PERSPECTIVES on Science and Christian Faith

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In this issue . . .

"The fear of the Lord
is the beginning of Wisdom."
Psalm 111:10

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Genesis, Quantum Physics and Reality

How the Bible agrees with Quantum Physics — An Anthropic Principle of Another Kind: The Divine Anthropic Principle

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Yea, if thou criest after knowledge, and liftest up thy voice for understanding; If thou seekest her as silver, and searchest for her as for hid treasures; Then shalt thou understand the fear of the LORD, and find the knowledge of God —Prov. 2:3-5, KJV.

Recently many discussions (mostly between scientists and theologians and even among scientists and fellow scientists) have focused on how the reports in Gen. 1:1ff will or will not contradict actual scientific realms. They begin with the evolution theories and lead to the cosmological theories of the big bang. The point I would like to make here includes aspects of the interpretations of quantum physics. As we will see, these aspects could make the other discussions superfluous. Indeed, this interpretation of reality seems to be foreseen in the Bible and supports a transcendent Creator. The Bible seems compatible with quantum physics and even leads to a new kind of anthropic principle: the Divine Anthropic Principle. God seems not only to be a mathematician, as some say; he also seems to be a quantum physicist.

Quantum Physics in a Nutshell

Most physicists agree that quantum physics is one of the most important physical theories in history, even more important than Einstein's theory of relativity. And the latest results of experiments in the field of quantum physics seem to solidify this view. Let us say in advance that up to now there is not one single phenomenon which contradicts this theory. This is unique in physics. Even the strange results of the subsequent, described experiments are fully predicted by quantum mechanics!

Physics normally makes a distinction between an observable phenomenon (e.g., an apple falls from a tree) and its mathematical description by the observer (e.g., $s=\frac{1}{2}gt^2$). The assumptions and formulas are called a "model." Such a model is called "good," if it can make predictions that can be verified by experiments. If such a model fulfills certain criteria, such as simplicity (in a mathematical sense) and consistency with the observed world, physicists then accept it.

With quantum physics, however, a new problem has risen within physics. It concerns the distinction between the observer and the observed phenomenon. The formula $s=\frac{1}{2}gt^2$, which describes the distance "s" performed by the falling apple during the time span "t" (where $g = 9.81m/s^2$), is used by the *observer*, and the influence of the observer in relation to this phenomenon can be neglected. But if a physicist tries to observe very small elementary particles such as electrons or photons (light particles), this influence can no longer be neglected. In fact, this influence usually is so big that it will destroy the measured results.

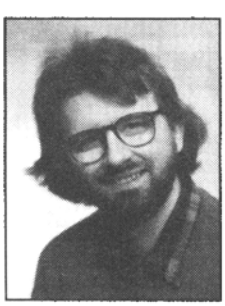
For example, consider the following problem. To measure the locality of an electron and its speed (actually its impulse, to be more specific) at a certain time, we can try to "look" at the electron with light. But a photon shot at the electron to determine its location and speed will alter the position and the actual speed of the electron in such a way that its former simultaneous location and speed can never again be precisely reconstructed. As shown by the German physicist, Werner Heisenberg in 1927, this is not a question of how "good" your measuring equipment is; it is a fundamental law called the "Heisenberg Uncertainty Principle." So the position and speed of an electron (and any other elementary particle) can simultaneously be determined *only* within a *boundary of uncertainty*. In general, impulse and locality cannot be measured with arbitrary accuracy at one time. There is a fundamental lower limit.

Yet, consider that our whole universe is made out of such elementary particles. Another problem is that the border between the *observer* and the *observed object* is not fixated. If a photon "observes" an object, who observes the photon? If this is a human eye, who observes the human eye? Is it the nerve skein connected with the eye? At the end of the nerve, is it a brain cell? So, who *is* last in this chain of observers? Which "entity" is aware of all this? Where is this entity located?

The problem of "who observes whom" is crucial. On the other hand, if a system is not observed, it is also "undisturbed" and behaves in a different way. This can be seen within the Wave-Particle Dualism. Every elementary particle (remember, all matter in the universe is made out of such particles) behaves either as a wave or particle, depending on the equipment used to "observe" it. For example, under certain circumstances, a photon behaves as a wave. Everyone can see the "color" of light. This can easily be interpreted as the frequencies of light waves. On the other hand, light is also able to "shoot out" electrons onto certain metal surfaces (e.g., photo cells). But only (light) particles, capable of enough energy, are able to do this. (Einstein won his Nobel Prize for this discovery.) So, what is light (and all matter)? The question here is, "Is light made up of waves or particles?" The answer is, "Neither." As long as light is not observed, it is a kind of unification of both called a *quantum system* (no one knows what it *really* looks like, because we just assume it is not observed). Only when and as we observe it, does it "behave" either as a wave or as a particle, depending on the measuring equipment used. The same is also true for our former "unobserved" electron. As long as no one "looks" at it, it is a quantum system with no certain location and impulse at one time. Yet, if we look at it, we can only find out *either* its exact location *or* its exact impulse, but not *both* exact values at the same time.

