LOGIC, GOEDEL'S THEOREM, RATIONALITY, AND SPIRITUALITY

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SUMMARY

In this article, we examine the role of 'Rationality' both in the materialistic and the spiritual contexts. Since 'rational' refers to that which "manifests, or is based upon, reason or logic", it is necessary to consider the latter as well. Goedel's theorem is perhaps the most famous result in logic, with profound implications in various directions. It is argued that what is called 'rationality' in everyday worldly life corresponds to optimization over a subset, while real spirituality basically means optimization over the Whole set. Since the Whole set contains the subset, the optimum over the Whole set cannot be inferior to the optimum over a subset. Thus, spirituality is seen to be supra-rational.

1. INTRODUCTION

It would be instructive to briefly relate my own story as to how I landed in this field. Even though I was born in a family that was very religious, at the age of sixteen I developed an atheistic outlook because of social influences. I argued with my friends insisting that there is no God, asking them to prove that there is one. This continued for many years until one day I began to feel that my arguments could be reversed. If some one asked me to prove that there is no God, how could I proceed? I could not find an answer to this, and my social patrons could not help. I became an agnostic.

My Ph.D., in 1961, involved Statistics and Discrete Mathematics, and in 1964, I found articles connecting the latter to Physics, attempting to find a discrete base for the same. I studied Quantum Mechanics. It led me to Logic and Goedel's Theorem (GT). All this time, as an agnostic, I considered Science to be my deity. However, my faith in Science was shaken when I understood the implications of GT. Briefly speaking, one of the results that follows from GT, in layman's terms, is as follows. If M is any mathematical system which involves the natural numbers 0, 1, 2, …, then there are questions inside M which can not be answered using the axioms of M. To answer a given question of this kind, one could expand the set of axioms by adding an appropriately chosen new one. But now, the new system will again be subject to GT, and there will be other questions that cannot be answered. Science is now a system such as M, and shall ever remain so, even after billions of years of research. Thus, GT ensures that there will always remain unanswered questions. In other words, Science will never be able to fathom the depths of Reality.

While the agnostic in me struggled in confusion, I wondered if there is any other way. I recalled vaguely that my father used to say that according to the sages, true and deeper knowledge often comes by 'direct perception' (DP). Besides receiving knowledge from their teachers, the sages had received some by DP as well. I realized that DP is often called 'intuition'. Soon, I felt that the very basic ideas in much of my own technical research had come by DP. I independently checked this with my teachers and others, most of whom happened to be fathers of many fields and were among the greatest scientists of the century. They all strongly confirmed that, yes, DP had played a great role in their own work. Since then, over the decades, I have found that among prominent scientists who touch on this subject in their works, the importance of DP (and the need to study it (and, consciousness in general,)) is echoed quite often. See, for example, articles in Singh et al (1986), and Singh and Gomatam (1988). To illustrate, in one of the articles in the former book (p.77), the distinguished computer scientist J. Weizenbaum says "…So, the idea that science is the only source of knowledge in the world is ridiculous….Indeed, all the important things that we know about the world are the result of transcendent thinking, not of , let me say, instrumental thinking…" Similarly, in the latter book (p.31), medicine Nobel Laureate M H Wilkins says "The logical and the rational is a very important element in science. But, emphasis on that tends to make people not notice the essential role played by intuition."

We now proceed to consider the above topics in more detail. Our intention is, obviously, not to go into the technicalities of these large and complex fields. We only wish to bring out some features that are of general interest from the point of the commonality between Science and Spirituality. Goedel's theorem is a result in the general subject of logic, and rationality is also, in a sense, logical behavior only. So, we start with logic.

2. LOGIC

Logic is the science of valid reasoning. We have deductive logic when, given a set of statements, we wish to draw valid conclusions from them. For example, suppose whenever C sings then D dances, and whenever D dances then C sings. Then, we deduce that the singing by C and dancing by D always occur at the same time. Similarly, we have inductive logic, when we make inference about a set from the information on only a subset. An example would be when we wish to get an idea of the average score of the students in a class of size 50 from a sample of only 5 students from the class. Logic is also the study of the principles of correct reasoning. It deals with the appropriate use of the words 'and', 'or', 'not', etc. In language settings, this can get very complex. Logic deals with the 'structure' of statements rather than their 'content'. Thus, the above statement about C and D has the same structure as "whenever C plays then D sleeps, and whenever D sleeps then C plays". The structure in both is "whenever C does c then D does d, and whenever D does d then C does c". The logical conclusion is "C does c and D does d always at the same time", and involves only the 'structure'. The 'content' deals with the specifics of what c and d are, and is clearly immaterial so far as logical analysis is concerned. The structure can be deceptively complex even in simple looking situations and even when the content is reduced to a very cut and dry form. For example, for fun, answer the question: " Given that whenever C sings and D dances then E eats, and

