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CHAPTER TEN

Higher-order Observations

It should be clear by now that before reflecting upon the complexity of any particular problem domain, be it physics or any other for that matter, it is essential that the researcher gets to grips with an expanded description of the nature of observation. We started that journey in the previous chapter; however, we still have to consider the subject matter of higher-order observations, and in far more detail. For we shall see that such observations, or rather the denial of their higher order and their collapse in something order-less, have considerable implications for the construction of theories.

Normally, of course, most human observers are quite unaware of the existence of these various orders of observation ... they don't need to be. For observation is second nature, in which all higher orders have unconsciously collapsed into the apparent objectivity of a mundane first-order observation of things in the world. We tend to take for granted that a better description of the assumed-objective world may be achieved by the simple expedient of repeated first-order observation, although perceiving this as order-less observation. This belief, reinforced by any subsequent utility of such mundane observation, generally ignores any problems that arise with the distinctions necessary for observation; it overlooks the subsequent paradoxes, or indeed the paradox of observation itself. For without the discarding of paradoxes with the use of delusions (see Chapter 3) observation would not be possible; and we are back with Luhmann's insight that 'the world is observable because it is unobservable'. For all knowledge is founded in the absurdity, the 'refined ignorance' that is implicit in all observation. Every process of knowing creates the distinction between what it is to know/not-know, namely a distinction that is itself constructed from what has been observed, and what has been left unobserved.

This is particularly the case for the more sophisticated observation undertaken by developers of theory. Their theories too are grounded in the same linear causality that supports the apparent validity of mundane observation. In their theories, problems that must inevitably arise from time to time out of the paradoxes of observation are taken to be anomalies, and are dismissed; that is they just disappear within a collapsed order-less 'objectivity'. Most of the time, the theories correlate with the regularities that are perceived within such collapsed orders of observation, and this only

serves to reinforce confidence in the objectivity of linear apparently orderless observation. However, and as we shall see, there are implications from ignoring these higher orders.

The present authors too must admit to falling into the same trap. In introducing ever-increasing sets of orders their descriptions enter into ever-decreasing circles. The time will inevitably come when they too must collapse this potentially infinite expansion into the linearity of a finite set of orders, and deny the paradoxes they have introduced. This present chapter is, to a certain extent, an analysis of the authors' own refined ignorance; and indeed they eventually admit that the concept of order of observation is itself paradoxical, although it does deliver some useful insights.

Self-evident Distinctions

Ultimately, even the field of epistemology, the study of *how we know what we know*, thereby constructing a meta-description of the distinctions of knowledge, must itself be prone to distinctions. In other words epistemology, the study of how knowledge is constructed, utilizes rules for such a study; and so imposes further distinctions. These distinctions imply that the process of delineating 'how we know what we know' is incomplete by default. It implies that the enterprise that is widely labelled epistemology, by its necessary use of distinctions to undertake that study, must create an observable/unobservable distinction within epistemology itself.

The study of how we know what we know projects a fallacy, namely that a method is possible for validating knowledge itself, and that the knowledge thus constructed is devoid of paradoxes. This fallacy ignores the distinction between knowing/not-knowing; it ignores the very fundamental concept of distinction, and in doing so legitimizes an absolute belief in attaining a truth for which no distinction is necessary. Such is the arrogance underlying science, which permeates much of modernity. Science insists, to its peril, that such not-knowing can eventually be suppressed by undertaking enough further observations. The belief is that after sufficient traversal around the loop of consequential experimentation, namely theorizing and yet more observing, the issue of distinction eventually ceases to matter, and science is left with an *understanding*, and in control of the world. But it is a vain hope.

Theoreticians search for the point in the development of a theory where all observations guided by that theory deliver self-evident distinctions. To all intents and purposes the world has become an objective place, so that all

observations, whatever their order, ultimately boil down to the same unique set of distinctions, reduced to identifiable and communicable universal categories. There can be no debate allowed, no difference of opinion. The world is as it is, as it appears to be, the same for everyone. Then the findings of science are taken as obvious, self-evident, just as we accept as *fact* that everything we observe in the world is as it is for everyone. This is after all how we humans consider our physical world of colour and sound to be; of objects like trees, clouds, animals and stones to be. We believe that we all see/feel/hear/smell/taste/reflect on the same things, exactly as they are. Higher orders of observation appear to have no consequence; all is order-less objective observation. Theory too operates in this same objective world.

