

## **EINSTEIN AND GOD**

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The richness of Einstein's work and thought is such that literally almost everything is relevant for our times.

The broad issue of Einstein and Religion had been much discussed during the years, and recently beautifully treated by Max Jammer in his "Einstein und die Religion".<sup>1</sup> So I shall not really touch on that topic at all. I want to concentrate on one small aspect of this huge oeuvre: Einstein's interest in thinking – in human thinking, in his own thinking, and God's thinking in particular.

Like every human being – genius or not – Einstein too is rich in paradoxes and contradictions. Most of them, in the specific context in which they occur, can be explained, or, rather explained away, but the sheer number of them is impressive and thought-provoking. One almost gets the impression when rereading the main written output from this point of view, that Einstein embraces contradictions. To put it differently: unlike most of modern science since at least Newton (probably not before, however) which is non-dialectic, and emphasizes a quest for black-and-white, yes-or-no answers to scientific questions posed, Einstein is a thoroughly dialectical thinker. As a self-exemplifying cue, Einstein himself fought a life-long battle, criticizing any statistical interpretation as a final theory, and thus Quantum Mechanics, looking for strict determinism in Nature (nature with capital 'N'), and for 'Nature' very often simply read 'God'. To make it plain what is meant here by dialectical thinking: a readiness to admit that the way you formulate your question (which is the context) will influence what you consider the one unequivocal answer.

Einstein had two major quests in life – which were sometimes seen by him as actually one: 1) to understand objective, real nature which is there independent of human influence or of our knowledge, yet hiding jealously its mysterious secrets, making it very difficult for us to

discern what lies there well protected by our own ignorance; and 2) to understand how people in general, how he himself, and above all how God thinks. The two questions are linked by the commitment to the deep belief that mysterious, secretive Nature had been planned - thought out - by God, and thus actually we are after deciphering God's thinking; moreover we, or at least he, Albert Einstein, can in principle enter God's mind and read his plans, thoughts and even discover what constraints apply even to God's thinking.

What was said so far constitutes my thesis. We are facing a wonderful psychological paradox: the almost unbearable tension between the deep humility Einstein the scientist feels toward Nature and the boundless hubris of presuming that he can enter God's mind and possibly answer his famous questions like 'could God have created a different universe' or, 'does God play dice' or, 'is the dear God malicious or subtle' etc.

Let us illustrate what was said so far with a few quotations and interpreting them each in its context:

- 1) *"My religiosity consists of a humble admiration of the infinitely superior spirit that reveals itself in the little that we can comprehend of the knowable world. That deeply emotional conviction of the presence of a superior reasoning power, which is revealed in the incomprehensible universe, forms my idea of God."*<sup>2</sup>
- 2) *"... it suffices to stand in awe of the structure of the world, insofar as it allows our inadequate senses to appreciate it".*<sup>3</sup>
- 3) *"nature conceals her secrets because she is sublime, not because she is a trickster."*<sup>4</sup>

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<sup>1</sup> UVK Verlagsgesellschaft. 1995; English version: Princeton University Press 1999

<sup>2</sup> Letter of August 1927, quoted by Alice Calaprice: *The Expanded Quotable Einstein*, Princeton University Press 2000, p. 204. This source will be quoted simply as A.C.

<sup>3</sup> Written in 1954; A.C. p. 219

<sup>4</sup> Written in 1930; A.C. p. 241

4) *"The eternal mystery of the world is its comprehensibility...The fact that it is comprehensible is a miracle."*<sup>5</sup>

5) *"One cannot help but be in awe when one contemplates the mysteries of eternity, of life, of the marvelous structure of reality. It is enough if one tries to comprehend only a little of this mystery every day."*<sup>6</sup>

One could add many more in the same vein. It all may sound on first reading as clear expressions of deep humility towards nature and its mysteries. On further analysis the problems arise: if we CAN comprehend only parts of the 'knowable world', in what sense is it 'knowable'? By whom?

