The trouble with thinking backwards

Poodles rarely do it, but philosophers do it all the time.
In either case the outcome is bizarre

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FEW PERSONS may readily perceive the common thread that binds Sir John Eccles, hermit crabs, and my mother-in-law together. Working in reverse order, which seems only fitting, let us examine the connections.

My wife’s mother once remarked, on viewing a BBC television nature documentary on the wonders of the seashore, how marvellous it was that Nature saw to it that all hermit crabs manage to find empty whelk, or other mollusc shells in which to live, and presumably prosper. This chance observation caused me to reflect deeply, and for some little time. I did not choose to press the matter at the time but had I done so I would have been compelled to point out that not all hermit crabs do. In fact, we might justly assume that the vast majority do not. And are therefore eaten by a truly horrendous variety of predators. And are therefore not to be filmed by underwater cameramen from the BBC and thereafter observed by us in whelk (or other mollusc) shells. Nor indeed, observed by anyone anywhere. Only the fortunate few among the scions of the hermit crab find a shell, and it is they, the pitiful remnant of a once mighty race, that we and our mothers-in-law observe in shells.

What my wife’s mother had done, of course, although I did not tell her, was to amass perfectly correct criteria, soundly related to each other, namely, that all hermit crabs she had ever seen were to be observed in mollusc shells (generally though not invariably whelk) at the time—and then draw a perfectly splendid, incorrect inference from this: that there is, somewhere, a Beneficent Universe that looks after the well-being of all hermit crabs as assiduously as it notes the fall of each sparrow, providing every hermit crab with his own empty mollusc shell.

Alas. The bloody annals of hermit crabdom, should some crustacean Toynbee ever arise to record them, would present quite another picture.

The Nobel laureate, the neurophysiologist Sir John Eccles, has taken an analogous view of the world. In The Self and Its Brain, which he co-authored with Sir Karl Popper a few years ago, Professor Eccles concludes that his existence has supernatural origins (so, for that matter, have all our existences; let us be fair), this proven by the fact that the odds of the combination of genes that went to make up John Eccles actually coming about run to something like 10^10^000 against. Ergo, these things are planned, granted that God moves in mysterious ways His wonders to perform.

What Sir John and my wife’s mother have done is to reason backwards, from presumed effect to ostensible cause. This sort of thinking, known in the logic racket as a posteriori, is the cause of a great deal of confusion. One of the more pleasing examples of a posteriori was the musing of Nancy Banks-Smith (Mrs Banks-Smith is of course the Guardian’s television critic), that it was bad tactics of Christ to be born on Christmas Day and to die on Good Friday, the only two days in the year when there are no newspapers. If one thinks about that long enough, one will, I am sure, see the logical flaw involved.

In a posteriori analysis, one assumes, often without knowing it, that a result somehow influences, or is immanent in, its own cause, or that the end is in some way part of the plan that the means is ruminating on. This is the well-known teleological approach, otherwise known as the argument from design. The notion that the Universe is a demonstrable purpose in its workings, this shown by all the myriads of wonders we see about us which clearly reflect the planned causes of these marvellous outcomes.

The trouble is, reasoning of this sort makes anything totally improbable to the point of virtual impossibility. The miraculum miraculum of being Eccles turns out to be somewhat less than the prodigy of wonder Eccles sees it as being, once we forget about reasoning backwards, from clear and observable fact to shadowy cause, and recollect that every human being (and everything else) has truly enormous odds against his being precisely him, and nobody else, but once he is he, and nobody else, the matter rests, and no seeking retrospectively over fantastic odds is called for. This is the case whether you happen to be Eccles, Moriarty, Bluebottle, a toad, a worm, an amoeba, or anything.

“Among all the events possible in the Universe the a priori probability of any particular one of them occurring is next to zero. Yet the Universe exists; particular events must occur in it, the probability of which (before the event) was infinitesimal... Destiny is written as and while, not before, it happens.”

Thus writes Jacques Monod in Chance and Necessity. The random possibility of anything happening in the particular way it did happen is pretty near impossible beforehand, but once it does happen, the odds in favour of it having happened are 100 per cent. This seems rather obvious, to the point of idiocy, but that fact does not necessarily rule out the possibility of a good many people, including some eminent scientists, overlooking it.

One of the most poignant examples of someone going to a great deal of trouble and effort to insure that a posteriori reasoning would turn on him and sink its teeth into his logic down to the bone, is accorded us by Pierre Lecomte du Noyé.

His case is virtually plucked out of random statistical irrelevance in the scientific-mystical field, an area whose burgeoning appeal over the past few years proves it a prime source of ominous prospects.