The authors of this book, however, take a different stance; albeit admitting that at some point they too must collapse their observations. Based on the premises of observation examined thus far, they claim that observations of an order higher than first need to be examined in much greater detail. Unpicking this particular knot of complexity within observation is no easy task. Indeed, this present chapter seeks to show that further complications come into play in these higher orders of observation, noting that too often these go unnoticed.

The Reader as Observer

It is useful to start our examination by distinguishing between the terms *observing* and *observation*. In the previous chapter observing was taken to be a physical act, where an observer merely observes. However, when both the observing and the observed parties, namely the observer and the scene and referred to there as A and B respectively, are subsumed into the unity of the distinction, then the question immediately arises of who is observing that unity. For ontologically, another observer is being created, brought into existence in someone's mind, operating at one order of observation higher; an observer who realizes that A is observing B. Who that observer is has little consequence. What matters is that A, not being able to self-observe himself, will know he is observing B, but will be unable to include himself in the unity of the distinction between observer and observed.

For the time being, let us consider another observer who is capable of realizing that A is observing B, namely the reader of this book, and designate her with the letter R. This apparently creates a second-order observation, since R is observing A observing B. But this designation of another order of observation exposes yet another issue. If we ask who it is that creates the

sequence of R observing A observing B, then one possible reply would be the authors, who are thus acting as third-order observers. In writing this text they have observed/imagined R observing A observing B, and constructed their analysis apparently to exclude for the moment this third-order observation, forcing the reader into accepting the second-order observation as R observing A observing B. However, having been made aware of this situation, R may now construct a fourth-order observation that would unavoidably include herself, observing how the authors are imagining/observing her (R) observing A observing B. The re-entry of an observing system, R in this case, into the order sequence of observations itself has interesting implications, which will be dealt with later. This introduction of new observing systems can go on *ad infinitum*. 'I know that you know, that I know that you know, that I know that you know ...'

For the moment, it will suffice to recognize that observational complexity is being created in a number of ways. If we go back to our example of a second-order observation, that of R observing A observing B, then we can additionally designate *A observing B* as a distinction, the unity of which we may label as U. In this case, R would be observing U. In light of this encapsulation of *A observing B* into U, is R conducting a second-order observation of B? Or a first-order observation of U, or of A? Or all? Or none? As a way of avoiding this conundrum, it will be useful to accept for the time being the difference between the terms *observing* and *observation*. Observing implies a direct first-order observation of something that may in turn incorporate further observations. In this regard, simply observing would classify as a first-order observation; observing someone observing would be a second-order observation, and so on.

The Absurdity of Infinity and the Twin Paradox

However, the very concept of order creates paradoxes, some of which are already apparent with the simultaneity of orders of observation: a second-order observation can also be a first-order observation of an implied unity, or both a first and a second. Higher-order observations, therefore, come with an inevitable confusion that is not easy, nay impossible to resolve. To this confusion, we may add observers that are imagined in the head of other observers. Therefore another distinction can be attempted: that between real orders of observation and imagined orders, and indeed imagined observers that have no possible counterpart in the real world, based as they are on the memory and the cognition of *a particular someone*.

With imagined orders of observation, the introduction of thought-experiments becomes possible; experiments that often involve observers with impossible superhuman powers, operating in artificial unnatural situations. We contemplate integers into existence that are greater than the total number of atoms/particles/things in the universe, not that we could ever count them, without the slightest concern for that absurdity. For something very odd has happened. Arithmetic started quite reasonably by adding up a number of things, but somewhere in the development of this abstraction a qualitative change takes place; the instrumental fictions have taken us beyond the total number of things that can be counted. Infinity is bigger than the total number of all atoms in the universe, bigger than all the fundamental particles there. Mathematics has moved from the rational/natural/non-linear real world to the irrational/unnatural/linear and artificial without us realizing it. How can we maintain that arithmetic is still of that real world? Why, simply by insisting that all descriptions of that world are self-referential, in which the absurdity of infinity is never confronted. In general the concept of infinity absorbs all the paradoxes and delivers a utility; but eventually singularities in the natural world will conspire to mess up all this unnatural tidiness.