The universe is incomprehensible, and thus it is our faith that it had been created by a superior reasoning power, namely God. Yet, its mystery is its comprehensibility. But if our 'inadequate senses' can only partially comprehend it, how come that it is comprehensible? And again, by whom? By the superior power that must have created it on rational lines? But if it is incomprehensible to us, the mystery of its comprehensibility, that is, its rationality is open to God only. Does that mean that rationality itself is not a human characteristic but that of God? This is certainly not Spinoza's view, to which Einstein constantly refers.

Could we in quotation No. 3 simply interchange Nature with God? My point is not trying to show pettily how illogical Einstein was, but rather to show how deeply involved he was in an emotional attitude towards Nature = God: standing in awe, admiring, admitting the mystery of its comprehensibility, knowing how small human powers are to comprehend it all, and yet working incessantly trying to do just that. This is not less nor more rational than a love affair. Indeed, Einstein uses the same comparison when speaking of Faraday:

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<sup>5</sup> Written in 1936; A.C. p. 278

<sup>6</sup> Written in 1955; A.C. p. 281

6) *"This man loved mysterious Nature as a lover loves his distant beloved".*<sup>7</sup>

One might look for an explanation like the claim that with age, and accumulating frustration of not being able to formulate a satisfactory unified field theory, the belief in the mystery and incomprehensibility of nature prevails, while in earlier years, in the midst of unprecedented success, the other view has upper hand, for example:

7) *"My comprehension of God comes from the deeply felt conviction of a superior intelligence that reveals itself in the knowable world. In common terms, one can describe it as 'pantheistic' ( Spinoza)."*<sup>8</sup> Compare this quote with quote No. 1!

Sometimes these contradictory views appear in the same sentence, like in quotation No.

(1). By 1952, we find one of the most simply 'humble' statements ever:

8) *"My feeling is religious insofar as I am imbued with the consciousness of the insufficiency of the human mind to understand more deeply the harmony of the universe which we try to formulate as 'laws of nature'."*<sup>9</sup>

Let us now move to the other, opposite attitude: Einstein and God , more or less on equal footing, and Einstein aspires – and finds it in principle not impossible – to read God's thoughts, or rather to think himself into God's mode of thinking and planning in order to find out God's intentions.

Already around 1920, in a letter to a Berlin student Esther Salaman we find:

9) *"I want to know how God created this world. I am not interested in this or that phenomenon, in the spectrum of*

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<sup>7</sup> Written in 1952; A.C. p. 80

<sup>8</sup> Written in 1923; A.C. p. 202

<sup>9</sup> A.C. p. 217

*this or that element. I want to know his thoughts. The rest are details.*"<sup>10</sup>

Then again in 1929:

10) *"I believe in Spinoza's God who reveals himself in the harmony [that is again comprehensibility on rational lines] of all that exists, but not in a God who concerns himself with the fate and actions of human beings."*<sup>11</sup>

And once again, speaking with his assistant Banesh Hoffmann in the late thirties:

11) *"When I am judging a theory, I ask myself whether, if I were God, I would have arranged the world in such a way."*<sup>12</sup>

To Ernst Strauss, another assistant, in the late forties:

12) *"what really interests me is whether God could have created the world any differently; in other words, whether the demand for logical simplicity leaves any freedom at all."*<sup>13</sup>

The whole series of quotations about God not playing dice, came from Einstein's opposition to a statistical interpretation of quantum mechanics – that is opposition to the idea that the world might be comprehensible only in probabilistic and not fully deterministic terms - and it started in an early letter to Max Born in 1926:

13) *"Quantum mechanics is very worthy of regard. But an inner voice tells me that this is not yet the right track. The theory yields much, but it hardly brings us closer to*

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<sup>10</sup> Ibid. p. 204

<sup>11</sup> Ibid.