In his immensely popular Human Destiny du Noyé goes to
super-human pains to stress the statistical unlikelihood of life emerging from a haphazard arrangement of atoms and molecules, randomly sorting themselves out into amino acids, the basic ingredients of protein, which is the basic ingredient of life. (A depressingly large number of other scientists with metaphysical proclivities have posed this problem, among them Sir Karl Popper and Sir John Eccles, whom I mentioned a while back, and, much more unexpectedly, Sir Fred Hoyle.) Du Noüy conclusively demonstrates that the chances of a protein molecule forming itself by random processes have, roughly speaking, the odds of $10^{318}$ against them; a rather large statistical imbalance there can be no doubt, though of course it falls lamentably short of the odds posted for being Professor Eccles. Therefore, du Noüy concludes, Life is a deliberate Plan and, therefore, God—or Someone Very Much Like Him—must exist as the Planner. Mere chance cannot, by the widest stretch of the aleatory process, overcome such incredible odds against it.

More recently, Sir Fred Hoyle employed a similar argument to show that terrestrial life could not possibly have originated on Earth (The Universe: Past and Present Reflections on a Faithful Generation) by a stochastic process; this workable model estimated by random shuffling of amino acids being, at a conservative estimate, less than $10^{20}$—putting even Eccles’ posted odds to shame. But then Sir Fred is not arguing for the miraculous creation of life on Earth. Not exactly. Hoyle postulates that, with odds of $10^{20}$ to 1 against, the chance of life spontaneously emerging on this planet must be laughably remote. Obviously then it was brought here from Somewhere Else. Though that does not solve the problem of how life originated there but merely removes it one step away. Presumably the likelihood of enzyme formation there and then, wherever and whenever that was, was better, though Hoyle neglects to tell us why. Hoyle goes on to affirm the existence of “super-intelligent” beings who deliberately sow the Universe with the seeds of life, in the form of vast clouds of viruses and bacteria, Johnny Appleseeds on a cosmic scale. In his book Life Itself Francis Crick postulates a similar scenario, thus clouds of chemical compounds exist in molecular form is established fact, though it is a great leap of the imagination to go on to infer that this indicates viruses and bacteria. (One thing we know to exist out there is vodka, CH$_3$CH$_2$OH, but only as .002 proof.) To take bound number 2 and infer that super-intelligent beings are doing this on purpose is a strange reversion to the supernatural and proves not so much imagination as bankruptcy of imagination. The concept of life emerging as a natural, perhaps inevitable function of existence is too miraculous. We must have gods. What a shame we have such a lack of imagination.

Underlying the argument for the supernatural or the super-intelligent is the anthropic principle, the realisation that the Universe is so exactly the right kind of Universe for man that we must meditate on the thousands of coincidences that are absolutely essential for man, or indeed life, to exist. One slight variation in just one of those thousands of essential coincidences would have led to the formation of a real Universe drastically, possibly totally. Yet, down to the fine structure constants that dictate gravitational, electromagnetic, and strong and weak nuclear forces, and up to basic biological prerequisites, we find the cosmos in general, our Sun in particular, and Earth most particularly, so minutely attuned to us, that the conclusion seems inescapable: God or someone else of the same name made it like that, with us in mind. It is, we insist, just too much of a coincidence, just too much of a miracle, to say it is pure, unassisted chance. This is the essence of the anthropic principle.

But why? Why couldn’t the Universe, just as easily have been somewhat different, the physical laws governing it somewhat unlike what they in fact are, in which case other life forms would presumably be here contemplating themselves about the Eternal Laws of the Universe being just their sort, and no one else’s—in the fine old a posteriori way. Alternatively, there would be no life forms, in which case there would be no real problem, there being no one to pose it.

The cart-pulling-the horse approach inherent in the anthropic principle receives a rude thump on the head in Gerald Feinberg’s and Robert Shapiro’s Life Beyond Earth. The course of the Mississippi River is philosophically over, employing what one might call the “fluvial principle”. What a marvel it is, bordering or indeed encroaching upon the miraculous, that the Mississippi river follows its channel in the absolutely invariable way it does, past every wharf, under every bridge, exactly, almost to the rock, and does not flow along some other channel, Feinberg and Shapiro cruelly muse. Surely, surely the cyme must be confounded, even he must bear witness to the footprint of the Hand of Providence. For Feinberg, the only way the Universe could have been. There being only one Universe, it is hard to draw upon a statistical sample of universes to help work the problem out on a sound, probabilistic basis.