whenever D dances and E eats then C sings, is it true that whenever E eats and C sings then D dances? ”

We now explain the concept of a logical-mathematical universe, starting with an example. Continuing with song and dance, assume now that there are some singers and dancers, such that the following conditions (or ‘axioms’) are satisfied: (1) every pair of singers has exactly one common dancer (with whom they work), (2) every pair of dancers has exactly one common singer, and (3) there is a group of four dancers, no three of whom work with the same singer. Let U be a collection of systems, such that each system in this collection satisfies the above axioms. For this, and other reasons (not given here), we shall call U a universe. Can there be a system of singers and dancers like the above? The answer is positive, an example being A (123), B (145), C (167), D (246), E (257), F (347), and G (356), where the singers are named A, B, C, D, E, F, G, and the dancers are named 1,2,3,4,5,6,7, and where for each singer the dancers are given in the parenthesis. Notice that the singers E and F have the dancer 7 in common, and dancers 3 and 4 have the singer F in common, etc. The third axiom is also found to be satisfied, if we take the four dancers to be 4,5,6, and 7.

The above system has 7 singers and dancers, and is an example of a ‘non-Euclidean geometry’. To see this, we change the ‘content’ of the logical aspect of U (while keeping the ‘structure’) by calling each ‘singer’ a ‘line’, and each ‘dancer’ a ‘point’, and where a point ‘lies’ on a line if the corresponding dancer and singer work with each other. Notice that while in our ‘ordinary’ geometry, there is a concept of ‘parallel’ lines, there is no such concept here, because here any two lines must intersect in one point! Thus, the new system, while contrary to our ordinary geometrical intuition, is still an existent system, and it affords us an example of a system where the axioms are actually satisfied. Thus, the axioms do not mutually contradict, because if they did, then no system could exist which satisfies them. A set of axioms is said to be ‘consistent’, if the axioms do not mutually contradict each other. Thus the above universe U is ‘endowed’ with a set of consistent axioms. But, could there be any use of such a weird thing? Yes, it is used for computers, for communication, for increasing the yield of wheat, and so on!

Inside the above universe U, we can ask questions. Can we have a system in U, which has 14 points instead of 7? The answer is no. Indeed, it can be proven that in every system, the number of points must equal the quantity [pxp+p+1], for some number p, where p is an integer. There is no integer value of p, for which [pxp+p+1] equals 14. Hence, there is no system, in which the number of points (or lines) is 14. It can also be shown that a system does exist with [pxp+p+1] points if, for example, p is a prime number. Thus, our universe under consideration has a lot of systems, indeed, an infinite number of them. The above example with 7 points corresponds to p=2. For p=3, we will have a system with 13 points, for p=7, we will have 57 points, and so on. All such systems are within the universe.

Now consider the question: Does there exist a system corresponding to the case p=10, which would give 10x10+10+1=111 points? No one has made such a system. Also, no one has proven that such a system cannot be made. Thus, the answer is yet unknown, even though a lot of effort has been put into it, particularly in the last 40 years. Here is an example of a situation where a universe U got formulated with relative ease by putting

forth three simple axioms, and yet there are simple questions within U whose answers are so hard to find even with the usage of the immense power of the modern computers. (I may add that even simple discrete mathematical problems go far outside the range of any conceivable computers. For example, a search for the solution to the above problem for p=10 done in a 'brute-force' manner, without using any mathematical thought, would require looking at about (10^900) cases, which is one billion billion …(repeated 100 times). Thus, any thought that powerful computers of the future will solve all problems is scientifically unsupported. We will have to fall back upon intuition.)

With these observations, we now enter into even deeper waters.