<sup>12</sup> A.C. p. 258

<sup>13</sup> In Carl Seelig, "Helle Zeit, dunkle Zeit: in Memoriam Albert Einstein," Zürich, 1956, p. 72

*the Old One's secrets. I, in any case, am convinced the He is not playing dice."*<sup>14</sup>

It is the same idea that God is not malicious:

14) *"The Lord God is subtle, but malicious he is not" ("Raffiniert ist der Herr Gott, aber boshaft ist er nicht.")*<sup>15</sup> In this context, there is a note scribbled in Einstein's handwriting where God is replaced by Nature: *"Nature conceals her secrets because she is sublime, not because she is a trickster."*<sup>16</sup>

In 1942, to his student-colleague, Cornelius Lanczos, he still uses this metaphor:

15) *"It is hard to sneak a look at God's cards. But that he would choose to play dice with the world...is something I cannot believe for a single moment."*<sup>17</sup>

There is an unchecked anecdote, which, however - if true - is very important, because it shows that his peers took some offence from this attitude. Niels Bohr supposedly responded to one of Einstein's remarks: "Stop telling God what to do."<sup>18</sup>

As a last example of Einstein's 'conversations' with God, Einstein said to James Franck:

16) *" I can, if worst comes to worst, still realize that God may have created a world in which there are no natural laws. In short: chaos. But that there should be statistical laws with definite solutions, i.e., laws that compel God to throw dice in each individual case, I find highly disagreeable."*<sup>19</sup>

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<sup>14</sup> "The Born-Einstein Letters" NY 1971, p. 91

<sup>15</sup> Originally said to Thorsten Veblen in Princeton in 1921, quoted by Abraham Pais, who called his book, quoting Einstein: "Subtle is the Lord..." Oxford University Press 1982, and later, as quoted in A.C. p. 241: "I have second thoughts. Maybe God is malicious."

<sup>16</sup> A. C. p. 241

<sup>17</sup> Op. cit. p. 250

<sup>18</sup> A. C. p. 252

<sup>19</sup> A. P. French (ed.): "Einstein: A Centenary Volume", Harvard University Press 1979, p. 6

It is interesting to note that Einstein must have been very conscious of his audience. It cannot be accidental that all his public statements emphasize the line of humbly admiring nature and being struck by awe when realizing Nature's (= God's) rationality. All his remarks about thinking himself into God's mind occur in private letters, or were said in personal conversations with his students who then communicated them. This is not meant to 'debunk' a strong public relations mentality, but rather a sensitivity of how people would interpret him if he exposed publicly his inner thoughts; at the same time he considers these private thoughts as a major factor of his creativity, and tries to impart them to his students.

That Einstein was quite clearly aware of the importance of his contributions – in consultation with God or without – we can see very early. Once again, since it borders on hubris, only in a private communication:

17) *"I cannot find the time to write because I am occupied with truly great things. Day and night I rack my brain in an effort to penetrate more deeply into the things that I gradually discovered in the past two years and that represent an unprecedented advance in the fundamental problems of physics."*<sup>20</sup>

Nowadays much can be heard about the so-called 'anthropic principle', the name was: "...suggested by Brandon Carter. One way to put [what it means] is that the reason why the physical constants have the values they do is that if they did not, we should not be here to measure them." This is a quotation from the magisterial overview of physics and its history by Gerald Holton and Stephen Brush, who further explain: "So far, theoretical physicists have not been able to explain why the dimensionless constants have the values they do. Perhaps they are random, not determined by any law of nature. But Wheeler and other cosmologists have shown that if these constants were very much different from their

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<sup>20</sup> To Elsa Loewenthal [his future wife] in February 1914, CPAE vol.5 Doc. 509

actual values in our universe, the formation of planetary systems and the evolution of higher forms of life might be impossible.”<sup>21</sup>

Not surprisingly this had occurred to Einstein too, way before there was experimental evidence or appropriate exact calculations which enabled Wheeler’s work. In 1930, in a conversation with Rabindranath Tagore he said:

18) *“There are two different conceptions about the nature of the universe; (1) the world as a unity dependent on humanity; (2) the world as a reality is independent of the human factor.”*<sup>22</sup>

Most physicists tend to disregard the anthropic principle as a scientific statement. Interestingly Steven Weinberg – certainly not a mystic – relates to it thoughtfully: he considers it a last resort but does not pooh-pooh it as nonsense: “If this [similar to the one I quoted above from Holton and Brush] version of the anthropic principle were true, there would be a kind of circularity built into nature and one would then I suppose have to say that there is no fundamental level – that the arrows of explanation go round in circles. I think most physicists would regard the anthropic principle as a disappointing last resort. We’ll just have to see.”<sup>23</sup>

