III-24. Genesis of Syad: The Logical Doubt

The virtue of a logical proof is not that it compels belief but that it suggests doubts.

- Nietzsche

Origins of *syad* doubt lie in the ways we experience, express, infer, and extrapolate from the observable. Each step along the way voids are filled with assumptions of uncertain validity. The *nay* reasoning takes such liabilities into explicit consideration.

* Behold the light emitted from the Sun,
What more familiar, and what more unknown?
While by its spreading Radiance it reveals
All Nature's Face, it still itself conceals. **(***Blackmore*)

* Do you really believe that the sciences would ever have originated and grown if the way had not been prepared by magicians, alchemists, astrologers and witches whose promises and pretensions first had to create a thirst, a hunger, and a taste for the hidden and forbidden powers? (*Niezsche)*

* Anyone who isn't confused does not understand what's going on. (*Dimitri Simes)*

* True science thrives best in glass house, where everyone can look in. When the windows are blacked out, as in war, the weeds take over; when secrecy muffles criticism, charlatans and cranks flourish. (Max Perutz)

* The concepts we habitually deal with correspond to logical functions that are more than simple conjunctions of two or more events, and the possible number of these logical functions rises much more rapidly. (Boole)

For sensitivity training consider the assumptions behind this poetic line as an assertion:

I talk to trees, but they do not talk back.

In the *syad* sense, a better assertion would be:

I talk to trees, and I do not hear their response.

In the first case we assume that trees did not talk but they may be able to talk. There are many other possibilities: trees did not understand, trees do not hear, may be we do not understand what trees said in their own way? Such possibilities are part of an assertion, and we can not be sure that we have considered them all.

In fact, as late as 1920 such possible assumptions continued to surface in the proofs of Euclidean theorems. More sinister aspects of the problem show up in the political and social experiences as the unintended consequences. People have been annihilated by labeling them ignorant because they did not speak Latin, or do not have a book. Native New Zealanders lost their country because the content of the document in English was different than in Maori. Exasperated with un-kept words and broken treaties, natives of the Americas and other Colonies had plenty of reason to assert that *white man speaks with forked tongue.* We can quibble about the anatomical basis of the assertion, but the point remains that *nobody heard their cry*.

It takes great courage to admit what one does not know. Traditional devices of well-reasoned discourse with pointed questions and answers are useful to develop a deeper understanding of the limits of what one knows. Viable alternatives are useful to isolate the unknowns. Story-telling traditions encourage such explorations of the alternatives.

Nay reasoning builds on affirmed assertions.

The basic assumption is that all mental constructs are to be validated by independent sense evidence:

- Word constructs express real as well as the imaginary worlds.
- Not only the inputs but also the assumptions are to be scrutinized by reality-based relations (logic operators).
- Grammar and logic may scrutinize relations but do not confer reality.
- The validation process is facilitated if its constructs are shared with others for scrutiny and relevance.
- Validity emerges in incrementally as each viable alternative is included in the assertion, or ruled out by affirmative evidence.

Affirmative Evidence: *Not-yes* **does not necessarily** *no.*

Representations rooted in reality are examined systematically and incrementally with reality-based rules. Imagine, on your walk through the woods you are startled by a noise in the bush. Instinctively you step-out of the way. If curious, then you may explore and assert:

The creature may be a crow or *a rabbit.*

It calls for additional facts to arrive at a definite and valid conclusion. In this construct awareness of the lack of adequate knowledge is the beginning of the effort for additional inquiry. There is more to it.

Contradictions. If you saw a rabbit run away and a crow fly away, a meaningful assertion would be:

The noise could be from the crow, or the rabbit, or both.

But one can not assert that:

The creature which made noise is (both) crow and rabbit.

The sentence may be grammatically, rhetorically and logically adequate. But only on the basis of prior independent evidence can one question the validity of the last assertion: It contradicts representation of rabbit and of crow as separate entities, and there is no reason to postulate a new entity or class of also entities if the uncertainty is due to insufficient information.