Let it be noted that *mathematically* the quantum system is precisely described through the solutions of the so-called "Schrödinger equation"; the corresponding solutions (called "wave-functions") are a superposition of all possible outcomes. If the so-called quantum system is "disturbed," e.g., by observation, then the wave-function "collapses" and one of the former possible outcomes becomes the solution of the Schrödinger equation (that is what we call "reality").

Thus, the problem can also be described as follows: What we normally call "reality" is the result of



Peter Zoeller-Greer was born in 1956 in Mannheim, Germany. He studied mathematics and theoretical physics at the University of Siegen and later at the University of Heidelberg from 1975 to 1981. In 1981, he received his M.A. in mathematics from the University of Heidelberg. From 1981 to 1987, he worked as a computer researcher at ABB Mannheim and from 1987 to 1993, as a lecturer at several colleges. In 1990, Zoeller-Greer received his Ph.D. from the University of Mannheim for a mathematical solution to a quantum mechanical problem. Since 1993, he has been professor of mathematics and computer science at the University of Applied Sciences in Frankfurt am Main, Germany. He is a member of the "Professorenforum," an Association of German University Professors, who have declared to support the Christian faith at German Universities.

collapsed wave-functions. The question is, "What kind of 'reality' corresponds to the 'un-collapsed' wave-functions, that is, how 'real' is a physical state described by the superposition of possible 'realities'?" Therefore *this* (un-collapsed) "reality" is an abstract notion with no concrete meaning.

In the example of the observation of an electron, we can reduce the interpretation of this behavior to two viewpoints:

a. There is (in *reality*) a definite location and an impulse below the Heisenberg uncertainty limit, but we cannot measure them simultaneously.

b. There *is* simply *no* location and impulse below the Heisenberg uncertainty limit (or, in other words, there is no reality for the electron's impulse and location below this limit; its reality is created only during its observation).

In other words, according to (a) there *really is* a world "out there," independent of the fact that we are observing it, while according to (b) the interpretation is that there is *no reality* "out there" (at least it makes no sense to talk about it) as long as we do not observe it (that is, reality is "created" during the process of observation). The latter is also well known as the "Copenhagen Interpretation" given by Niels Bohr in the 1920s.

Although it seems a little far-fetched to say that reality only exists while observed, many scientists tried to conceive experiments, whose results would lead to a clear decision between the two interpretations. Two major experiments, one performed by Alain Aspect during the 1980s[1] and one by Marlan Scully and his research team in the early 1990s,[2] gave results even more staggering than expected. Both experiments have to do with the Wave-Particle Dualism of a photon. I want to give a rough overview here of the Scully experiment, to show how important its results are.

A light beam enters a crystal, which divides every photon into two so-called "twin photons" with lower intensity (see Fig. 1). The twin photons are directed in separate directions, each of them reflected by a mirror and later "united" by a semi-transparent mirror (50% of the photons can pass through, the other 50% are completely reflected and therefore cannot pass through). Behind this mirror are two detectors that can register each photon.

Scully's arrangement of the components is made so that the twin photons unite in a way that at one time, one twin photon is reflected and the other one passes through the semi-transparent mirror or vice versa. In either case, as a result, a reunited, "whole" photon (with the original intensity) is detected either at the upper or lower detector. This represents