Elsewhere in the same book he is even more positive: “We too may have to discover new sorts of hypotheses, which may at first seem to us as uncongenial as Einstein’s symmetry principles seemed to Lorentz....the so-called anthropic principle states that the laws of nature must allow for the appearance of living beings capable of studying the laws of nature. This principle is certainly not widely accepted today, though it provides what is so far the only way we have of solving the problem of a large vacuum energy density. (Too

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<sup>21</sup> Holton & Brush: “Physics, the Human Adventure,” Rutgers University Press 2001, p. 514

<sup>22</sup> A.C. p. 205

<sup>23</sup> In “Facing Up” Harvard University Press 2001, p. 20.

large a vacuum energy density would, depending on its sign, either prevent galaxies from forming, or end the Big Bang too early for life to evolve).”<sup>24</sup>

Einstein certainly considered his late (and as it turned out to be unsuccessful) efforts to find an all-embracing Unified Field Theory to be undertaken in a way ‘jointly’ by himself and God. At one point, when for a short while he believed to have succeeded, he said:

19) *“I believe that this is the God-given generalization of general relativity theory. Unfortunately, the Devil comes into play, since one cannot solve the [new] equations.”*<sup>25</sup>

In the same vein:

20) *“Had God been satisfied with inertial systems, he would not have created gravitation.”*<sup>26</sup>

And when the failures continued, and fewer and fewer of the serious physicists showed enthusiastic readiness to take up the fight and continue the search, Einstein, somewhat bitterly said:

21) *“The unified field theory has been put into retirement. It is so difficult to employ mathematically that I have not been able to verify it somehow, in spite of all my efforts. This state of affairs will no doubt last many more years, mostly because physicists have little understanding of logico-philosophical arguments.”*<sup>27</sup>

In a way Einstein would be caught by surprise how much progress has been made in recent years towards a possible unified field theory, especially by the creators of string theory.

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<sup>24</sup> Op. cit. p. 68

<sup>25</sup> A.C. p. 254

<sup>26</sup> Ibid.

<sup>27</sup> Written to one of his most intimate friends and correspondents, Maurice Solovine in 1951 – by now a fifty-year old friendship. In Einstein: “Letters to Solovine”, 1906-1955, NY 1993, p. 123

Yet, he was deeply appropriate with his remark about logico-philosophical arguments, because string theory is exactly that type of argument.<sup>28</sup>

And again, two years later:

22) *"That no one can make a definite statement about [the unified field theory's] confirmation or non-confirmation results from the fact that there are no methods of affirming anything with respect to solutions that do not yield to the particularities of such a complicated nonlinear system of equations. It is even possible that no one will ever know."*<sup>29</sup>

The picture that emerges is a complex, sometimes inconsistent, dialectical relationship between two attitudes: standing in awe of the creation. Nature or God, created a wonderful rational world which sometimes looks comprehensible, and sometimes hiding its secrets and leaves the scientist wondering with amazement at the incomprehensible. The belief in this divine order is cosmic religion. It is dialectical in the deep sense, when Einstein declares that:

23) *"the eternal mystery of the world is its comprehensibility."*<sup>30</sup>

Whether it is all comprehensible or not, in any case the world is rational. It is rational insofar, as it is 'comprehensible to reason':

24) *"The supreme task of the physicist is to arrive at those universal elementary laws from which the cosmos can be built up by pure deduction. There is no logical path to*

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<sup>28</sup> Compare with the fascinating interview with one of the great string theorists, Brian Greene, in Focus 52/2004 pp. 85-86.

<sup>29</sup> Op. cit. Letters to Solovine, p. 258.

<sup>30</sup> In "Physics and Reality" J. Franklin Institute, 221, 1936 pp. 349-382.

*these laws; only intuition, resting on sympathetic understanding of experience, can reach them.”<sup>31</sup>*

The world is rational, it can be built up by pure deduction from universal laws, which we can reach by intuitive leaps. These cannot be taught - there is no method for finding them. Rationality and deduction are formal, logical and thus mechanically available intellectual tools. It is not about these that Einstein would like to think himself into God’s mind; it must therefore be the divine thought which involves those great intuitive leaps which then help us find and formulate the universal laws.