Logically the last assertion is not much different than let us say *the entity G is every where and nowhere.* Based on our representation of the boundless space it is possible only if G is indistinguishable from the expanse of the nothingness that we call space. If something is everywhere in the *space*, it cannot have a *place* anywhere in particular. If G could be assigned a place in the scheme of things, it could be scrutinized affirmative evidence and subject to the rules of reality based logic. Feel free to apply this to the characterizations *ever present* (infinite time), *omnipresent* (infinite universe), *omnipotent* (infinite power and energy), *omniscience* (infinite knowledge).

Logic has bounded validity. Logic is intimately tied to the rules of word representation: The assertion

The noise came from a crow, or a rabbit, or both.

is logically consistent with the world as we know. But it does not necessarily assure that *it is so.* To minimize doubt, as a first step Nay calls for affirmative evidence where it is possible to say:

The noise came from a crow, or a rabbit, or both, and nothing else.

It is also logical, but some more doubt (*syad*) persists. Have we examined all viable alternatives (*anekant*)? Unless negated by positive evidence all viable alternatives have a finite truth-value.

Fuzzy assertions. Fuzzy boundaries (redundancies) are part of word constructs. We understand world by reducing fuzziness. This what we do as we explore the range between generalizations

and particulars (#A8). The search remains rooted in reality if it done logically with suitable attributes, relations, and criteria of evaluation. Often it is difficult to peel out fuzziness, even from the atomic statements about a defined world. Such real world concerns are sometimes trivialized as semantics, skepticism, fuzzy thinking, or fuzzy logic.

Often we make up above shortcoming with beliefs. Here again we minimize damage by using rules of logic to identify, cognize, define, and manipulate our belief. Such beliefs may be logically consistent but that do not assure validity of the beliefs. Confidence increases further if the outcome of belief is relevant and useful to solve real world problems. On the other hand, beliefs that are not consistent with the rules of grammar and logic can not be validated by evidence. It is the realm of faith. It is out of the bounds of real worlds, and it can not be evaluated by real world methods and criteria. These are the attributes of non-existence. It makes the whole subject not a controversy but a non-issue.

Realization of the fuzzy bounds of assertions has emerged in the approaches of probability, multi-valued logic, fuzzy-logic. Fractals are visual representations of what can happens through successive iterations (simulations) if the fuzz in the representation is not precisely controlled. It is dramatic demonstration of unpredictable outcome of an event that is systematically manipulated. Simulations literally show that with suitable coincidence *fluttering of butterfly wings in China can cause a hurricane in USA*. In real worlds we can not predict a series of such exact coincidences, nor can we be sure that it ever happened or if it will happen again. In other words we can not rely on to manage our affairs (Bhadrbahu, II-9).

Not-known and non-existent (implied)

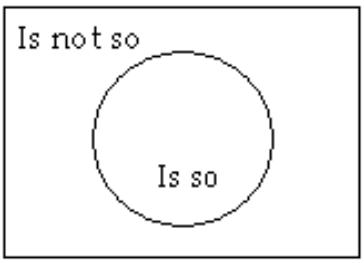

Figure III-1. Venn diagram of a binary world: Beyond *is-so* (true) lies the *is- not-so* (interpreted as false) within the square boundaries of the world. The universe outside the square is discarded ad hoc includes non-existent as well as not-known.

Fuzziness of the binary world. Aristotelian atomic statements are binary (Figure III-1). Negation of *is so* necessarily lies outside the circle in the space of *is not so*. However the boundaries of this binary world separate it from the rest of the universe that is out side the rectangle. Logic can deal only with what is within the square. The Nay position is that unless we are sure *the domain of reason* about a concern may extend well beyond the world of rectangle.

Doubt: Assumptions and consequences

A curious 5th grader liked the challenge of parable. One evening father started: There was this bird that found a way to the grain storage bin of a peasant. It flew into the bin, took a grain, went back to the nest, and then came back. It took a grain, … and then came back. With sleepy eyes father repeated the same line for several minutes. The annoyed listener asked what happened in the end. Father said all the 30 kilograms of grain was gone in 3 months. The listener found it easy to calculate from the given facts that the bird took 10 kilograms of grain every month. Father asked you mean the peasant did not check the bin for 3 months.

What other assumptions are necessary if we want to know the numbers of trips that the bird made in 3 months? What happened to the health, well-bring and social life of the bird? What affects it had on children and mates? Of course such assumptions and considerations are critical for consequence evaluation.

