

THE RELATION OF SCIENCE AND RELIGION

Some fresh observations on an old problem

by RICHARD P. FEYNMAN

IN THIS AGE of specialization men who thoroughly know one field are often incompetent to discuss another. The great problems of the relations between one and another aspect of human activity have for this reason been discussed less and less in public. When we look at the past great debates on these subjects we feel jealous of those times, for we should have liked the excitement of such argument. The old problems, such as the relation of science and religion, are still with us, and I believe present as difficult dilemmas as ever, but they are not often publicly discussed because of the limitations of specialization.

But I have been interested in this problem for a long time and would like to discuss it. In view of my very evident lack of knowledge and understanding of religion (a lack which will grow more apparent as we proceed), I will organize the discussion in this way: I will suppose that not one man but a group of men are discussing the problem, that the group consists of specialists in many fields—the various sciences, the various religions and so on—and that we are going to discuss the problem from various sides, like a panel. Each is to give his point of view, which may be molded and modified by the later discussion. Further, I imagine that someone has been chosen by lot to be the first to present his views, and I am he so chosen.

I would start by presenting the panel with a problem: A young man, brought up in a religious family, studies a science, and as a result he comes to doubt—and perhaps later to disbelieve in—his father's God. Now, this is not an isolated example; it happens time and time again. Although I have no statistics on this, I believe that many scientists—in fact, I actually believe that more than half of the scientists—really disbelieve in their father's God; that is, they don't believe in a God in a conventional sense.

Now, since the belief in a God is a central feature of religion, this problem that I have selected points up most strongly the problem of the relation of science and religion. Why does this young man come to disbelieve?

The first answer we might hear is very simple: You see, he is taught by scientists, and (as I have just pointed out) they are all atheists at heart, so the evil is spread from one to another. But if you can entertain this view, I think you know less of science than I know of religion.

Another answer may be that a little knowledge is dangerous; this young man has learned a little bit and thinks he knows it all, but soon he will grow out of this sophomoric sophistication and come to realize that the world is more complicated, and he will begin again to understand that there must be a God.

I don't think it is necessary that he come out of it. There are many scientists—men who hope to call themselves mature—who still don't believe in God. In fact, as I would like to explain later, the answer is not that the young man thinks he knows it all—it is the exact opposite.

A third answer you might get is that this young man really doesn't understand science correctly. I do not believe that science can disprove the existence of God; I think that is impossible. And if it is impossible, is not a belief in science and in a God—an ordinary God of religion—a consistent possibility?

Yes, it is consistent. Despite the fact that I said that more than half of the scientists don't believe in God, many scientists *do* believe in both science and God, in a perfectly consistent way. But this consistency, although possible, is not easy to attain, and I would like to try to discuss two things: Why it is not easy to attain, and whether it is worth attempting to attain it.

"The Relation of Science and Religion" is a transcript of a talk given by Dr. Feynman at the Caltech YMCA Lunch Forum on May 2, 1956.

When I say "believe in God," of course, it is always a puzzle—what is God? What I mean is the kind of personal God, characteristic of the western religions, to whom you pray and who has something to do with creating the universe and guiding you in morals.

For the student, when he learns about science, there are two sources of difficulty in trying to weld science and religion together. The first source of difficulty is this—that it is imperative in science to doubt; it is absolutely necessary, for progress in science, to have uncertainty as a fundamental part of your inner nature. To make progress in understanding we must remain modest and allow that we do not know. Nothing is certain or proved beyond all doubt. You investigate for curiosity, because it is *unknown*, not because you know the answer. And as you develop more information in the sciences, it is not that you are finding out the truth, but that you are finding out that this or that is more or less likely.

That is, if we investigate further, we find that the statements of science are not of what is true and what is not true, but statements of what is known to different degrees of certainty: "It is very much more likely that so and so is true than that it is not true;" or "such and such is almost certain but there is still a little bit of doubt;" or—at the other extreme—"well, we really don't know." Every one of the concepts of science is on a scale graduated somewhere between, but at neither end of, absolute falsity or absolute truth.