What does Einstein think about thinking? What is the type of thinking that yields intuitive leaps, allows one, or rather Einstein (and his peers, if such exist), to penetrate God’s mind, and is at the same time rational like nature itself and capable, by the way, of unerring logical deductions? Is this type of thinking covered by any of our psychological theories? Is it one of Howard Gardner’s ‘multiple intelligences’? Could it be an additional thema among Holton’s ‘science-making’ (Maxwell’s term) themata? There is one important study on Einstein’s thinking, by Gerald Holton<sup>32</sup>, without, however referring specifically to Einstein’s belief that he can ‘think himself’ into God’s mind. As far as I know most other analyses of Einstein’s thinking were on psychoanalytic rather than on cognitive lines. There are however two important papers, By Eric Erikson and Roman Jakobson; Erikson’s study is indeed on psychoanalytic aspects, but Jakobson’s correlates psychology of thinking with linguistics in a very interesting manner.<sup>33</sup>

But let us look again at the available quotations:

25) *“I very rarely think in words at all. A thought comes and I may try to express it in words afterwards.”<sup>34</sup>* Especially

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<sup>31</sup> From “Principles of Research”, speech held in Berlin in honor of Max Planck’s sixtieth birthday in 1918. Quoted from “Ideas and Opinions”, NY 1982, p. 226

<sup>32</sup> Gerald Holton, Victory and Vexation in Science, Chapter I. Harvard University Press, 2005

<sup>33</sup> Both in “Jerusalem Einstein Centennial Symposium” in 1979, edited by Holton and Elkana, Princeton University Press. 1982

<sup>34</sup> From the Autobiography, Schilpp, op.cit. p. 9; quoted by Max Wertheimer, who interviewed Einstein at length for his psychological studies in thinking and published it in his “Productive Thinking”, NY 1959, pp. 213-228

on this nonverbal thinking, see Roman Jakobson<sup>35</sup> who also correlates this claim with the Sapir-Whorf hypothesis, and with Einstein's famous exchange with the mathematician Jacques Hadamard, who appended Einstein's answer to his "Essay on the Psychology of Invention in the Mathematical Field".<sup>36</sup>

What does that mean for our query: does it mean that when Einstein investigates how God would have made decisions – or 'think' about what kind of world to create – that God too would have projected non-verbal images, pictures, appearances... of possible worlds? Intriguing idea – we shall never know.

In his Intellectual Autobiography, (in the Schilpp volume) he talks about the development of his 'thought-world' - *Gedankenwelt* – translated in Schilpp as 'mental world, (which I think is translating away from the real meaning like translating Freud's 'Ich' as 'ego'). He says:

26) *"The development of that mental world is a continual flight from 'wonder'."*<sup>37</sup>

He repeatedly made the point that the seeker for knowledge 'wonders' as long as he admires the unknown. With achieved knowledge the wonder diminishes and slowly disappears. Interesting to recall that the etymology of 'theorizing' is to wonder.

Indeed, a few lines before the above quoted sentence, we find:

27) *"I have no doubt that our thinking goes on for the most part without the use of signs (words), and, furthermore largely unconsciously. For how, otherwise, should it happen that sometimes we 'wonder' quite spontaneously about some experience? This 'wondering' appears to occur*

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<sup>35</sup> In op. cit. Jerusalem Einstein Centennial Symposium" in 1979, edited by Holton and Elkana, Princeton University Press. 1982

<sup>36</sup> Jacques Hadamar: "Essay on the Psychology of Invention in the Mathematical Field", Princeton U.P 1945

<sup>37</sup> In "Physics and Reality" J. Franklin Institute, 221, 1936 pp. 349-382.