Chances but not random

The key factor in my mother-in-law’s, Eccles’s du Noüy’s, Hoyle’s, and Crick’s contest with the law of averages may not be, as they suppose, odds; but rather, random. Physics seem to show that the creation of heavier elements, out of lighter ones and more complicated molecules out of simpler ones is not random. It is a matter of chance, to be sure, but not random chance. The process appears organised, systematic, and in fact inevitable by the nature of atomic action itself, as explained by Wolfgang Pauli exclusion principle, which governs quantum theory of electronic shells and their saturation numbers. It is really quite a simple principle, reminiscent of the game of rounders, or its American descendant, baseball, in which a cardinal rule dictates that not more than one runner can occupy one base at a time, any excess numbers being “out”. (In Pauli’s principle the matter is not this exclusive, and a varying but precise number of electrons may occupy the various shells, but you get the picture.) The slow but steady construction of heavier atoms, more complex molecules, amino acids, proteins, nucleic acids, organelles, and self-replication cells, given the necessary environment and time, may be not mere possible but unavoidable, and the environment may not, it seems, be so exclusive. The fact that terrestrial life-forms require a terrestrial environment does not make it incumbent that non-terrestrial life-forms require terrestrial environments. Life-as-we-do-not-know—itis necessarily difficult to speculate on, but that does not oblige it to refrain from existing. Chance plays its role, but chance has not written the script. Randomness decides on the likelihood of winning the 12th pair of dice, but randomness cannot decide that we roll a 13.

Perhaps the real miracle about existence and that most complex development existence exhibits, which we call life, is that no miracle is involved, no divine or super-intelligent interposition, no god descending to our stage from a creaky pulley and jerry-built bucket. We are (or more likely, are not) Sir John Eccles or a hermit crab, thinking backwards of scrambling sideways, because random chance necessitates that we must be someone and something. Unless it decides we are no one and nothing. In that case, all the a posteriori
thinking in the universe can't help us.

It should not be necessary to point out that a sort of logic which already has its answer in hand and merely requires some supporting examples and instances is very bad logic. It is reasoning from a firm conviction backwards to possible cause, and if this or that particular cause will not serve, never mind; it can be rejected and other causes will be hunted down. Eventually of course, we shall find a cause that properly fits the absolute conviction we happen to hold. It is just a question of being patient and looking. And not being too demanding.

A posteriori logic underpins all "broad" thinking, and is therefore the principal type of contemplation employed by philosophers and metaphysicians of all sorts and fashions, those who are inclined to reject empirical evidences they don't happen to like, on the (unspoken) grounds that these tend to damage the particular broad thought they are busily expounding. Some logicians have remarked that it is curious that a posteriori thinking so closely parallels and indeed complements apriorism, curious because one would have supposed that a system of logical deduction that reasons, as its name signifies, from cause to effect would have little in common with one that reasons from effect to cause. But of course when we stop to analyse the situation we realise that whatever organised formula of logic is followed, it is of minor significance if the reasoner already has his reasons nicely prepared in advance, his conclusions safely concluded and tucked away snugly.

The ability of dogs, or at least poodles, to reason like humans, that is, deductively in a logical but totally erroneous fashion because of a posteriori approaches, is hinted at by my colleague Brian Vaux in his account of a black poodle named George.

George was in the habit of raiding the chicken house and making off with eggs, and to terminate this behaviour George's owner carefully emptied the contents of one egg, filled it with hot mustard, and then replaced it beneath a hen. George in due course made off with the egg, attempted eating it, and suffered the consequences. When he had finally recovered, however, George ran back to the chicken yard and sought out the hen whose clutch he had raided, and bit her head off, thus committing both the error of a posteriori reasoning and the logical fallacy of post hoc ergo propter hoc deduction, which poodles rarely do.

Human beings, on the other hand, do this regularly. A classic case, in which I happened to be personally involved, emerged in 1966 in a report issued by the US Department of Defense, which set out to prove conclusively that communist influence in South Vietnam was declining, this because it could be clearly demonstrated from statistics that fewer incidents of Viet Cong activity were being reported from hamlets in the countryside. This information, statistically quite accurate, was welcomed enthusiastically and given the widest circulation, as conclusive evidence that the war against the Viet Cong communists and for the hearts and minds of the Vietnamese people was being won. Everything was fine and everyone was very happy for several weeks. But one day it occurred to someone, I don't know whom, that the reason there were fewer reports of Viet Cong activity from these hamlets was that the hamlets had passed under the control of the Viet Cong, who were known even then to be notoriously lax in making reports to the Department of Defense about their activity.

It must be stressed that there was no conscious attempt by the American authorities involved to deceive (so far as this particular example is concerned). All the individual criteria were accurate, the statistics were correct. Merely the infer-