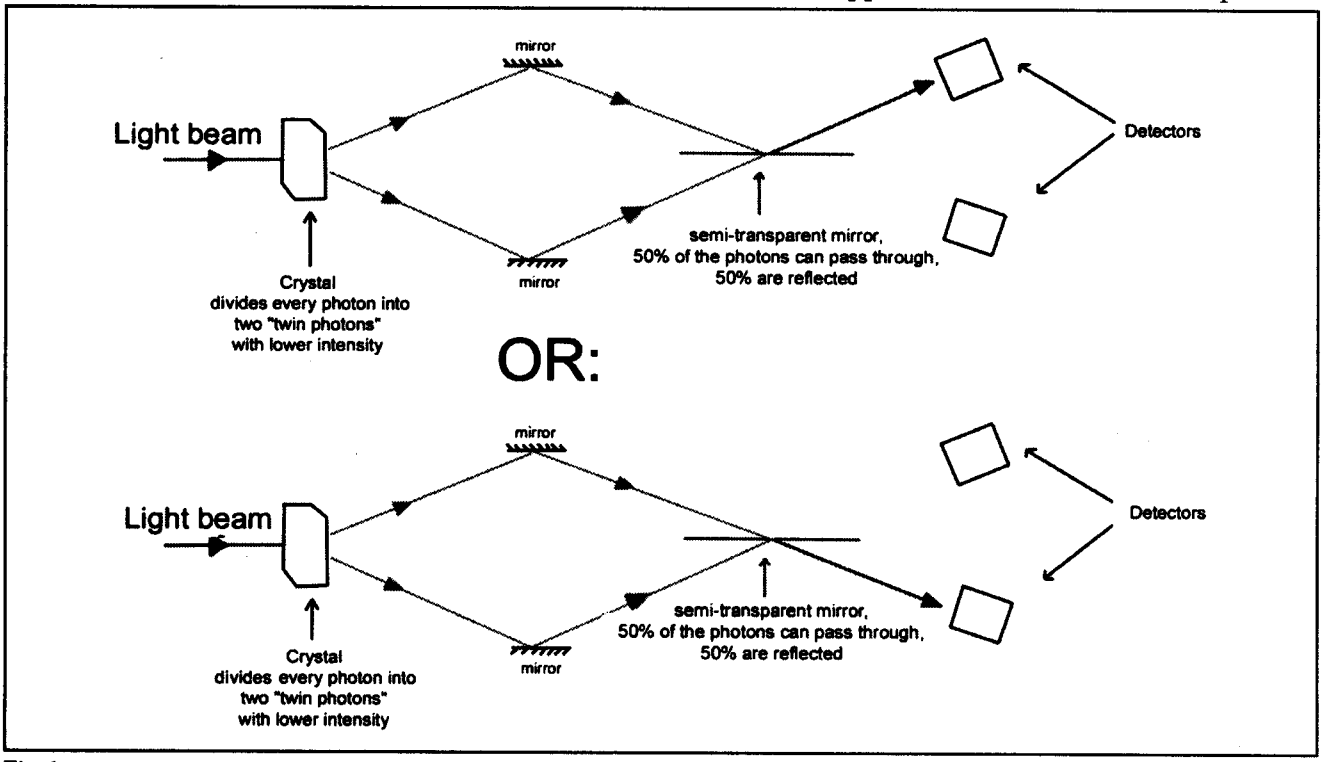


Fig 1.

the "wave-behavior" of photons and the effect is called "interference."

Next, Scully and his team were interested in finding out which way each of the two twin photons went before they were reunited at the semi-transparent mirror. So they "marked" one of the twin photons with a so-called polarization filter, an optical device that slightly "twists" the photon beam. In doing so, the photons "feel" observed and thus their wave-behavior is destroyed. Suddenly, Scully and his team detected not only "united" photons, but also "single" twin photons at the upper and the lower detector at the same time (see Fig. 2).

But what happens if two other polarization filters are set up directly in front of the detectors, which are adjusted in such a way that "behind them" the information of which photon is marked (that is, polarized) is deleted? (See Fig. 3).

Here is the amazing result. Since the information has been destroyed (concerning *which* photon went which way), the photons no longer "feel" observed and, therefore, as in the "undisturbed" experiment (without any polarization filters), only "reunited twin photons" are detected, *either* at the upper *or* lower detector. So, the twin photons unite again at the semi-transparent mirror in such a way that either the one twin photon is reflected and the other one passes through or vice versa.

But wait a minute. How could the two twin photons know that *behind* the semi-transparent mirror (this means *later* in time) a device is waiting that destroys the information of the first polarization filter and that for this reason the twin photons reunite at the semi-transparent mirror? Can the photons foresee the future? Or does our measurement (that is, observation) influence the past? If there is an independent reality "out there" (this means, independent from the observer), how could these results be explained? In fact, they could not! At least, with no "reasonable" explanations.

Still some scientists tried to do this. For instance, they declared the existence of so-called "parallel-universes" that exist at the same time and are often very similar to our universe. In this model (founded by Hugh Everett in 1957), according to our experiment, there are (at least) two universes: (1) where, at the semi-transparent mirror, the twin photons are reunited and take the upper *or* lower way, and (2) where they stay separated and take *both* ways. Thus,

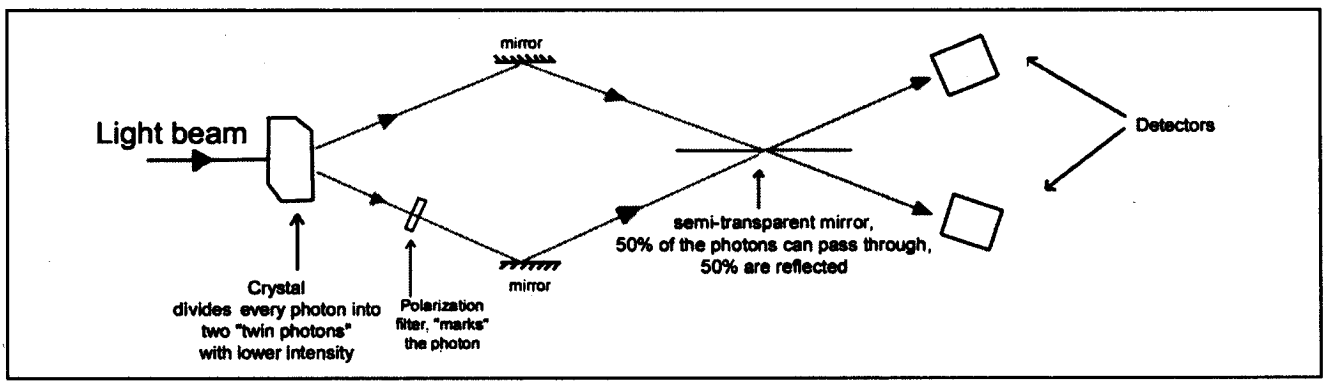


Fig. 2.