Then there's the thought-experiment where one of a pair of twins travels in a hyper high-speed rocket, and returns to earth only to find his/her twin much older. Paradoxically, as a consequence of the Special Theory of Relativity, the twin left behind experiences the same effect, so that each twin is simultaneously both younger and older than the other.

This inconsistency does not matter, because such a situation can never occur, since that experiment can never happen in practice. A series of compromises have been made: a rocket travelling close to the speed of light does not exist; human physiology could not withstand the implied pressures. Even more important than these restrictions is their complete suppression and the neglect of their implications to the experiment. We humans operate as if the restrictions do not matter, do not exist, and then move on to ponder without a moment's thought the consequences and implications of realizing the thought-experiment. Absurd!

We even wonder why it leads to a paradox, the so-called *twin paradox*; and consider possible modifications to the theory that led to the paradox, so that the paradox may be resolved. Whenever we are fortunate enough to find a resolution we stand tall, and heavily, upon the thin ice of our intellectual constructs, and gaze proudly at the marvel. But any such resolution of a

paradox is a delusion in itself: the paradox of paradox. It is the situation whereby the paradox is rendered invisible by creating an alternative distinction so that reality can be observed and described differently. For, no matter what the facts tell us, these so-called facts remain the outcome of a distinction made by an observing system; and those distinctions are contingent, they can be drawn differently, and always spawn yet more paradoxes.

As responsible for the generation of distinctions, observing systems are therefore of vital importance. Observing systems have the capacity to generate observations by stipulating guiding differentiations, instead of simply being observed: the physical world of phenomena being an example of the latter.

The Reader Complicating Matters

The reader should remember at this point that a number of issues were discussed in the previous chapters regarding *A observing B*, including the delusions that A may be using to sample the observation, the feedback from B to A, as well as the frames that were utilized by A in order both to communicate his observation of B and to reflect on B. All these issues are still valid, but are omitted in the diagrams below in order to simplify matters by enabling the reader to focus on the main subject matter of this chapter, namely observations of an order higher than first.

In Figure 10.1, we depict the scenario where A is observing B. However, if we depict the scenario where another observing system is introduced, then we would have to increase the order of observation by adding an additional observing system to produce Figure 10.2: an observing system that we shall label as C.

Figure 10.1 A first-order observation?

At the same time, the reader R (the one actually reading the book, not the one imagined into existence by the authors, and who hence cannot appear in the figure), in realizing that she could herself assume the place of another observer who is observing C, who is observing A observing B, is faced with the possibility of elevating her own observation of this phenomenon up another level to an observation of the third order. Already, a number

of observing systems have been introduced. This implies that a number of distinctions have already been made and a number of possibilities are raised for analysing this complexity behind multiple observers. Let us briefly examine one such possibility.

Figure 10.2 A second-order observation?

Deconstruction

In Figure 10.2, as an observing system, *C* is developing his own choice of frame in the process of observing *A* observing *B*. However, that choice of frame is influenced by the agglomeration of personal delusions that instantaneously collapse in the face of utility. Ultimately the choice of frame is influenced by what the observer perceives to be the appropriateness of the frame in a particular context of personal purposes. The frame is denoted in the diagram above by $F_{C \rightarrow (A \rightarrow B)}$. Again a simplified notation is used for the purposes of this present chapter. This diagrammatic form does not reduce the complexity highlighted in Chapter 9, but it will suffice for the material being discussed in the present chapter. Why are we stressing this point about higher orders? Because it is through higher orders that observers make assumptions about what others are observing, something crucial when considering the construction of theories. We must recognize that *C*, in using his own choice of frame while carrying out the observation, has opened up the possibility of treating his second-order observing as a process of deconstruction of, that is inferring meaning to and from, the original observation of ‘*A* observing *B*’.