3.GOEDEL'S THEOREM

We continue with our (necessarily imprecise) discussion of logical-mathematical universes. Let W be such a universe. In the last section, we had the example where W=U, and where U is endowed with a set of 3 consistent axioms. We now discuss the following problem. Consider W, and assume that W is endowed with a finite number of consistent axioms. Let s be a statement pertaining to W. Then, is it always possible to decide whether s is true or false by using the axioms of the system? Goedel's theorem answers this problem. The answer is that whether a statement s is decidable by the use of the axioms will depend on s. But, very importantly, if W is 'rich enough' (in a certain mathematical sense), then there will exist a statement (say, t) in W which is true, but whose truth cannot be decided by using the axioms. In order to show that t is true, it may be possible to add a new axiom to the universe (consistent with the old ones), such that this enlarged set of axioms implies that t is true. However, now the Goedel's theorem will be applicable to the universe with the enlarged set of axioms, and there will be some new statement (say, u) such that u is true, but its truth cannot be established by using even the enlarged set of axioms. And, so on.

I may add here that a full explanation of the qualification 'rich enough' requires technical details beyond the scope of this article. However, this condition is not very restrictive, and is satisfied in large numbers of interesting situations.

In our example of the universe U, let s2 be the statement "Inside U, a system with 'p=2' exists." In this case, it can be checked that using the axioms one can construct the system in question. Thus, the statement s2 happens to be decidable by the use of the three axioms, and the axioms imply that s2 is true. However, let s10 be the statement "Inside U, a system with 'p=10' exists." In this case, under our present stage of knowledge, we cannot say whether s10 can be proven to be true or false by using the three axioms of U. In other words, we do not know whether s10 is a statement like t mentioned above. If some one could show that s10 is a statement like t, then further attempts to decide on it using the axioms are obviously futile. If it can be shown that s10 is not like t, i.e., it is decidable using the axioms, then we should continue to try to settle it using the axioms. At present, we do not know whether s10 is like t or not.

It is thus clear that, basically, Goedel's theorem says the following: Under certain fairly general conditions, a (finite) consistent set (say, X) of axioms for a universe W is 'incomplete', in the sense that there exist true statements t in W whose truth cannot be established using X.

How did Goedel come about this result? The proof, of course, is very complex, but there is an idea in it that is of general interest, and is instructive. The idea is a logical situation known as 'self-reference', or 'tangled hierarchy'. Here, the predicate refers

back to the subject. Normally, the subject in a sense acts on the predicate. But, here. the predicate acts back on the subject. Consider the statement "I am a liar". Here, 'I' is the subject and 'liar' is the predicate, which is referring back to the subject, so that the hierarchy (i.e., which one is acted upon by the other), is tangled. If the statement "I am a liar" is true, then it implies 'I am speaking a lie', and therefore the statement "I am a liar" made by me is not true! On the other hand if the statement is false, then it implies that 'a lie is being spoken', so that the statement 'I am a liar ' is true! Thus, if you assume the statement is true, then you must conclude that it is false, and if you assume the statement to be false, then you must conclude that it is true! Another example is the Russell's paradox. Let Z be a set with the property that it is a collection of all sets that do not contain themselves. The question is: Does Z contain itself or not? If we assume that 'Z contains itself', then we conclude that 'Z does not contain itself', because Z is the collection of only those sets that do not contain themselves. On the other hand, if we assume that 'Z does not contain itself', then it follows that 'Z contains itself', because Z is the collection of all sets that do not contain themselves. In the first example, the predicate 'liar' refers to the subject 'I', and redefines it. The redefined subject then redefines the predicate, which in turn redefines the subject, and so on. In the second example, the definition of Z involves Z. In both cases, there is a reference to the 'self'.

One may wonder what is the use of looking at such artificial and crazy problems. The answer is that it is really the crux of the matter in many subtle and important conceptual issues. For example, consider U again. When we ask a question about U (such as whether it has a system in it, for 'p=10'), we are asking a question about its 'self'. Now, if the axiom set is not complete, we are asking a question about something which is, in a sense, not 'sufficiently' well defined. So, it is somewhat like the situation in Z. This 'self-reference' is a conceptual entity, sometimes called 'Goedel-knot', since Goedel used it in his proof. I feel that this 'self-reference' needs much more study. Goedel has probably only touched the tip of the iceberg.