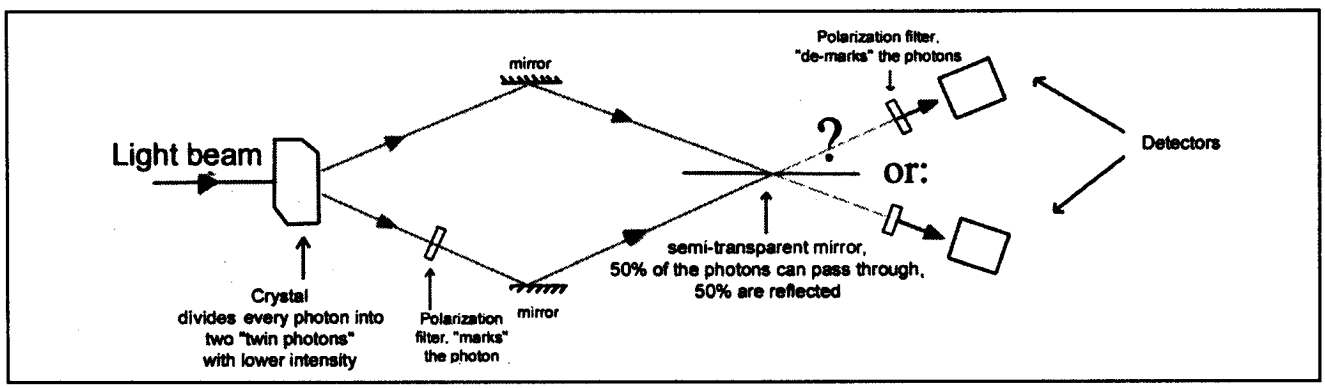


Fig. 3.

both universes are supposed to have a true reality, and at the very moment we "look" at the result of our experiment, we decide which of the two universes we are "slipping" into (the one with the appropriate past).

But many scientists feel that it is unscientific to invent objects (like multi-universes) ad hoc, which could never be directly observed, only for the purpose of justifying a physical model or explaining the results of an experiment. Another group of scientists hope one day to find so-called "hidden variables" that will connect the observed photons registered at the detectors with the twin photons, which are supposed to unite "in the past" at the semi-transparent mirror. The problem with this is that, in the whole realm of physics, there is not one single example (up to now) of variables that can "influence" an event in the past from the present. This too seems a very "artificial" way, and again, it is only justified by its purpose, to explain the results of Scully's experiments.

Another point is the "observer-chain" mentioned earlier. The who-observes-whom problem leads to an infinite regress. In this case, some scientists conclude that there *has* to be an observer "outside" the universe, because otherwise the problem of how a universe could exist without an observer is unsolvable. Guess who this outside-the-universe observer could be!

Now, a critic could say that the time-span between the semi-transparent mirror and the detectors is so short that the influence into the past can be ignored.[3] However, this is no real argument, because in a way a "Scully-like" experiment can be stretched to cosmic dimensions! (Actually, the following is a cosmic version of the classical two-slit experiment.) Fortunately, there is a cosmic constellation that destroys this argument.[4]

A so-called "quasar," a pulsating light source, "hidden" behind a big galaxy is visible on earth by "bending" its light around the galaxy, billions of light years away (see Fig. 4). This is possible, because according to Einstein's theory of relativity, a large mass (like a galaxy) could work as a gravitational lens and therefore bend the light around itself. So the light of the quasar is "doubled" by the gravitational lens, that is, one beam comes from the right side of the galaxy to us, and the other beam comes from the other side.

Simply put, an experiment on Earth can be made in such a way that it determines if one photon comes along either on the *right* or the *left* side or if it comes (as a wave) along *both* sides of the gravitational lens at the same time. However, how could the photons have known billions of years ago that someday there would be an earth with inhabitants on it, making just this experiment? Or do we "influence" the past "out there" billions of years ago through our observations here in the present? Hardly imaginable! In addition, let us assume that different scientists here on Earth perform two experiments of this kind at the same time. One experiment is arranged in such a manner that the light beams pass both sides of the gravitational lens and the other experiment "forces" the beams to pass either on the one side or the other. What follows? Are there two different pasts for each observer at the same time? This is *big trouble* for the multi-universe theory and for the "hidden-variables" approach.

