A:** *Having encountered already the narrative that Charles Townes tells of his own process of scientific discovery, to what extent is **his personal experience** supportive of the conclusion he draws here? Please elaborate.*

**Question S-3B:** *Do you appreciate the content of his message here? In what ways—or not?*

**Question S-3C:** *If the same argument had been made by an experienced scholar working in the history of science, instead of by a Nobel Prize-winning scientist, would the way you regard its validity and importance differ? Why or why not? And does it make a difference to you to be told that this 1966 article still is widely cited by scholars working in the science-and-religion field?*

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