It is necessary, I believe, to accept this idea, not only for science, but also for other things; it is of great value to acknowledge ignorance. It is a fact that when we make decisions in our life we don't necessarily know that we are making them correctly; we only think that we are doing the best we can—and that is what we should do.

Attitude of uncertainty

I think that when we know that we actually do live in uncertainty, then we ought to admit it; it is of great value to realize that we do not know the answers to different questions. This attitude of mind—this attitude of uncertainty—is vital to the scientist, and it is this attitude of mind which the student must first acquire. It becomes a habit of thought. Once acquired, one cannot retreat from it any more.

What happens, then, is that the young man begins to doubt everything because he cannot have it as absolute truth. So the question changes a little bit from "Is there a God?" to "How sure is it that there is a God?" This very subtle change is a great stroke and represents a parting of the ways between science and religion. I do not believe a real scientist can ever believe in the same way again. Although there are scientists who believe in God, I do not believe that they think of God in the same way as religious people do. If they are consistent with their science, I think that they say something like this to themselves: "I am almost certain there is a God.

The doubt is very small." That is quite different from saying, "I know that there is a God." I do not believe that a scientist can ever obtain that view—that really religious understanding, that real knowledge that there is a God that absolute certainty which religious people have.

Of course this process of doubt does not always start by attacking the question of the existence of God. Usually special tenets, such as the question of an after-life, or details of the religious doctrine, such as details of Christ's life, come under scrutiny first. It is more interesting, however, to go right into the central problem in a frank way, and to discuss the more extreme view which doubts the existence of God.

Once the question has been removed from the absolute, and gets to sliding on the scale of uncertainty, it may end up in very different positions. In many cases it comes out very close to being certain. But on the other hand, for some, the net result of close scrutiny of the theory his father held of God may be the claim that it is almost certainly wrong.

Belief in God—and the facts of science

That brings us to the second difficulty our student has in trying to weld science and religion: Why does it often end up that the belief in God—at least, the God of the religious type—is considered to be very unreasonable, very unlikely? I think that the answer has to do with the scientific things—the facts or partial facts—that the man learns.

For instance, the size of the universe is very impressive, with us on a tiny particle whirling around the sun, among a hundred thousand million suns in this galaxy, itself among a billion galaxies.

Again, there is the close relation of biological man to the animals, and of one form of life to another. Man is a latecomer in a vast evolving drama; can the rest be but a scaffolding for his creation?

Yet again, there are the atoms of which all appears to be constructed, following immutable laws. Nothing can escape it; the stars are made of the same stuff, and the animals are made of the same stuff, but in such complexity as to mysteriously appear alive—like man himself.

It is a great adventure to contemplate the universe beyond man, to think of what it means without man—as it was for the great part of its long history, and as it is in the great majority of places. When this objective view is finally attained, and the mystery and majesty of matter are appreciated, to then turn the objective eye back on man viewed as matter, to see life as part of the universal mystery of greatest depth, is to sense an experience which is rarely described. It usually ends in laughter, delight in the futility of trying to understand. These scientific views end in awe and mystery, lost at the edge in uncertainty, but they appear to be so deep and so impressive that the theory that it is all arranged simply as a stage for God to watch

man's struggle for good and evil seems to be inadequate.

So let us suppose that this is the case of our particular student, and the conviction grows so that he believes that individual prayer, for example, is not heard. (I am not trying to disprove the reality of God; I am trying to give you some idea of—some sympathy for—the reasons why many come to think that prayer is meaningless.) Of course, as a result of this doubt, the pattern of doubting is turned next to ethical problems, because, in the religion which he learned, moral problems were connected with the word of God, and if the God doesn't exist, what is his word? But rather surprisingly, I think, the moral problems ultimately come out relatively unscathed; at first perhaps the student may decide that a few little things were wrong, but he often reverses his opinion later, and ends with no fundamentally different moral view.