Let it be noted that the older experiment of Alain Aspect was similar. His purpose, however, was not to determine if an observation could "influence" the past, but to discover if the observation of one of the two twin photons could influence the other one through space instantly, even at a great distance. The result was that they could, with no time loss! But this finding contradicts Einstein's special theory of relativity, where the speed of light is the absolute speed-barrier. While some scientists' hope of ghostly "hidden" variables capable of instantly transporting information from one photon to the other was understandable, the existence of variables that can transport information back in time seems

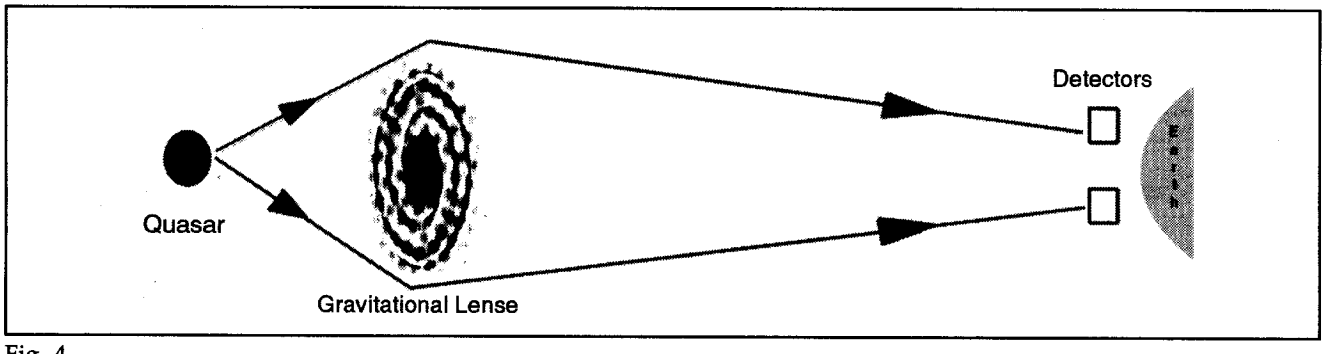


Fig. 4.

ridiculous. So it is no wonder that these scientists now feel a certain angst because of the possible loss of their *weltbild* (world view).

Some may say that quantum physics, with all its strange results, does not matter in the macroscopic world, since all the problems described above deal only with elementary particles. And indeed, in the macroscopic world, we do not seem to have the problems mentioned here. But this is not *really* so. First, as I stated earlier, everything in our universe is made out of elementary particles. Secondly, quantum mechanics is not only applicable to elementary particles, quantum mechanics can also be accurately applied to macroscopic objects. A well-known example of strange behavior, even in our macroscopic world, is given by "Schrödinger's Cat."[5] And furthermore, phenomena seem to exist in the macroscopic world that are not explainable with classic physics. For example, some physicists try to explain certain ESP phenomena with quantum physics.[6]

The assumption that our macroscopic past is not effected by the Heisenberg Uncertainty Principle is not as clear as often postulated.

Others say that the conscious human is not crucial for *reality*, because a photographic plate could substitute for the observer. Of course, this is not a valid argument, because, as corresponding experiments show, the results come into being (reality) when the photographic plate is observed by a human being. So, this is only another example for the already described "observer-chain," since the time-point of the observation is only delayed to the observation of the plate.

Therefore, the assumption that our *macroscopic* past is not effected by the Heisenberg Uncertainty Principle is not as clear as often postulated. Who can say for sure what the "past" of our universe looked like if one *does not* look at it, e.g., through telescopes? One may have many similar questions, as for example: "How far is it possible to extrapolate from Scully's quantum mechanical bench-top experiments to the classical world of the past?" "Is such an extrapolation troubling for sciences such as geology or astrophysics?" Because of limited space, it is not possible to answer these questions in this paper, but much material concerning such questions can be found in Wheeler's "Law without Law."[7]

So, what remains? Obviously, only the "old" Copenhagen Interpretation, which leads to the assumption (simplified) that the observer during his observation creates that reality. Without an observer, there seems to be no "reasonable" reality "out there." But what does all this have to do with the Bible?

The Bible Connection

Let us consider the creation report in Gen.1:1–31. There we have the following events:

1. Creation of heaven and earth, light, and day and night.
2. Creation of land and water.
3. Creation of plants and fruit trees.
4. Creation of stars, sun, and moon.
5. Creation of fish and birds.
6. Creation of animals and humans.