*when an experience comes into conflict with a world of concepts that is already sufficiently fixed within us..."*<sup>38</sup>

Applying this to Einstein's own work we should understand that he had 'experienced' time and space, or light, in a way which clashed with that much of classical physics that he knew at the time, and he started to wonder – not in signs - but by some other means, and probably unconsciously. Perhaps his – or our- luck was that when this process started, the accepted concepts were NOT so deeply fixed within his mind. If he now tried to understand how God thought about the world, he surely must have deduced that the conventional concepts, i.e. the then accepted physics, were not those in terms of which God had thought, and indeed created the world. This is surely not even close to what great though conventional physicists meant under 'god-like' knowledge. Planck famously referred once to "god-like" knowledge, meaning that if ever anybody could possibly know all that is knowable, in a deterministic world, would mean having god-like knowledge.

Meyer-Abich recounts that in a discussion of the Bohr-Heisenberg interpretation of quantum mechanics in the late 1930s Planck rejoined to Bohr: "But you must admit, Bohr, that a god-like eye could know both the particle's position and momentum", to which Bohr: "I do not think that this is a question of what a god-like eye can know, but of what you mean by knowing." And indeed, Meyer-Abich elucidates that "...what a god-like eye would observe the world to be is a fairly good description of the kind of knowledge sought by a classical physicist."<sup>39</sup>

Mathematical thinking is clear: it is deduction of phenomena from principles by mathematical tools. Einstein refers admiringly to Newton when saying this:

28) " *Newton was the first to succeed in finding a clearly formulated basis from which he could deduce a wide field of phenomena by means of mathematical thinking -*

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<sup>38</sup> Ibid.

<sup>39</sup> Klaus Meyer-Abich: "Bohr's Complementarity and Goldstein's Holism" in *Mind and Matter*, vol.2, 2004. p. 92

*logically, quantitatively, and in harmony with experience.*<sup>40</sup>

What is meant by the notoriously famous saying:

29) *"All of science is nothing more than the refinement of everyday thinking."*<sup>41</sup>

Whose everyday thinking? Einstein's or of any serious scientist or of every lay person? And what kind of thinking is it? Is it different from the mathematical thinking of Newton who made deductions from principles to everyday phenomena? Is it the rational procedure by which we tend to develop conventional science, since nature is rational and logic is universal and immutable? Or, perhaps, this is the uniquely Einsteinian everyday thinking, which leads from experiencing the world towards new concepts and theories by intuitive leaps? Statements like that can be read either as part of the humble, nature-admiring public Einstein, or part of the 'dialogue' with God about inventing/creating the rational world. In the context of the 1936 paper, we read that in these times:

30) *"...the very foundations of physics itself have become problematic...when experience forces us to seek a newer and more solid foundation...In looking for a new foundation, he [the physicist] must try to make clear in his own mind just how far the concepts which he uses are justified, and are necessities."*<sup>42</sup>

But as we learned elsewhere and repeatedly, precisely this process of clarifying the mind in order to check whether the old concepts are satisfactory in order to draw from experience the appropriate theories, can be achieved only by intuitive leaps. There is no royal road, no 'method' to achieve that. And the next paragraph starts with the quotation that science is nothing else but refinement of everyday thinking. Thus we are forced to draw the conclusion that this refinement is the peculiarly God-guided use of free imagination. And

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<sup>40</sup> Said on Newton's 300<sup>th</sup> birthday, in A. C. p. 95

<sup>41</sup> In "Ideas and Opinions," p. 270, *Physics and Reality* (1936). op. cit. pp. 349-382

<sup>42</sup> Ibid.

therefore the task of the ever-reflective Einstein, or, as he claims, of every physicist, is to consider critically "... *the problem of analyzing the nature of everyday thinking*".<sup>43</sup> This is made even more problematic if we continue to read carefully and analyze what is said further in this very seminal writing.

In an aside, in parentheses, we read :

31) [thinking] is "...*operations with concepts, and the creation and use of definite functional relations between them, and the coordination of sense experiences to these concepts.*"

<sup>44</sup> Thinking can put in order our sense experiences, by means of concepts, and this leaves in awe. [Here follows the elsewhere quoted saying that "*the eternal mystery of the world is its comprehensibility*"].

These concepts – ordering tools - are reached only by intuitive leaps.