Concerns about our dealings with the averages are generally treated as statistical uncertainty which can be expressed if the event can be repeated many times over. If a behavior is never seen again, a fluke event is remains outside the realm of statistics. Such flukes of miracles can not be distinguished from the random noise of the background including the random coincidences.

If a particular outcome is always associated with an event, assigned probability is 1 (or 100 percent) for *is-so*. One the other end of the scale 0 probability is for *is-not-so*. For occasional outcomes fractional probabilities are between 0 and 1. This is the basis of the multi-valued logic. Good many, if not the most, occurrences of every day world fall in this realm. In such cases doubt persists about the reasons for the departure from the event-outcome relation. As such statistics ignores information that underlies such departures from the probability of 1.

Probability relates to causality associated with event-outcome relation. Probability of 1 means perfect causality. Fractional causality could suggest that the cause is not always there. Probability of 0 means that the cause is not there, the causality does not exist, or other real world events mask the cause-and-effect association. If these other events are random, one could improve the certainty by repeating the measurement many times over. Inability to improve means the assumption about the causality is not correct.

Consider the reverse implication associated with causality. Even if the repeated measurement improves the certainty, it does not necessarily mean that the assumption about causality is correct. Such concerns cannot be dismissed even for the near ideal microscopic or atomic events. In fact much of the progress of modern science is based on the understanding of such events, their causality, and also of what distract from causality. It is a critical step to arrive at the reliably valid conclusion.

Causality of events that introduce uncertainty and doubt is virtually sacrificed for most statistical treatments of behaviors except as the fractional probabilities. Irrespective of the method one uses without additional information it is not possible to evaluate the deterministic significance of the statistical probabilities (generalizations) for an individual event. For example, a home-test for pregnancy is 92% reliable, and it may give a false positive in 8% of the case. Of course it is meaningless to say that a person with a positive test is 92% pregnant, or a person with a negative test is 8% pregnant. Here we are not necessarily dealing with uncertainty in the initial input or data. Repeating the same test many times over will not improve the level of confidence.

Logical way to handle doubt (*syad*). Doubt exists in real world. The reality of existence is the evidence against contradiction. External evidence only affirms what exists. Such knowledge permits identification and resolution of inconsistencies. The challenge is how to distinguish what is not affirmed by evidence. As outline in the Venn diagram (III-2) two of these states are not known to exist (UN), or not-known not to exist (UN). The domain of not-known (U) is within real universe. It is meaningful for further consideration if it exists (U-E). In a real world, it is also

useful to know if it does not exist (K-N) because one could stop deliberations about it. In short, anomalies in the known world arise from our inability to affirm on the available evidence. **Syad-Nay** entertains all such valid concerns to reduce doubt through affirmative reasoning.

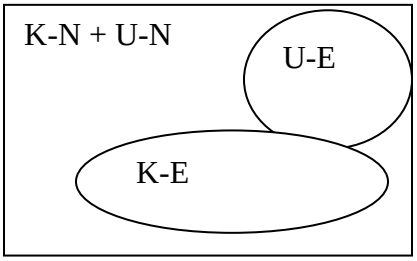

Figure III-2. Venn diagram for the states known and exists (K-E, oval), not-known but exist (U-E, circle). The other space is for known not to exist (K-N), or not known not to exist. The rectangular boundary marks the universe that obeys rules of reality, i.e. it can be examined, conceived, represented and shared. Contradictions lie outside real worlds.

Conceptual tools for the orthogonal slices. Multivariate complex worlds are explored through multiple criteria. If Tao stands for real world certainty, it is echoed (Lao Tsu ca. 300 BCE) as:

The Tao begot one.
One begot two.
The two begot three.
And three begot ten thousand things.

For wading through complexity we need a plan. It must include real world attributes and criteria (Volume I). The search moves forward if these can be asserted in orthogonal ways that can be independently addressed by separate evidence.

The Syad syllogism. Multidimensional search increases the reliability of inference. The process can be efficient if strategically applied. For a particular concern consider:

(a) An assertion A (*it exists*) that can be affirmed (A+) or not-affirmed (A-) on the basis of independent evidence.