Evolutionists complain that, as stated in the Bible, the sun and moon were created *after* the plants and trees, and because of this, they say, that the creation report cannot be (literally) true. Let us consider the following: According to the results of experiments, we now know that reality (at least as we observe it) is a "construct" of our interaction with it, that is, no one could really say what this reality "looks like" without our observation. And, as we have already seen, this even seems to be true for events that took place in a "past reality." So, what can we *really* say about any events of a past that were not observed by any human being (that is, before the existence of humankind)? We can only say that our "reconstruction" of the past is an image that obviously depends on our present observation of it. So the question, "What did the past *really* look like?" cannot be answered accurately as long as no observer was there.

Remember that the Scully experiment teaches us that the past (of the electron's decision about "how" to unite at the semi-transparent mirror) was created during its observation in the present. But we also understand that this reconstruction of the past leads us to more than one possibility. The past's reality "happens" while it is being observed in the present, and the kind of observation even determines what the past looked like. But according to the Bible, the creation of humans was the "last" event of the creation period, so this was the first time a conscious observer came into being. This is important to remember.

After seeing the famous movie, "Gone With the Wind," one knows which events took place. At first, there was the announcement of the Civil War, then there was the war with all its destruction, meanwhile there was a love story going on, and after the war, the famous "Frankly, my dear, I don't give a ... !" scene took place. But was this *really* the order of the filmed sequences? Of course not! As everybody knows the sequences were filmed in an order suitable to logistic and organizational demands. If, for instance, a person is to appear only three times during the whole movie, let us say at the start, in the middle, and somewhere toward the end, then it would be easier (especially if the actor is costing the movie company lots and lots of money!) if these scenes were filmed at one time. Later these sequences are inserted at the proper position in the movie, even if "years" lay in between (according to the plot).

... our "reconstruction" of the past is an image that obviously depends on our present observation of it.

Or let us take the TV-series, *Star Trek* (the one with Kirk & Spock, etc.). After this series was on the air, authors "constructed" a matching past to the series, and wrote, e.g., about Spock's youth. So, *in the present*, a possible, "reasonable" *past* was created for Spock, which led to the "reality" of the stories of the series in a logical way. This reconstruction could be called an "extrapolation" from the present into the past. However, there could be more than one possibility for Spock's past which matches the TV-series! But remember, in *reality* (in the series), there was no "past" of Spock *at all*. Furthermore, Spock "exists" only if someone looks at one or more of the *Star Trek* series or movies. Thus, Spock exists only by observation, not in reality! And as we know from the movie, *The Truman Show*, even the reality of a "real" person can be a total fallacy.

Now, what do scientists do, when they are talking about a past where boldly no human has gone before? They are talking about an extrapolation of the present (of humankind) with three possibilities:

1. The extrapolated past could have *really* happened this way.
2. Another "reasonable" past could have happened.
3. There was no *real* past at all (at least no kind of past that we can imagine or talk about).

According to the results of Scully's experiments, only the third interpretation seems to make sense! But even the scientists, who believe in the "many-world hypothesis" must agree that there could be an infinite number of past "realities" that may lead to the same present world (depending upon our observation of it).

So, what remains? Obviously, only a "movie" we call reality, and an extrapolation postulated by some scientists of one of many possible pasts which may (or may not) match our present observation of this reality.

The Bible says:

"He [God] has made everything suitable for its time; moreover he has put a sense of past and future into their minds, yet they cannot find out what God has done from the beginning to the end" —Eccles. 3:11 (NRSV).

Now consider that the Bible is talking of a *sense* of past (and future), and God has put it into our *minds*. As the Scully experiments seem to tell us, we are not able to *find out* what God has *really* done, that is, know how the universe really "works" (at least with physics). Does the reality of our past exist *only* in our minds? Since CNN was not there with their camera teams, we can only produce a mathematical calculation of this past. Here is another example from the Bible that shows us how we possibly may have to deal with the experimental results.

"Thou shalt not make unto thee any graven image, or any likeness [of any thing] that [is] in heaven above, or that [is] in the earth beneath, or that [is] in the water under the earth: Thou shalt not bow down thyself to them, nor serve them: for I the LORD thy God [am] a jealous God ..." —Exod. 20:4, 5 (KJV).

The "graven image" [Exod. 20:4] could also be the model a scientist makes of the universe.

According to the newest results, these verses now may stand in a brand-new light. The "graven image" could also be the model a scientist makes of the universe. Perhaps the Bible foresees the impossibility to complete the chain of logical conclusions within our *weltbild* based on such graven images. Obviously, severe contradictions arise if traditional

reasoning is applied to the newest results of quantum physical experiments, like the ones done by Scully. This fits perfectly with the following Bible verses in an amazing way:

"Every man is brutish in [his] knowledge: every founder is confounded by the graven image: for his molten image [is] falsehood, and [there is] no breath in them. They [are] vanity, [and] the work of errors: in the time of their visitation they shall perish" —Jer. 10:14, 15 (KJV).

One could quite provocatively say that the classical image of the universe, constructed by the "founders" called scientists, breaks down. It seems to be a "work of error."