Indeed, I feel it is no coincidence that in Indian spiritual literature, God is often referred to as the 'Self'. So, it is also in Soofee-ism, where the word 'Khudaa' is often used for God, because this word is derived from 'khud', which means 'self'. We shall come back to this after the next section, where we discuss what is considered to be perhaps the most desirable aspect of our day-to-day life.

4. RATIONALITY

As stated earlier, 'to act in the rational way' is 'to be logical' and 'reasonable'. Consider the statements 'It is raining outside', 'I must walk outside', 'If I do not have an umbrella, I will become wet', and 'I do not want to become wet'. The logical consequence of this is 'I should carry an umbrella'. Thus, to be rational, I should accept the logical argument and carry an umbrella. What happens if I don't? Well, in that case, I will incur a 'loss', namely, that I will become wet. So, 'rationality' demands that I avoid losses, which is why it entails that I pay heed to logic. Clearly, 'rationality' is a utilitarian concept, and is necessary for a successful life in the world.

As would be expected, it is quite important in economic contexts. Indeed, the great mathematician von Neumann helped develop the field of 'game theory', which does influence the actions of business corporations today. Imagine there are two players (corporations) G and H. In any given situation, G can take (one of the) actions a1, a2, a3, … , and H can take actions b1, b2, b3, … . If G takes action a1, and H takes b1, then G

pays the amount u(a1,b1) to H, where the symbol u(a1, b1) denotes a monetary amount. If u(a1,b1) is positive, then G has a loss, if u(a1,b1) is negative, then G has a gain. Thus, a loss is a negative gain, and vice versa. The loss (or gain) of G is equal and opposite to the gain (or loss) of H. This is called a 'zero-sum' game, since the [(loss of G)+(loss of H)] equals zero.

Now if, for example, G and H respectively take actions a4 and b3, then the payment by G is u(a4,b3). Thus, given any action a of G and any action b of H, the payment by G equals u(a,b), where the symbol u(a,b) depends only on the actions a nnd b. The symbol u is called a 'loss function', and indicates how the loss depends upon the pair of actions chosen by the players. Looking from G's perspective, 'Rationality' requires that G should play so as to reduce his loss. Game Theory deals with the question of how G should play so that the loss to G is minimized in some sense. Thus, game theory provides a model for rational economic behavior.

How are the quantities u(a,b) decided for different a and b? If the players are gambling, they make a mutual agreement. In business, the amounts are estimated by considering how much the corporations would actually lose or gain by their economic behavior. A study of the same fixes the function u. Of course, the situation presented here is very simplistic. But, it does bring us to the fact that, at least from the worldly point of view, a loss function needs to be considered if we wish to be rational. In applications, often, the above becomes a model for 'cut-throat competition'. Actually, the mathematical theory is not at fault. Indeed, in real life, there are many varieties of losses, not just monetary losses. In other words, there can be many loss functions, u(a,b), v(a,b),…, etc. So long as each type of loss can be expressed numerically, the theory can be used. Conceivably, ethical parameters could be brought to bear on the functions u, v, …, etc. If this is done, then we would have a rational behavior, which though economic in nature, is ethical in its core.

Unfortunately, the world of today does not come arranged that way. There is a many-person game going on, which is not zero-sum, but in which the sum of the losses of all parties taken together, is very large and positive. To give a simplistic example, consider the above game again, but with new players G` and H`. Assume that, besides paying to H`, the player G` also puts an amount t(a) into the 'trash can', when he takes action a. Similarly, H` puts t(b) into the trash when he takes action b. Here, t(a) and t(b) are positive quantities for all actions a and b. In this case, (loss of G`)+(loss of H`)= t(a)+t(b), which is a positive quantity. Thus, this is not a zero-sum game. Here, on the whole, both players lose. The situation under 'cut-throat competition' is similar (irrespective of how rational such competition seems while one is engaged in it). A big part of the energy of every player in the game goes towards 'destroying' the competitor(s). This often corresponds to putting valuable resources into the 'trash can', i.e., into wastage.