(b) An orthogonal assertion B (*it does not exist*) that can be affirmed (B+) or not-affirmed (B-) on the basis of other independent evidence.

For the two assertions there are four possible outcomes:

(A+,B+) affirms the existence and also affirms the non-existence

(A+,B-) affirms the existence and not-affirm the non-existence.

(A-,B+) not-affirm the existence and affirm the non-existence.

(A-,B-) not-affirm the existence and not-affirm the non-existence.

The (A+,B+) is a *contradiction* of the kind that can not be resolved by any evidence. Such outcomes, of assertions of the kind *the God exists* and *the God does not exist*, are expected if the concern under consideration is unknowable or non-existent.

The other three outcomes have truth-value and therefore useful for decision making: Non-existence is consistent with (A-,B+); existence is affirmed as (A+,B-); lack of sufficient evidence is suggested by (A-,B-) which calls for continuing the search. As also suggested in the Venn diagram III-2, inability to affirm does not necessarily mean negation. The same hold for the converse, that is inability to not-affirm negation does not mean affirmation of existence.

Saptbhangi Nay syllogism. Bhadrbahu (II-9) introduced as third assertion C, i.e. whether the outcomes of the first two can be asserted in a suitable word construct. Thus affirmation (+) or not affirmation (-) of A, B and C has a total of 8 ($=2^3$) outcomes. If C+ is that A+,B+ can be uttered then (A+,B+,C+) outcome remains a contradiction. As shown elsewhere in this site the other seven

states have partial truth values. (A+,B+,C-) amounts to God exists, *and* God does not exist, ***and*** god cannot be expressed in words. In other words, such a conception can only be a matter of faith or personal knowledge however it is not an expression of reality. Of course, we could deny the known reality and believe that god does mysterious things in mysterious ways. Another way of rationalizing would be that randomness is incomprehensible because there is no information there to comprehend. Such inferences based on the (A+,B+,C+) outcome kept the contradiction of omniscience out of intellectual discourse.

When do we have a valid theory?

There is a modern version of the Saptbhangi syllogism. There are three criteria for a reasonable theory: Consistency (*is so*) with (A) logical elaboration, (B) available facts, and (C) the rest of the reality (that we assume to be the case). With affirmation (+) or lack of affirmation (-) for each of the three criteria there are a total of eight states. Out of these, the state (A+,B+,C-) is the one that is consistent with the facts and is logical in its elaboration, but inconsistent with the rest of the reality. It signals a fundamental contradiction, and is not worthy of further consideration. All the other seven states have at least some validity and therefore useful of further consideration. The most valid of these, i.e. logical in its elaborations and consistent with the available facts and also the rest of the reality (A+,B+,C+) is also the most valid guide that is judged as "truth" to the limits of "all ravens are black" (III-17). The other six have elements of doubt about the facts or logical criteria or about their relationship to the extant reality. All of which are worth exploring because anomaly appears only against background of a disciplined matrix. It may call in question any one or all of the three criteria.

Beyond the realm of logic? Thought processes could be represented as matrix of possibilities. The approach of Bhadrbahu also illustrates the significance of considering orthogonal assertions, and also shows that the number of outcomes with partial truth-value increases dramatically with the introduction of assertions based on additional orthogonal criteria to be evaluated with *independent* evidence. For example, $2^4 - 1$ (= 15) states of partial truth functionality exist for 4 assertions, and $2^{10} - 1$ (= 1023) for ten assertions. For example, if there are six independent assertions about a beast from the perspective of the six blind persons, there will be 2^6 (=64) possible inferences ranging from contradiction to total consistency. If all of the assertions are properly worded at least one of the outcomes would be an identifiable contradiction. Discarding contradictions from further consideration is the most important step in decision making. Therefore it is useful to look for assertions that expose contradictions. The rest can be evaluated on the weighted average basis to reconcile the difference between the assertions.

All-knowing computerized robot?