One could quite provocatively say that the classical image of the universe, constructed by the "founders" called scientists, breaks down. It seems to be a "work of error." What is now happening to a lot of scientists can be expressed perfectly through another verse from the Bible:

"They shall be turned back and utterly put to shame—those who trust in carved images, who say to cast images, 'You are our gods'" —Isa. 42:17 (NRSV).

The "god" of solid, deterministic reality, describable by physics and understandable by reasoning and "common sense," may very well have to be sacrificed. As in the above verse, our knowledge turns out to be foolish. This development may also be foreseen in the book of Isaiah:

"Thus says the LORD, your Redeemer, and He who formed you from the womb: "I am the LORD, who makes all things, who stretches out the heavens all alone, who spreads abroad the earth by Myself; Who frustrates the signs of the babblers, and drives diviners mad; Who turns wise men backward, and makes their knowledge foolishness" —Isa. 44:24, 25 (NKJV).

Last, but not least, "the making of their knowledge foolishness" is prophesied for the End Times and astonishingly matches these verses in the Bible:

"But know this, that in the last days perilous times will come: For men will be lovers of themselves, lovers of money, boasters, proud, blasphemers, disobedient to parents, unthankful, unholy, unloving, unforgiving, slanderers, without self-control, brutal, despisers of good, traitors, headstrong, haughty, lovers of pleasure rather than lovers of God, having a form of godliness but denying its power. And from such people turn away!

"For of this sort are those who creep into households and make captives of gullible women loaded down with sins, led away by various lusts, always learning and never able to come to the knowledge of the truth. *Now as Jannes and Jambres resisted Moses, so do these also resist the truth: men of corrupt minds, disapproved concerning the faith; but they will progress no further, for their folly will be manifest to all, as theirs also was"*

—2 Tim. 3:1-9 (NKJV, emphasis mine).

Another Anthropic Principle?

For a moment, let us put aside the problem of the *reality* of the past without an observer and turn instead to classical physical views.

It has only been a few years since physicists found out that the values of our nature constants are crucial for our existence.[8] If, during the Big Bang, some values would only differ by 0.000000000001%, the resulting universe could never yield any biological life. Even conservative mathematical estimations show that the probability for the existence of a life-bearing universe is at least $1:10^{229}$,[9] this number is:
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If one holds to the position that the universe came into existence without a Creator, who deliberately "fine-tuned" these nature constants in such a way that biological life could appear, then this is a position where one is betting against the most unlikely and the most highly and extreme odds. Furthermore, if one estimates the possibility for some kind of life form to appear within the universe, then—corresponding to the evolution theories—the probability that an *intelligent* life form will appear (we assume humans are intelligent) is much worse (over 400 zeros after the "1" of the denominator). Thus, it is quite clear that scientists ask the question, "Why do we observe these special values of the nature constants?"

Now, the usual anthropic principle says (simplified) that the universe evolves (deliberately) in such a way that sooner or later an intelligent life form will arise who will "appreciate" it, that is, who could observe it and try to understand it. This is a

kind of pantheistic world view (*pantheism* says that God is identified with the universe and its phenomena, and is bound by the laws of nature). There are different variations of this principle, like WAP (weak anthropic principle), SAP (strong anthropic principle), PAP (participatory anthropic principle), and FAP (final anthropic principle).

These views, however, do not help us understand the results of Scully's experiments. So I will try to formulate an anthropic principle of another kind. But I surely do not want to add another CRAP (completely ridiculous anthropic principle). Therefore, to distinguish my position from all the pantheistic versions of the usual anthropic principle, I would like to call it the "Divine Anthropic Principle" (DAP).

Physical reality is no longer a thing "out there," it is something that needs two things: an observer and an observable object.

We surely can say that we exist ("I think, therefore I am"). What the "we" is, is not evidently clear (consider the infinite regress mentioned earlier). But as we now know, this "we" is responsible for the outcome of our reality (the "we" decides how our experiments are chosen and, therefore, what reality "looks like"). Thus, our reality is, in a sense, "created" by our observation. The past could only be defined through our remembrance. Therefore, past is what we remember. The question, whether our remembrance is "true" or "real," is meaningless. Let us call this remembrance (or past) our "path" or "way" as the Bible calls it. This path appears rather subjective. None of our paths are identical. Even two "different" pasts can occur (see the description of the cosmological analogy of the Scully experiment). There is no "unique" past, the past depends on the observer. Therefore, scientifically speaking, no special past has more reality than any other, so *the* "real" past simply does not exist (in this physical sense). Furthermore, and this is the intrinsic message, *there is no "real" past at all, if there are no observers* (see also the PAP).

To make one thing clear: "There is no real past ..." does not absolutely exclude *any* past at all, but it should be understood in relation to a (human) observer. Physical reality is no longer a thing "out there," it is *something* that needs *two* things: an observer and an observable object. Thus, once again, *physical* reality is what mathematicians call a "relation." Without an observer, we simply *cannot say anything* (in a physical, that is, "real" way) about any past. This is what we call "no *real* past." And this leads us to the "divine" part of this Divine Anthropic Principle.