There seems to be a kind of independence in these ideas. In the end, it is possible to doubt the divinity of Christ, and yet to believe firmly that it is a good thing to do unto your neighbor as you would have him do unto you. It is possible to have both these views at the same time; and I would say that I hope you will find that my atheistic scientific colleagues often carry themselves well in society.

Communism and the scientific viewpoint

I would like to remark, in passing, since the word "atheism" is so closely connected with "communism," that the communist views are the antithesis of the scientific, in the sense that in communism the answers are given to all the questions—political questions as well as moral ones—without discussion and without doubt. The scientific viewpoint is the exact opposite of this; that is, all questions must be doubted and discussed; we must argue everything out—observe things, check them, and so change them. The democratic government is much closer to this idea, because there is discussion and a chance of modification. One doesn't launch the ship in a definite direction. It is true that if you have a tyranny of ideas, so that you know exactly what has to be true, you act very decisively, and it looks good—for a while. But soon the ship is heading in the wrong direction, and no one can modify the direction any more. So the uncertainties of life in a democracy are, I think, much more consistent with science.

Although science makes some impact on many religious ideas, it does not affect the moral content. Religion has many aspects; it answers all kinds of questions. First, for example, it answers questions about what things are, where they come from, what man is, what God is—the properties of God, and so on. Let me call this the metaphysical aspect of religion. It also tells us another thing—how to behave. Leave out of this the idea of how to behave in certain ceremonies, and what rites to perform; I mean it tells us how to behave in life in general, in a moral way. It gives answers to

moral questions; it gives a moral and ethical code. Let me call this the ethical aspect of religion.

Now, we know that, even with moral values granted, human beings are very weak; they must be reminded of the moral values in order that they may be able to follow their consciences. It is not simply a matter of having a right conscience; it is also a question of maintaining strength to do what you know is right. And it is necessary that religion give strength and comfort and the inspiration to follow these moral views. This is the inspirational aspect of religion. It gives inspiration not only for moral conduct—it gives inspiration for the arts and for all kinds of great thoughts and actions as well.

Interconnections

These three aspects of religion are interconnected, and it is generally felt, in view of this close integration of ideas, that to attack one feature of the system is to attack the whole structure. The three aspects are connected more or less as follows: The moral aspect, the moral code, is the word of God—which involves us in a metaphysical question. Then the inspiration comes because one is working the will of God; one is for God; partly one feels that one is with God. And this is a great inspiration because it brings one's actions in contact with the universe at large.

So these three things are very well interconnected. The difficulty is this: that science occasionally conflicts with the first of the three categories—the metaphysical aspect of religion. For instance, in the past there was an argument about whether the earth was the center of the universe—whether the earth moved around the sun or stayed still. The result of all this was a terrible strife and difficulty, but it was finally resolved—with religion retreating in this particular case. More recently there was a conflict over the question of whether man has animal ancestry.

The result in many of these situations is a retreat of the religious metaphysical view, but nevertheless, there is no collapse of the religion. And further, there seems to be no appreciable or fundamental change in the moral view.

After all, the earth moves around the sun—isn't it best to turn the other cheek? Does it make any difference whether the earth is standing still or moving around the sun? We can expect conflict again. Science is developing and new things will be found out which will be in disagreement with the present-day metaphysical theory of certain religions. In fact, even with all the past retreats of religion, there is still real conflict for particular individuals when they learn about the science and they have heard about the religion. The thing has not been integrated very well; there are real conflicts here—and yet morals are not affected.

As a matter of fact, the conflict is doubly difficult in this metaphysical region. Firstly, the facts may be in conflict, but even if the facts were not in conflict, the

attitude is different. The spirit of uncertainty in science is an attitude toward the metaphysical questions that is quite different from the certainty and faith that is demanded in religion. There is definitely a conflict, I believe—both in fact and in spirit—over the metaphysical aspects of religion.