According to Luhmann:

Deconstruction draws attention to the fact that differences are only distinctions and change their use value when we use them at different times and in different contexts. The difference between heterosexuals and homosexuals is not always the same; it is subject to *différance* [sic] ... Then immediately a variety of observing systems appear: the political system, the interaction of a session of the US Senate, the army, etc. The illusion to be deconstructed is the assumption that all these systems designate the same object when they use the distinction heterosexuals/homosexuals. *The stereotypicality of the distinction leads to the*

assumption that all these systems observe the same thing, whereas observing these observers shows that this is not the case (Luhmann, 2002a) – emphasis added.

From this example, and generalizing between the orders of observation, we may infer that first-order observations may be deconstructed by a second-order act of observing, a second-order observation will be deconstructed by a third-order observing, *ad infinitum*. We are back with the prisoner brainteaser of Chapter 6. The introduction of more and more observers creates more distinctions, and more possibilities, as well as additional constraints and uncertainty.

Therefore, in order to deconstruct and observe further in what context-sensitive capacity A is observing B, and to reflect on some of the consequences of such an observation, a second-order observation needs to take place; an observation for which the observing system that we designated to be C becomes necessary.

As we saw with the prisoners brainteaser, C can never properly deconstruct what A is thinking when observing B, because C and A have different personal delusions, and thus operate with different cognitive processes, and therefore observe different things in B. Hence the authors' insistence on separating the orders of observation. However, in certain restricted environments, it is possible to deconstruct the frames that are externalized in the process of observation. This is after all what theory, what science, is all about. Then what A is observing in B, as represented in a linear frame, itself constructed in a shared notation, is communicated to C. Then C, if he accepts the theoretical propositions in that frame, will presume that he observes exactly the same in B as does A. Objectivity is simply an acceptance that vague non-linear personal delusions are irrelevant, and that anything of any consequence will be uniquely represented in a linear frame, to be shared with others as a true and total description of B.

Mutual Interference

Needless to say, the addition of further observing systems creates a complexity that is attributable to the mutual interference between these observing systems, the frames they use, the delusions and perspectives that influence their observation to begin with, etc. Hence, the introduction of new observing systems interferes with any pre-established observational setting.

But where are the paradoxes behind the introduction of new observing systems and the concept of higher-order observations to be found? Ironically enough, within observation itself. That is, the only way that cognition can distinguish between the various orders of observation is through observing. In other words, observation is itself the means through which higher-order observations are granted their status of being of a higher order. However, in doing so, another paradox is constructed; orders of observation can be determined by observation that, in itself, may have an order, either first- or second- etc., but at least one order greater than the orders of observation examined.

In other words, if an observer attempts to classify the order of an observation, he has to do so while he himself is engaged in observing, and more explicitly, in observing at a particular order. At the same time this must be a first-order observation, since the observer always observes, as well as all the other observational orders up to a point one less than that particular order. But this level can only be recognized by that observer with the introduction of yet another observation one order higher again, and that recognition needs yet another level.

Hyper-complexity

This paradoxical implication, whereby orders of observation require observation with an associated order to be implied, creates a hyper-complexity as a result of the interplay of paradoxes underpinning observation itself. Here, we are using the concept of hyper-complexity from Luhmann, who has used it in a slightly different context, but with the same implications for observation. In discussing this meta-complexity as hyper-complexity, Luhmann remarks:

What has become visible after some centuries of impact of the printing press and after a hundred and more years of mass media is a much more complicated, some say *hyper-complex*, description of complexity; hyper-complex in the sense that within the complex system of society there are many competing descriptions of this complexity. The unity of the complexity becomes unobservable. Intellectuals occupy themselves and others with describing description, philosophers become experts on philosophical texts – and literary criticism takes over, nicknaming ‘theory’ something that we suppose has been done elsewhere (Luhmann, 2002a).