Most readers would consider the players G, H to be wiser than the pair G`, H`. Notice that both pairs are 'rational' in their own way. G and H do not mind losing to each other as much as they mind dumping into the trash. On the other hand, G` and H`, in the fury and frenzy of competition, may wish to play the different game, because each thinks that he may force the other out of business by making him pay large amounts to the trash. Clearly, the 'axioms' of the 'logical universe' of the pair G, H are different from those of the pair G`, H`. It is thus seen that 'rationality' is not the same procedure under all

circumstances, but depends on the 'logic' and 'axioms' of the world in which utility is defined. Depending upon the nature of the logical universe and its axioms, different procedures will turn out to be rational. An important example of this fact is the case of 'nested' universes.

To illustrate, consider the sequence of universes U1 (home), U2 (housing complex), U3 (town), U4 (county), U5 (state), U6 (region), … , and so on. Notice that these universes are sequentially nested, in the sense that U1 is contained in U2, U2 in U3, and so on. Let m be an action, such as buying a motorhome. From the viewpoint of the people in the home (U1), i.e., the family, the action m may be very exciting, so m may be perfectly rational. But then, the housing complex (U2) may not allow it to be parked at the home. So, may be, m is not such a good idea. Further, the town (U3) may levy a huge tax, so perhaps m should be discarded. But then, the motorhome may be very useful in serving the county (U4), which may give a large reward. Thus, at the level of U4, considering everything, doing m may be quite rational. But, at the level U5, m may cause major trouble, because drivers in U5 may not generally like motorhomes and may give a hard time. However, the state border may not be far from home, and the region (U6) may be scenic, and motorhomes may be quite popular in U6 (except for U5). So, at the level U6, m may be very rational. And, so on. It is thus clear that what is rational depends upon how far you look.

However, at any time, a person has only a relatively small amount of knowledge, this being enveloped by ignorance. In the above case, one person may take decision by looking at only U2, while another may go up to only U4, and another only up to U5. Thus, different people may take different decisions, each considering himself to be rational. The question arises: What is truly rational in this case? To answer this, one should perhaps look at some U7 (which includes U6), but then there may be a U8 containing U7, and so on. Where does one stop? What is the 'rational' answer to the stopping problem? Obviously, one should stop only at TR, the Total Reality, because it contains all possible universes. It may be added that TR is only another aspect for the Divine.

How can one find out what is right at the TR level? The fact is that it is awfully simple (though it may be quite hard for many people). I will describe the method (called here, 'procedure' P*), which I followed starting around 1980, and which I now use very often. Suppose you have a question q, and you wish to have Rational guidance from the Divine, i.e., guidance at the TR level. Go sincerely into your heart, and 'ask' the Divine for guidance. The 'asking' can be achieved by setting up some simple experiment (say, E) whose result is random and depends upon chance. Different possible answers (to q) are put into correspondence (before E is performed) with the different possible random results. You first pray to the Divine without asking for anything. Next, pray to the Divine to produce that result which corresponds to the correct answer. Believe that the Divine has agreed to your request. Then, you do the experiment E, observe the result that you got, and interpret the result according to the correspondence you have set up.

Know that the Divine is your greatest well-wisher, even more than you yourself are. Pledge that you will always do whatever the Divine tells. and will never try to edit or modify it. Pledge that you will practice 'contentment', in the sense that you will totally accept (and, not 'evaluate' or dislike) any consequences that flow from your obeying the guidance of the Divine. Remember that what you believe to be the best thing that should

happen to you, may not be the same as what is actually best for you (considering Everything). Know that the Divine will give you only that thing which is actually the best for you in the overall perspective. Also, unless your faith becomes very strong and your practice mature, do not ask questions whose results are verifiable. Even when you feel that you got some answers that seem to be wrong, ignore this and think that whatever answers you were given were really for your own good. When you are adequately mentally prepared this way, you are ready to be told what action is Rational for you, and (through your experiment E) you will be provided with the same.

Even when you are far below this level of mental preparation, you can start the above practice. If you are keenly observant, you may begin to see a subtle but distinct positive-ness in your results that, occasionally, might be independently and voluntarily confirmed by other people. (However, as stated earlier, do not try to evaluate or verify the 'correctness' of the answers you get from your experiment E.) All this will tend to increase your faith, which in turn would improve your mental outlook, which would give even more faith. Thus, slowly, you will 'ascend'. Thus, a key to this whole procedure P* is faith. As your faith increases, the practice will begin to bear positive fruit that will be easily visible. Again, I would like to stress that 'attitude' is very important here. In Science, one tests a given scientific hypothesis by doing repeatable experiments. Remember that this is not what we are doing here. Nothing is being 'tested'. Never try to test the Divine. If one has the attitude "Let me try the experiment which is to be done under P*, and see if it works and gives me answers which are reasonably good", then one is not really doing P*, and will get random answers only. Getting 'correct' answers by using P* is a result of faith and the pledges made. Why? These and other similar questions will be considered in the next section.