In my opinion, it is not possible for religion to find a set of metaphysical ideas which will be guaranteed not to get into conflicts with an ever-advancing and always-changing science which is going into an unknown. We don't know how to answer the questions; it is impossible to find an answer which someday will not be found to be wrong. The difficulty arises because science and religion are both trying to answer questions in the same realm here.

Science and moral questions

On the other hand, I don't believe that a real conflict with science will arise in the ethical aspect, because I believe that moral questions are outside of the scientific realm.

Let me give three or four arguments to show why I believe this. In the first place, there have been conflicts in the past between the scientific and the religious view about the metaphysical aspect and, nevertheless, the older moral views did not collapse, did not change.

Second, there are good men who practice Christian ethics and who do not believe in the divinity of Christ. They find themselves in no inconsistency here.

Thirdly, although I believe that from time to time scientific evidence is found which may be partially interpreted as giving some evidence of some particular aspect of the life of Christ, for example, or of other religious metaphysical ideas, it seems to me that there is no scientific evidence bearing on the golden rule. It seems to me that that is somehow different.

Now, let's see if I can make a little philosophical explanation as to why it is different—how science cannot affect the fundamental basis of morals.

The typical human problem, and one whose answer religion aims to supply, is always of the following form: Should I do this? Should we do this? Should the government do this? To answer this question we can resolve it into two parts: First—If I do this, what will happen?—and second—Do I want that to happen? What would come of it of value—of good?

Now a question of the form: If I do this, what will happen? is strictly scientific. As a matter of fact, science can be defined as a method for, and a body of information obtained by, trying to answer only questions which can be put into the form: If I do this, what will happen? The technique of it, fundamentally, is: Try it and see. Then you put together a large amount of information from such experiences. All scientists will agree that a question—any question, philosophical or other—which cannot be put into the form that can be tested by experiment (or, in simple terms, that cannot be put into the form: If I do this, what will happen?)

is not a scientific question; it is outside the realm of science.

I claim that whether you want something to happen or not—what value there is in the result, and how you judge the value of the result (which is the other end of the question: Should I do this?)—must lie outside of science because it is not a question that you can answer only by knowing what happens; you still have to *judge* what happens—in a moral way. So, for this theoretical reason I think that there is a complete consistency between the moral view—or the ethical aspect of religion—and scientific information.

Turning to the third aspect of religion—the inspirational aspect—brings me to the central question that I would like to present to this imaginary panel. The source of inspiration today—for strength and for comfort—in any religion is very closely knit with the metaphysical aspect; that is, the inspiration comes from working for God, for obeying his will, feeling one with God. Emotional ties to the moral code—based in this manner—begin to be severely weakened when doubt, even a small amount of doubt, is expressed as to the existence of God; so when the belief in God becomes uncertain, this particular method of obtaining inspiration fails.

I don't know the answer to this central problem—the problem of maintaining the real value of religion, as a source of strength and of courage to most men, while, at the same time, not requiring an absolute faith in the metaphysical aspects.

The heritages of Western civilization

Western civilization, it seems to me, stands by two great heritages. One is the scientific spirit of adventure—the adventure into the unknown, an unknown which must be recognized as being unknown in order to be explored; the demand that the unanswerable mysteries of the universe remain unanswered; the attitude that all is uncertain; to summarize it—the humility of the intellect. The other great heritage is Christian ethics—the basis of action on love, the brotherhood of all men, the value of the individual—the humility of the spirit.

These two heritages are logically, thoroughly consistent. But logic is not all; one needs one's heart to follow an idea. If people are going back to religion, what are they going back to? Is the modern church a place to give comfort to a man who doubts God—more, one who disbelieves in God? Is the modern church a place to give comfort and encouragement to the value of such doubts? So far, have we not drawn strength and comfort to maintain the one or the other of these consistent heritages in a way which attacks the values of the other? Is this unavoidable? How can we draw inspiration to support these two pillars of western civilization so that they may stand together in full vigor, mutually unafraid? Is this not the central problem of our time?

I put it up to the panel for discussion.