Indeed a few lines later:

32) "*In my opinion nothing can be said concerning the manner in which the concepts are to be made and connected and how we are to coordinate them to the experiences.*"<sup>45</sup>

And, somewhat confusingly:

33) "*The connection of the elementary concepts of everyday thinking with complexes of sense experiences can only be comprehended intuitively and it is unadaptable to scientifically logical fixation.*"<sup>46</sup>

Where does it leaves us? I am incapable of dealing with this complex of ideas without resorting here to an old work-horse of analysis; first-order and second-order ideas (or concepts). There seem to be two kinds of concepts; first-order concepts which are part of

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<sup>43</sup> Ibid.

<sup>44</sup> Ibid.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

everyday thinking, but even these we cannot find by any automatic method; these emerge when experiencing the world, and representing them to ourselves with recurring pictures and juxtaposing the sense experiences to conventionally accepted concepts of the accepted science. Then we have formed our concepts of everyday thinking. Now we have to coordinate these, our own newly found 'elementary' first-order concepts of everyday thinking with complexes of sense experiences. This connection can be comprehended only intuitively, by leaps of imagination, through which our new insights – our second-order-concepts – are created. This process is an uncontrollable god-like process. Here are the real problems that Einstein confronts in science, and here he consults God by trying to understand, to think himself into God's mind.

And indeed:

34) *"the totality of these connections - none of which is expressible in notional terms - is the only thing that differentiates the great building which is science from a logical but empty scheme of concepts presumably those first-order concepts which are part of everyday thinking."*<sup>47</sup>

Alternatively, we drop the distinction between two types of concepts, leave the concept 'concept' for those of everyday thinking, and draw the conclusion that when Einstein consults God, in order to find out how God thinks, it is a 'dialogue' conducted not in any 'notional terms' but probably in pictures, and other non-verbal signs. That is, ultimately Einstein and God think alike in non-verbal terms.

What follows now is a clear analysis of what ordinary science is about. It is a first stage of contemplation of nature, in terms of what were so far called concepts of everyday thinking, and now are called 'primary concepts', the ones that are intuitively connected with typical complexes of sense experiences:

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<sup>47</sup> Ibid.

35) *"Science concerns the totality of the primary concepts, i.e. concepts directly connected with sense experiences. And theorems connecting them. In its first stage of development, science does not contain anything else. Our everyday thinking is satisfied on the whole with this level. Such a state of affairs cannot, however satisfy a spirit which is really scientifically minded."*<sup>48</sup>

Now the struggle continues: after having created a 'first layer' of the system, we now create a second layer of greater logical unity by having its own elementary concepts (concepts of the second order):

36) *"... only those which are no longer directly connected with complexes of sense experiences... Thus the story goes on until we have arrived at a system of the greatest conceivable unity, and of the greatest poverty of concepts of the logical foundations, which are still compatible with the observation made by our senses. We do not know whether or not this ambition will ever result in a definite system."*<sup>49</sup>

One must wonder if this extremely convoluted, not really consistent, attempt at explaining his own thinking in a public document, would not have become much, much simpler if Einstein allowed himself to publicly tell, that at some point, after he accounted for all the complexes of direct sense experiences, and tried to bring them in harmony with conventional knowledge, and failed, then he turns to God and asks how God would have thought about the problem that emerged. If this consultation is fruitful, Einstein reaps the leaps of imagination by which 'out of the blue' he connects the complex of sense experiences in a completely novel and unexpected way.

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<sup>48</sup> Ibid.

One last point to make: hubris or not, Einstein considered himself part of a small, select company of laborers on the building of the genuine cathedral of science. This finds its expression in the celebrated address delivered in Berlin in 1918, on the occasion of Planck's sixtieth birthday (it was already referred to above). This time I have to quote at somewhat greater length:

37) *"In the temple of science are many mansions, and various indeed are they that dwell therein and the motives that led them thither. Many take to science out of a joyful sense of superior intellectual power; science is their own special sport to which they look for vivid experience and the satisfaction of ambition; many others are to be found in the temple who have offered the products of their brains on this altar for purely utilitarian purposes. Were an angel of the lord to come and drive all the people belonging to these two categories out of the temple, the assemblage would be seriously depleted, but there would still be some men, of both present and past times, left inside... I am quite aware that we have just now light-heartedly expelled in imagination many excellent men who are largely, perhaps chiefly responsible for the building of the temple of science; and in many cases our angel would find it a pretty ticklish job to decide. But of one thing I am sure: if the types we have just expelled were the only types there were, the temple would never have come to be, any more than a forest can grow which consists of nothing but creepers. For these people any sphere of human activity will do, if it comes*

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<sup>49</sup> Ibid.