5. THE SPIRITUAL PERSPECTIVE: FOUNDATIONS OF REALITY

So, continuing the above discussion, the question is: Why is it that faith and pledges come into the picture in the procedure P*, but not in the ordinary scientific experiments? Of course, the spiritual leaders have always been stressing the importance of faith, etc. So, their authority is behind it. However, apart from authority, it is also (heuristically) implied by the author's (skeletal) mathematical theory of the Foundations of Reality (FR).

In the author's theory (denoted by atfr) of FR, deep down, we have only mathematical structures. These constitute 'Nature' (denoted by 'N'). 'Nature' is the 'nature' of the Divine (denoted, henceforth, by 'V'). A person's (in general, a living entity's) 'consciousness' converts (or, interprets) a particular structure ('near' the entity) as his/her/its immediate 'reality'. (Thus, for example, in atfr, what is called 'matter' in ordinary physics and chemistry is only a mathematical structure. Our consciousness converts this structure into the perception of matter.) Consciousness is an attribute of V alone; V is conscious of all of N. An entity that is 'alive' has the form (V, W), where W is like a 'web' formed by (some set of) 'links' of V to N. For different living entities, W is different, but V is the same. The consciousness of (V, W) is far less than that of V, because W muffles it. [Here, 'muffle' is used only in a 'logical' sense. Ordinarily, to 'muffle' something means to wrap it up in a cover. Here, however, it refers more to logical restrictions on V. For example, it may corresponds to 'desires' (only directions

d1, d2, .., should be taken), or aversions (directions a1, a2, .., should not be taken), or 'attachments' (stay inside (the sub-universes) s1, s2,..), etc.].

Living entities may or may not be 'embodied'; an embodied living entity has the mathematical form (V, W, X), where X is a structure inside N. The part (V, W) may be called the 'soul' of the entity (V, W, X). As time passes, X may change, decay, and die, W may change to W*, and the entity (V, W, X) may change to (V, W*). As W goes to 'zero' (in the universe N# (a part of N) where X is defined), the soul (V, W) tends to become close to the 'super-soul' V. However, it should not be concluded that (V, W) 'becomes' V. Indeed, in a sense, V is defined in all possible universes. W is also defined in many universes. Thus, although, W may approach zero inside N#, there may be universes where W is defined which have nothing to do with this. For example, one such universe is N~, which consists of all entities which possess the awareness that they have had a sequence of bodies. A particular W may contain a 'link' of the form (V: N~), which in some manner connects V to N~. This is a somewhat logically tangled situation.

No structure inside N has V in it, although N has evolved out of V. Thus, 'life' arises only from 'life'. Structures X may 'evolve' inside N# (which is inside N), but V is fixed and does not change or evolve. For example, on our earth (which is a part of N#), Darwin's theory must really concern only with the evolution of 'bodies' X, not of 'life' V. Thus, according to atfr, instead of saying that 'life evolved' on earth, one would say that 'bodies evolved'.

Under atfr, N consists of innumerable (mathematical) structures (indeed, all possible ones). N# is one such mathematical structure inside N. Some of these structures are rich enough to be called a universe (denoted by U), and some of them (like N#) may contain self-reproducing systems X, called 'bodies', through which a pair (V, W) may operate. Thus, the physical aspect of a scientific experiment is contained in a universe like U. The procedure P* of the last section involves invoking V, which is not a part of N. Thus, P* happens outside N, in another domain (say, N*). The domains N and N* are like two branches in the flow chart of a computer program. (I may add that, under atfr, our physical universe has the structure of a logic-tree, i.e., it is like a computer program.) In a computer program, at a particular juncture, we may have a variable v, and from this juncture two branches may go forth, one branch corresponding to (say) v=0, and the other corresponding to (say) v=1.

