Thoughts on Monads

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I – Simplicity (Complexity?)

> "My topic here will be the monad, which is just a simple substance. By calling it 'simple' I mean that it *has* no parts, though it can *be* a part of something composite." – The Monadology, §1

For something to be simple or have no parts, it means that it cannot be broken down into smaller pieces, nothing can be extracted from it, it can't be rearranged, re-composed, degraded, fixed, or fall apart (§2 - §5). There is nothing within a monad that can be rearranged or composed, and as such it stands to reason that it could not have been created (as created means it must have been put together, which as shown can't happen if it is the most simple of substances), unless every monad was created ***simultaneously***, and cannot go out of existence unless everything is annihilated ***simultaneously*** (§6).

Monads are the only simple substance in existence, but Leibniz is not an atomist (in the classical sense); atoms are the single building blocks from which everything is constructed, and there is ***no difference*** between one atom and another; they are simple, uniform, universal (hence why atomism cannot be part of Leibniz's system: Atoms would contradict the ***principle of indiscernibles***, and so matter must therefore be infinitely divisible). Monads are instead not the building blocks from which everything is made, but rather a monad *names* (see point V) those most basic, indivisible qualities that initiate a change/alteration/mutation that allows Leibniz to account for free will (One can find ***cause*** by investigating the movement of matter/energy, but not ***reason***) by keeping the mechanical world of cause and effect incomplete because a completeness (Or "perfection" as Leibniz calls it) must be able to account for everything inside it as a totality completely explainable within itself, and if this were so, then we could prove why the world is this way other than otherwise, which we cannot do without proceeding to Leibniz's metaphysics.

So monads are finite in their indivisibility, they have properties, materiality…***substance*** to them, and it is this substance which makes the monad a non-static entity; something that can undergo change or has complexity. If we take Andrey Kolmogorov's definition of algorithmic complexity as a (finite) sequence that is maximally complex if it cannot be encoded into any sequence shorter than itself, we can see why the monad was a very early contributor to understanding complexity: A monad (like the complex algorithm) cannot be divided or broken down into anything smaller or simpler than *what it is.*[1](This is also an important part of Gregory Chaitin's discussion of the contribution of monads to complexity, who I will be referring to throughout these thoughts).

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[1] See M. Li and P. Vitanyi, "An Introduction to Kolmogorov Complexity and its Applications", (New York: Springer-Verlag, 1993)

There is nothing redundant or unnecessary in the monad, otherwise it would be able to be divided or "shortened" if we are to use the algorithmic expression. As such, ***every quality that the monad contains must be there for a reason***, and must play a part in making the monad what it is. Another consequence of this is that a monad is not simply a *tabula rasa*: It has something non-localisable, some quality that cannot be extracted from its very fundamental principle of being without said quality being annihilated…it must have an *identity* which cannot be re-programmed or given without completely obliterating the monads "what it is". From Leibniz's discussion of simplicity, it is quickly possible to make the leap to complexity and understand its contribution to dealing with identity and change.

II - Qualities and (in)difference

What are these qualities that monads possess? In §8 of The Monadology, Leibniz explains why monads must have qualities:

1. Monads would not exist without qualities (How could anything?)

2. If monads do not differ in their qualities there would be no detectable change in the world of composites.

From these points, Leibniz develops his ***principle of indiscernibles*** which states that if there are two completely identical objects, then neither of them would have any ***reason*** to exist. This is because monads unfold in relation to every other monad (which in turn all unfold in relation to one another simultaneously). Two identical monads cannot come into relation because there is nothing to distinguish the one from the other, and so no way for one to affect the other. As such, there would be no reason for either monad to exist, as they would exist independently, and like Newton's space/time, it makes no sense for something to exist that cannot come into relation with anything else. ***Mere presence means nothing unless it is active or in relation to something*** (Two identical monads could be present to each other, but since they could not affect each other, that presence means nothing)***.*** Again without these differences, the universe would be a uniform space, with nothing discernible from anything else; this is why time and space are relative rather than absolute: If time/space did not shift along with the shifting of the ordering of monads, then time/space would be unrecognisable, and one cannot account for change in a time/space that is uniform, as "now" would be no different from "then", and "here" no different from "there".