*to a point; whether they become engineers, officers, tradesmen, or scientists depends on circumstances.”<sup>50</sup>*

Now follows a lengthy, poetic description of those in the third category – these are motivated by the wish “... *to escape from everyday life with its painful crudity and hopeless dreariness, from the fetters of one’s own desires. A finely tempered nature longs to escape from personal life into the world of objective perception and thought...”<sup>51</sup>*

One wonders whether a person whose strongest wish is to escape the ‘merely personal’ is indeed a ‘finely tempered nature’. Is the association Bach’s *wohltemperierte Klavier*? On the positive side, as Einstein puts it, is the much more important general trait of men that they try to make sense of the world:

38) *“Man tries to make for himself in the fashion that suits him best a simplified and intelligible picture of the world; he then tries to some extent to substitute this cosmos of his for the world of experience, and thus to overcome it. This is what the painter, the poet, the speculative philosopher, and the natural scientist do, each in his own fashion. Each makes his cosmos and its construction the pivot of his emotional life...”<sup>52</sup>*

Clearly we are now describing a group of people, among them Einstein. Actually, what Einstein here says about such men is verbatim what he then, and repeatedly later, said about himself. And this Einstein is seemingly part of a select company of present and past seekers – perhaps prophets – without whom the temple of science would not have been built. And all these, probably in each in his own way - again like the prophets – communicates with God in order to fathom God’s thoughts.

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<sup>50</sup> From “Principles of Research”, speech held in Berlin in honor of Max Planck’s sixtieth birthday in 1918. Quoted from “Ideas and Opinions”, NY 1982, pp. 224-5.

<sup>51</sup> Ibid.

Let me conclude with one last quotation, which will bring us back from the unfathomable sublime black box, to one of Einstein's perhaps most important insights, which are very much down to earth, very appropriate, and indeed is of 'science-making' quality. Alas, this saying, often as it is quoted, is not certain that it was ever said in such words by Einstein. Alice Calaprice puts it in the category of 'attributed to Einstein', yet:

39) *"We cannot solve the problems we have created in our world by thinking the way we thought when we created them."*<sup>53</sup>

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<sup>52</sup> Ibid.

<sup>53</sup> A. C. p. 317.

Einstein's God is infinitely superior but impersonal and intangible, subtle but not malicious. He is also firmly determinist. As far as Einstein was concerned, God's "lawful harmony" is established throughout the cosmos by strict adherence to the physical principles of cause and effect. Thus, there is no room in Einstein's philosophy for free will: "Everything is determined, the beginning as well as the end, by forces over which we have no control; we all dance to a mysterious tune, intoned in the distance by an invisible player." Albert Einstein wrote and spoke extensively about God and religion. What you think you know about his beliefs may not be true. What did he really believe and why? Albert Einstein said so many varied things about God that every theist and non-theist group can claim him for their own. Einstein is most famous for his work in physics and mathematics, but he also applied his brilliant mind to religion. Pixabay (modified by Catherine Giordano). The Jews claim him. Albert Einstein: God, Religion & Theology Explaining Einstein's understanding of God as the Universe / Reality. A knowledge of the existence of something we cannot penetrate, of the manifestations of the profoundest reason and the most radiant beauty - it is this knowledge and this emotion that constitute the truly religious attitude; in this sense, and in this alone, I am a deeply religious man. (Albert Einstein). I do not believe in a personal God and I have never denied this but have expressed it clearly. Although Albert Einstein was not an atheist, he did not believe in the existence of a personal God, primarily because of the existence of evil in the world. Einstein didn't seem to understand that one could not choose between good and evil if evil did not exist. Introduction. I get a fair amount of e-mail about Albert Einstein's quote<sup>1</sup> on the homepage of Evidence for God from Science, so I thought it would be good to clarify the matter.