The situation here is very similar. The case v=0 corresponds to N, where V is ignored, and v=1 corresponds to N* where V is invoked. Let P denote the procedure P* when the faith and the pledges are lacking, i.e., V is ignored. Then, P occurs in N, while P* occurs in N*. Since P occurs in N, it obeys the ordinary rules of probability theory, and thus P will lead only to random answers. Now, in a sense, N* is the version of N where V is invoked, i.e., where V plays 'active' role. (As I stated earlier, N evolves out of V only, but in N the role of V is 'passive'.) In N*, V acts on the experiment E. How? Notice that you (the person doing the experiment E) are of the form (V, W, X), your operative part being (V, W). Your faith in the Divine and the (sincere) prayer and pledges temporarily 'remove' W from inside N# (i.e., from inside N), so that (V, W) becomes like V, so far as N# or N are concerned. At this point, your will (to obtain the Rational guidance) is close to the will of V, which in turn acts on E, and produces the correct result (under the Overall Perspective, i.e., considering Everything). Thus, the procedure P*, indeed, does work.

If your attitude is one of doubt, then the W in (V, W) tends to (logically) obstruct the role of V, which then does not act to modify the result of E to make it correspond to the Rational answer to your question. Notice also that if you have too much of selfish motive and worldly desire behind asking the question q, then your pledges (such as 'contentment') cannot be sincere, and P* will tend to reduce to P, and the Divine guidance will not come.

To summarize the mathematical aspect of the above discussion, the situation is this. Looking at the flow chart of the logic-tree which corresponds to our Reality, we have the choice to execute one of two procedures P* and P, which are definable only in two disjoint worlds N* and N respectively. Doing P is simple, because we are in N, and doing P will give us results according to the rules of N (i.e., according to probability theory). However, doing P* requires us to be in N*. In order to go to N* and work in N*, one must first acknowledge the existence of N*. This simple but important mathematical fact corresponds to what is called 'faith' in human experience. This faith can give us entrance into N*. Next, in N*, N gets transcended. This happens because the person (V, W), ('subduing' W through faith, prayer and pledges), temporarily comes close to V. As W decreases inside N#, the 'will' of (V, W) and the will of V become similar. The will of V thus changes the probability distribution of the result of E, giving probability 1 to that result of E which would correspond to the Rational answer to the question q. Thus, the key is to get rid of W.

How does V influence E in N*? Since N and N* are logical structures they are ideas, and so is E and the set of its results, and the interpretation of these results. In view of these interpretations, the Rational answer to q is one particular result (say, r) of E. Thus, the will of V corresponds to getting r from E. Since all of N and N*arise out of V only, the result r receives probability 1.

It should be remarked that the above discussion is rather close to the point where it can be the guiding principle of a mathematical formalism for revealing the (already existent) bridge between Science and Spirituality. The reader is invited to future technical papers of the author in this field, where such formalism is attempted.

We see from the above discussion that to be truly rational, we have to go beyond the 'rationality' arrived at by looking at narrow universes, to the level of TR, which is done by cutting down on W. But, that is nothing but the practice of Spirituality. The same conclusion is reached by Goedel's theorem in two ways. The first is the realization that every universe (of reasonable richness) has an incomplete set of (consistent) axioms. Doing Science is discovering such axioms. But, they will always remain an incomplete set. Thus, the knowledge obtainable by the 'scientific process' will always remain relatively insignificant. Yet, every universe is open to 'direct perception', which occurs more and more as W decreases, so that we are again led into the lap of Spirituality.

The second implication of Goedel's theorem is that it leads us to the consideration of the 'Self'. Arguments can be given pointing towards V as being the 'Self'. This is a large topic, and its elucidation will be done elsewhere.

6. BEYOND RATIONALITY?

What is the upshot of this article? It is that rationality should be practiced in the true sense, i.e., we should go beyond ordinary rationality to Rationality. Also, Goedel's theorem tells us that whereas each universe is a spiritual realm reachable by direct perception, Science can take us only to negligibly small portions of the same. Both of

these conclusions send us into the lap of Spirituality, which is seen to be relevant in all cases. We may therefore sing:

Spirituality is the answer.
It’s blowing with the wind.
The answer, my friends,
Is blowing,
With the wind.

7. REFERENCES

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THE END

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