Such reasoning leads us to assert that between monads there is always a ***qualitative difference*** between them, and since no two can be identical, there is no possibility of indifference or neutrality (§9). Leibniz supports this claim further by saying that God's presence alone is not enough to explain everything (As Descartes "Prime mover" is after God sets the world in motion and just remains present to watch it go…), but must be actively co-ordinating monads to unfold with respect to each other, as they do not have the capacity within themselves to affect each other without God's intervention (As he puts it so eloquently: "***Monads do not have windows***" (§7). Leibniz's God must be the one to put monads into relation, but God does it in terms of his own limits/rules (Such rules are based on perfection/completeness, and making the universe more perfect/complete. But since the universe is composed of matter that can be infinitely subdivided, then there is no way that the universe can ever "complete", hence always remains open). It should also be noted that ***qualities are not segments***, they cannot be taken out of the monad or disassembled.

As a side note, this impossibility of indifference is something that Lyotard picks up in *The Differend when* he discusses how two sets of phrases that, when put into relation make it impossible to avoid conflict between them, as there is no universal discourse to regulate or resolve, hence something is irretrievably lost, whch Lyotard names the *differend* (The difference between Lyotard and Leibniz being that God can put monads into harmony with another, but Lyotard does not acknowledge God as a universal judge/discourse which can regulate between the two parties/sets. See *Preface* in *The Differend*, especially section: *Problem*).

III – Sets

So a monad's qualities distinguish itself from every other monad, and grant it an existence based on reason. A rather long-winded example: Post-Leibniz (though certainly inspired by him), the invention of set theory by Georg Cantor in the late 1800's was brought up to counter the problem of numbers that constantly brought in the problem of infinity and made axioms/theorems that would make use of numbers unable to fully deal with them. A set differs from a number in that it is ***wholly without parts*** (Sound familiar?) Example: Any number, let's say 2, could be split in half to 1, then again to 0.5 and so on to infinity, so even a single number is made of an infinite number of parts, which makes it difficult to "capture" completely in an axiomatic function. In place of the number 2 we could use (for a crude example) "the set of all pairs", which stops any infinite regression as one cannot split a set into pieces: A set does not have parts, but there must be objects/matter that ***belong*** to that set (If the set had no qualities, it would be indifferent and not have any reason to exist, see above). The quality "of all pairs" in this example orders matter (numbers), which is infinitely divisible, and allows a belonging or order to come about without being accountable within a numerical or material system (Further proved by Gödel and Chaitin). Would it be too big a leap to parallel this with how a monad (set) and the matter it is "attached" to (object/body) belong to one another in terms of Leibniz's pre-established harmony?

A set presents a strange kind of limit: It allows an object to ***belong*** to it because of its qualities, but an object can always belong to a class of sets, and even move in and out of sets as it changes, not to mention a set can have more than one quality, as a monad. In this sense this belonging does not put the object/matter/number into a box or category and build a limit from which it can never escape. Through this line of reasoning, it should be a little clearer how thinking about the monad as a set does not mean the monad has a pre-determined unfolding process; a monad unfolds its possibilities with respect to the relations between the difference of qualities between monads, and only when things are put into relation can these differences arise.

IV – Possibility and Probability

A monad is a set of possibilities that unfolds with respect to every other monad and each of their own possibilities. A monad never goes out of existence, so does that mean these possibilities never disappear too? Depending on the relation between monads, they are both active and passive simultaneously, it is not cause ***then*** effect that goes on between monads (*The Monadology*, §51 – 52). A monad cannot exist unless it is in relation, and its qualities/possibilities become active or passive depending on how they are co-ordinated (as they undergo changes in their degree of perfection). Monads do not seek to bond together or join up in the sense of an atomic bond, it is instead an act of each monad ***harmonising*** with one another: Think of them like a choir, within which each "part" must harmonise with the whole, each augmenting the whole. (God here plays the role of conductor…)

As already discussed, this active/passive relation and unfolding works not according to a mechanical (Newtonian), but instead to reason. How are we to define reason? How do we "know" when we "know"? How do we use our reason to find possibilities for change or difference when that reason conflicts with how things work and operate? For this, we need to think about how our principles extend beyond the material/mechanical world. Leibniz applauds the use of mathematics to explain the world and all its mechanics, but criticises how nobody extends these mathematical principles to the metaphysical world (Which he claims to proved many times, in the *Theodicy, On Nature Itself* and so forth). To proceed from the foundational mathematics of the material world (***The principle of contradiction or identity***) to metaphysics, the ***principle of sufficient reason*** must be used, to explain why things are they way they are and not otherwise. (See "Letters to Clarke", Second Letter, §1)

Principle of contradiction or identity = A is A and cannot be "not A"

- Example: 2 + 2 =4, it can never be "not 4"
- This works well for mathematics as we know it, and since the material world can be expressed mathematically, this principle holds up.
- However, Newton and co. stop there. They don't extend this mathematical foundation into the realm of metaphysics.
- The realm of metaphysics also operates mathematically, but in this realm, we are accounting for reason (The ***reason*** for why 2 + 2 = 4 instead of any other number or number system).