Let us explore the limits of affirmation for n orthogonal assertions with a total of 2^n combinatorial outcomes. Out of these, one is the null set that is just outside the logic space i.e. it contradicts the reality. Also there will be one set where all the assertions are valid. All other inferences are partially valid. So the issue is how to search for that all-valid set? Can a super-computer help in the search? The task of sorting out an inference consistent with all of the valid assertions becomes increasingly difficult. The number of combinatorial possible states with partial information increases geometrically with the number of assertions. For example, resolution of all possible combinations

resulting from 300 assertions would take about one billion years on the fastest conceivable computer of the size of the known universe. Rest assured, there is no omniscient robot out there that is controlling all the happenings even in a single human brain.

In fact, this Syad-Nay dissection of suitably worded independent assertions about a concern is one of the simplest demonstrations of what is known in mathematics as the Not Polynomial (NP)-complete problems. Such problems do not have a general solution, although a solution can be checked for being correct. On the other hand, it is quite difficult, if not impossible, to prove that the solution is the most efficient solution. There are many real-world problems of this class.

A matrix structure to guide thought, reason and arguments on the basis of defined criteria is a remarkably effective way to develop an initial understanding of how to deal with complex system. Such insights about the lay-of-the-land (logic space) provide a good illustration of the effectiveness of the deterministic range of the reality-based statements rooted in a few relations (operators) and criteria applied to the observable. As pointed out above, often the trade off for the information assembled in the probabilistic domain comes with at a cost. While such issues are readily illustrated through the device of truth table, the syad and saptbhangi states clearly illustrate a need for deeper understanding. In order to access the algebra of the higher states in the deterministic domain, Professor Ramachandran (1979) has developed algorithms for the origin of other states of doubt, and shown that such states emerge from a novel matrix form of higher order Boolean Algebra. It is available in Vol IX in the Nay section.

Node for representation: Two of the interpretations of zero are: Zero as a node between the positive and negative rational numbers, or as a 'filler' in the place based decimal numbering system. In the Boolean logic 0 is a lack of 1 or existence of the represented reality of the binary world. Nothingness of zero goes even further in the Nay reasoning: Zero is a lack of anything tangible, i.e. anything that occupies space, or changes, or interacts with other entities, or responds to manipulations and operators.

Within such confined 'nothingness' of zero becomes a node for **representation.** It is also a null point against which the logical reality is represented one side, and the state(s) of contradiction on the other side Imaginary worlds?). This *nothing* is not *anything real*, and it does not contradict or modify reality. On one extreme the nothingness or zero is one of the limits in the limitless space. In short, as a node nothingness is intertwined with the conception of reality, as well as the infinite, imagined and contradictory. At this level "node" is a point from which the logic space can be charted in of the real and imaginary worlds.

In virtually all aspects of Western thought the node of representation is chosen ad hoc. In the Aristotelian system it is built into the assertion that "not-yes is no." The Euclidean and Cartesian systems define the point of intersection of the 'axes" as the origin. In Syad-Nay, the node the representation of reality is nothingness that dis-associates the boundless universe into real and imagined worlds which necessarily have limits imposed by their own rules of representation.

Rules of representation provide suitable basis and tests for validating assertions. If a new assertion does not lead to at least one contradictory state, then it is not relevant for the world of the concern to provide an orthogonal and independent valid inference. Assertions that can not be affirmed by evidence are

either irrelevant or self-referential to what is already built into the concern.

In closing it is worth pointing out a broad conceptual issue for representation and the world-views that follow from it. By avoiding contradictions the search space always remains within the logical bounds of viable alternatives (*anekant*) and also subject to doubt (*syad*) that can be addressed on the basis of evidence. The process moves forward with a full realization that the search may never be complete (far too many variables), it also avoids dead ends of contradictory beliefs and detours of inconsistent choices.

Other kinds of doubt, uncertainty and relativism

(a) The debate about wave-particle duality of light and electron was guided by looking at the microscopic world though a macroscopic lens. The problem was resolved once it was realized that both the behaviors are intrinsic in particle of that size.

(b) The Heisenberg Indeterminacy (often improperly referred as uncertainty) principle about the position and momentum of an electron and its mass in the orbit of an atom invokes that certainty for one measure increases the uncertainty for the other measurement. Here the probabilistic certainty is expressed as a smeared out (cloud) view of an electron.

(3) There has been a tendency to interpret Einstein's theory of relativity as the philosophical relativism to characterize ***anekant*** (logical alternatives). It is not correct even as rhetoric.

Against Gods and Humbug