This, we argue, is the case for any system that is dependent on observation for constructing knowledge. The system of science is not, cannot be, an exception to this rule. It too depends on observation, on the generation of distinctions and on the paradoxes that these imply. One typical way this hyper-complexity becomes expressed in science is the increasing number of disciplines. Because the 'unity of the complexity becomes unobservable', then scientific knowledge, like all knowledge, must have a number of meta-descriptions of itself. As testified by the existence of a growing number of scientific disciplines, the multiplicity of approaches in epistemology and the fragmentation within physics itself and other disciplines; something that is apparent in the expanding and various descriptions of the system of science. How perversely paradoxical that, according to our analysis, the drive to unify physics will culminate in the exact opposite effect? Actually every branch of science, as it develops, far from becoming unified must continually fragment into sub-disciplines, which are supposedly recombined in what has become known within modernity as multi-disciplinary research, which in itself will lead to yet more fragmentation.

Even though the consequences of the above assertions will be expanded upon in Chapter 13, the concluding chapter, what needs to be made clear here is that any discipline that attempts to end up with some form of a Grand Unified Theory is in effect simultaneously moving in an opposite direction. The system of science is not immune to this schizophrenia.

The State of Complexity in Orders of Observation

Amongst this sequence of interplaying paradoxes it turns out that higher-order observations become, to a large extent, unsupportable. The sequential linearity projected by the use of the concept of order is seen to be highly problematic. The designation of higher-order observations actually entails in itself the assumption that second-order observers may refine their understanding of reality by subjecting each first-order observation to their own second-order observing. This is usually based on the belief that some sort of structure, a communicable frame, is being pulled out from the reality being observed. Being linear it must mean that the non-linearity will be lost among the paradoxes. However, what is structured and how structure is perceived depend on the presuppositions, the delusions and the disturbances, with which observers engage in observation. Insofar as the act of observing something must automatically leave something else unobserved, including the non-linearity, then observation as a means of pulling out a structure

from the observed reality is what automatically implies the existence of an unstructured part. But the unstructured part is not something to be viewed as yet another residual category; it is constitutive of the existence of the structured part of the observed reality, and interferes with how the fabric of reality is observed and ultimately perceived.

While this distinction between structured/unstructured reality is different for every observation, the way any perceived structure within the reality comes to be constructed/framed from a series of observations requires that the observer is able to generate linear categories appropriate for describing the scene. Categories are then created, combined and reinforced and imposed on reality by processes that are, to a large degree, presupposed. Such processes are there prior to observation, in the private delusions and choices of frames available to the observer, so that observation can be initiated.

More questions arise at this point. Is it possible to observe something that has originally been left unobserved? The answer is 'yes, but only partially', simply by taking a different distinction. But a different distinction will in itself create another way of differentiating between an observed/unobserved reality. While it may initially appear possible to observe everything by creating different but complementary distinctions, it should not be forgotten that the distinction between observed/unobserved implies interference between the two parts, and each time this interference is different, depending on the observer, his delusions, choices of frame etc. The sum of linear descriptions can never describe non-linearity.

Hence, higher-order observations should not be viewed as refined descriptions of lower-order observations that gather up the distinctions used by the latter. Higher-order observations are not devoid of paradoxes themselves, since they too have to utilize distinctions. And since each higher-order observation is a particular form of observation, it reduces the complexity of lower-order observations while forcing their collapse: their clarification. But in clarifying, something is lost. The complexity hasn't gone away, parts of it have simply been ignored. While the latter outcome is a consequence of observation itself, clarification is only the 'refined ignorance' of a second-order delusion constructed out of the contingent distinctions that are used by the first-order observer. Any higher-order observer remains an observer who requires of himself simply to observe.

Hence, the order of observation must collapse in the mind of the observer. For otherwise each observation would lead to the unending cascade of new observing systems: an infinite regression that perversely would prevent

observation from taking place. Remember 'the world is observable because it is unobservable'.