Gregory Chaitin's "Omega number" and Kurt Gödel's incompleteness theorem also build on Leibniz's use of mathematics to find reason and truths outside of the material/finite/mechanical world. Gödel was heavily influenced by Leibniz to the point of obsession (he believed that "dark forces" had suppressed certain writings of Leibniz to keep mankind stupid and prevent people from understanding the infinite power of their minds), and is rather complicated, so let's look at the slightly more simple Chaitin. He answers Turing's problem of there being no mechanical procedure to determine is an individual program will halt (or whether it will complete or not). The omega number (Ω) manages to account in a running program, as it changes and calculates, Ω will converge on a value between 0 and 1, which is defined as the ***halting probability,*** the probability of the program completing its function and halting. This probability can be expressed as a ***ratio***, which as we have learned, is the Latin word from which reason comes from. This link between probability and reason is key to understanding how one is able to “know” something in terms of possibility and change without knowing all the facts. (For further reading, Turing’s writing on the “oracle” which would be able to “know” if a machine should halt is worth a look).

V – The Naming

How does one come to name a monad? It is not something we can point to, that we can barely describe, but as we have mentioned it must have an impact or relation to what goes on that is worthy of our investigation. We cannot point to metaphysical truths, but we can point to their examples in the world (Perhaps we could also call metaphysical truths “sets” as well?). Perhaps we should think about this differently; instead of thinking about naming some***thing***, how do we name some***one***? What is it we mean when we evoke someone’s name (or a nickname?) We are not specifically naming any particular amount of matter: I can leave shed a few dead skin cells in my sleep and still be the same person that you saw yesterday; I can lose an arm or leg and still be the same person. How about the old problem of the ship of Theseus (is a ship still the same ship if gradually all its original parts are replaced?), or Neurath’s bootstrap? These all support Leibniz’s point of a soul/monad/name not being at a “point”, if it was, it would be material, an extension and subject to laws of mechanics, time etc. (See “Letters to Clarke”, 2nd letter, §4). We must remember that ***a name is not a definition***, but neither is it a frivolous attachment/supplement to an object or matter.

So to recognise or acknowledge someone by a name/nickname is not to point at a “point” as if to say “this is it; this is you”, though of course without any body, one would find it difficult to find something to name. When we name something as well, we are not just naming an object or body, and we are naming something that perseveres from moment ***A*** to moment ***B***, it does not matter if I cannot figure out how they arrived their via any logical method, I would still “know” to name what is in moment ***B*** from what was in moment ***A***. I did not know all the facts/reasons in moment ***A***, but I know something from there made the discontinuous leap to moment ***B***, I can get there (or “get it”) without knowing all the facts, but there is still some reasoning involved.

And like a monad, what could be more simple than a name? One cannot break a name down into smaller parts, how could a name even have parts (Who has ever had half a name?)? Alongside to a name, we attach to that name certain qualities that fulfil the name. A name belongs to someone, but is not localisable. Naming something does not mean to totalise it, to completely comprehend its identity and possibilities, without nothing ever changing and to set something in stone. On the contrary, there must be a naming, because just accounting for a bodies matter and mechanics without reference to its relation to time, space and order, which all affect it, would leave it indistinguishable. Algorithms possess this similar quality: They “name” an operation, a set of possibilities that unfold with respect to their relation to the numbers that it engages with, and so unfolds into all sorts of strange topologies/surfaces., but never without some sort of order (order in terms of Leibnizian reason) Algorithms have no limit, names do not limit a person either; To say “You can only ever be ***X***” does not really capture anything about what ***X*** is or could be (Evokes the ***Principle of Sufficient Reason***). That is not to say, as I have shown earlier, that which is named can be instantly re-defined like a *tabula rasa* that can be simply written on without consequence or indifference; the monad has a conditioning to it which will affect anything it interacts with.

That which has its name possesses these qualities that will have a reaction to what touches/engages it (sensorially), and this in turn can allow that which is named to develop its own judgment and indeed to enact change.