Again, "past reality" is subsequently created by an (intelligent?) observer; this means created by *that* which we named our "we" in the above statements. So, who can tell us what the universe *really* looked like before the creation of the first conscious human beings according to the Genesis report (see day 6)?

As we find in Genesis 1, it took six days to create the universe, including the earth and human beings. Thus, the first five days are beyond human observation. So according to the former considerations, these five days are a *kind* of past that we would not regard as "real" in our physical definition. But, as I mentioned, this certainly does not mean that this past did not take place. As we have seen, the word "real" (in physics) only makes sense in relation to a *human* observer. The "reality" of God is surely something totally different and completely incomprehensible, and it is even unimaginable for us. But there is no reason whatsoever to doubt the description given in the Bible concerning the creation account of the universe. Since God cannot lie (Tit. 1:2), we must assume that the Genesis report is true. So now we can distinguish between the kind of past that has a "reality" (since the sixth day) and the "other" past that occurred during days 1 through 5. This "other" past is just as true as the past after the sixth day, but it is a "divine" past, "unreachable" through our physical reality. Furthermore, quantum physics not only supports this view, it also supports the possibility for God to act within our reality.

The word "real" (in physics) only makes sense in relation to a* human *observer.

The Bible says:

"Now therefore, stand still, that I may reason with you before the LORD concerning all the righteous acts of the LORD which He did to you and your fathers"
—1 Sam. 12:7 (NKJV).

According to quantum physics, God is also able to interact effectively with our (observable) reality. As John Polkinghorne stated in his book, *Belief in God in an Age of Science*,[10] the Heisenberg Uncertainty Principle offers almost infinite possibilities

for God to interact on a subatomic level with tremendous results on our physical reality in the macroscopic world.

Furthermore, here is another point which agrees with Genesis: God provided Adam with a free will. But according to classical physics, especially according to Newton's mechanics, there is no room for a free will, since the universe was "only" seen as a kind of clockwork, and God's position in it was restricted to the winding up of the clock, and then the clock was "left to itself."

We can distinguish between the kind of past that has a "reality" (since the sixth day [of creation]) and the "other" past that occurred during days 1 through 5. This "other" past is just as true as the past after the sixth day, but it is a "divine" past, "unreachable" through our physical reality.

Now, with quantum physics, God can interact with reality through the Heisenberg Uncertainty Principle, and he can also enable human beings to make "true" decisions. These decisions are not determined in advance by the current state of the universe. So the old dilemma of living in a calculable universe and having a free will is also solved (although God is, of course, omniscient concerning all events that occur in the universe).

We have seen that, even from a scientific viewpoint alone, Genesis 1 is just as good as any other possible "path" for our past beyond humankind. And, according to classical physics, there still remains the highly improbable and unlikely absurd ratio that seems to lead rational and logical thinkers to a "deliberately" fine-tuned universe. But when Genesis 1 is seen in the new light of the Divine Anthropic Principle along with the improbable appearance of conscious human beings, this makes Genesis the most likely "past" for the search for truth that is supported by actual physical observations and laws.

For God said:

"Trust in the LORD with all thine heart; and lean not unto thine own understanding. In all thy ways acknowledge him, and he shall direct thy paths"

—Prov. 3:5, 6 (KJV).

"The LORD by wisdom hath founded the earth; by understanding hath he established the heavens"

—Prov. 3:19 (KJV).

"Jesus said to him, 'You shall love the LORD your God with all your heart, with all your soul, and with all your mind'" —Matt. 22:37 (KJV). ✠

Notes

[1] A. Aspect, et al., in *Physical Review Letters* 49 (1982): 91.
[2] M. O. Scully, et al., in *Nature* 351 (1991): 111.
[3] H. Ross, "Astronomical Evidences for a Personal, Transcendent God," in J. P. Moreland, ed.,*The Creation Hypothesis* (Downers Grove, IL: InterVarsity Press, 1994), 158.
[4] J. Horgan, in *Spektrum der Wissenschaft* 9 (1992): 82; and *Scientific American* 4 (1999): 18.
[5] P. C. W. Davies, and J. R. Brown, *Der Geist im Atom* (Insel Verlag, 1993), 41–4.
[6] W. von Lucadou, *Experimentelle Untersuchungen zur Beeinflußbarkeit von stochastischen quamten-physikalischen Systemen durch den Beobachter* (Haag + Herchen Verlag, 1986).
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[8] P. Glynn, *God – The Evidence* (Prima Publishing, 1997), 21 ff.
[9] Rüdiger Vaas, in *Bild der Wissenschaft* 2 (1998): 80.
[10] J. Polkinghorne, *Belief in God in the Age of Science* (Hartford: Yale University Press, 1998), 48 ff.