Observations of a Higher (Dis)Order and the Observing of Disorder

In examining further this concept of order found within the phrase higher-order observations, we can notice that a first-order observation is followed by a second-, a third- and so on. But how is it possible that a linear numerical sequence (1, 2, 3, 4, ...) can describe the totality of observing systems implied in higher-order observations? The answer to that question is very simple: it is not possible. It is not possible for any such linear sequence to depict accurately the complexity of all the interactions present in the multiplicity of observations. Such a sequence cannot account for the hyper-complexity described above. This ordered sequence of numbers that is supposed to account for all this underlying complexity creates a further problem, namely the imposition of the integer sequence, itself an invention that 'was made on the basis of the error [or as we would have it, absurdity], dominant even from the earliest times, that there are identical things (but in fact nothing is identical with anything else)' (Nietzsche and Hollingdale, 1996); there are just different things, and even those are brought out of *chaos* by perception.

Nietzsche's remark that 'mathematics ... would certainly not have come into existence if one had known from the beginning that there was in nature no exactly straight line, no real circle, no absolute magnitude' (Nietzsche and Hollingdale, 1996) acquires a relevance in respect of observation for a number of reasons. The process of theory construction and scientific discovery leads us humans to believe that we are approaching profound truths as we are supposed to deepen our knowledge by putting the outcomes of observations together. But this is only a delusion within perception. We are only refining our ignorance.

We can see this in Nietzsche's example within the context of mathematics: in nature no such object as a line or circle exists, not even an integer greater than one; everything is different. Yet despite their unnatural linear nature, the concepts in themselves constitute acceptable and useful conventions. They are brought into existence despite the absurdity of their *unnaturalness*, that is their loose correspondence to what they describe. Indeed, this 'unnaturalness' seems to be a necessary prerequisite. This artificial process of abstraction indicates a transcendence to a meta-reality that has to be

different from reality itself. By being different from reality, while at the same time being necessary for its representation as an abstraction, a system/environment dichotomy can be conceived between reality/meta-reality. Therefore the relationship between reality, the *natural*, and its abstract representation, the *unnatural*, can be thought of as having been split into two: into a reality that we attempt to represent and into an unreality, namely the meta-reality, created by the representation. Consequently another distinction is constructed: between the possibility of representing reality and the impossibility of representing it accurately. The possibility of representing reality is immediate and self-evident; we do it all the time. However, such representations can never be accurate, because they are *unreal* systemic constructions, and as such they can never be identical with the things in the world they represent.

Hence, imposing an orderly numerical sequence on the concept of observation appears to suffer from a number of logical difficulties. The constructed set of linear numerical abstractions associated with concepts related to observation appears not to match the non-linear complexity of interactions within observation. What is termed as a second or third order of observation simply masks the underlying complexity and reduces it by resorting to a comfortable sequence of numbers that, in this context, cannot make sense. The absolute count exists only as a conventional contrivance for reducing complexity in how we attempt to represent higher-order observations. But each observation is different, separate; it is dependent on different observers with different experiences, different delusions, looking at different scenes, and hence delivering different deconstructions; and these are all muddled together in a contrived order. A higher-order observation eventually brings about an emergent qualitative change in the complexity of interactions. A quantitative framing of a qualitative difference has never been, can never be, much of a success story.

And so we have reached an inevitable conclusion: observing, namely first-order observation, which serves humanity so well, is actually a denial of the complexity involved in what is actually going on in our sensing/perceiving of the real world. However, the moment we attempt to analyse that complexity, by recognizing that we are observing exploding sequences of imagined observers of observations and their differing deconstructions, we are trapped in a futile sequence, which has also to be terminated at some point; again a forceful reduction of this complexity. And we must return to Luhmann's profound insight: 'The world is observable because it is unobservable',

because whenever an observer observes, he creates a contingent distinction between what is observed and what is by necessity left unobserved. The complexity of the real world that is observed rests upon this stratum of such contingent distinctions. Part of the complexity is reduced when the observer observes, and part of it is ignored.

Furthermore, the consequential abstract representation in frames of such impossibly possible observations, whatever the notation in use, be it quantitative, specifically mathematics; qualitative, namely language, images etc.; or arbitrary, can never be an exact description of any single thing in the world. They can only ever be approximations. So much is abandoned, left unsaid, unrepresented by abstraction, and by the various individuals involved in choosing. So much of the complexity and paradoxes are denied. Such representations can never capture the totality, and so cannot be used in any claim on truth. Their sole validity depends on appropriateness, utility and choice.