

Paleo-Normal Science and Corruption

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First, what do we mean by Paleo-Normal Science? Clearly it is a variety of 'Normal'. As to 'Normal Science', we can invoke the principle (or paradigm, or faith) that for every scientific problem there exists just one solution – there always is one (no insoluble problems) but never more than one (no ambiguity or dilemmas in Science). This faith has governed and guided science, natural and social, for all the centuries since the Scientific Revolution. It still dominates teaching in the sciences. In the better Humanities courses and exams, students are encouraged to critically examine arguments and form their own judgements. In science, it happens hardly ever. It was in this sense that the philosopher T.S. Kuhn described science education as comparable to dogmatic theology. The products of such indoctrination normally do 'puzzle-solving' research where the assumption of solubility works well enough, and they can rest secure in their belief that science is superior knowledge in virtue of the certainty of its results.

Indeed, the triumphs first of theoretical science and then of science-based technology in the last couple of centuries have made this 'Normal Science' totally plausible. For the public image, there were various protective mechanisms. When problems appeared, it wasn't the fault of Science; thus Science took the credit for penicillin, while Society got the blame for the Bomb. Even now, there is a tendency for the good news to be in Science, while the bad news is The Environment. But over the past few decades, the balance of plausibility has shifted. The safety and comfort produced by technology, at least for the world's rich, has been tarnished and compromised by the emergence of ever more risks and threats. We have even had the emergence of a 'risk society, of pervasive technological risks whose political content cannot any longer be concealed. Now, when risks are debated and scientists make their statements, a very sophisticated public queries, not so much whether they are True or False (as in the old naïve logic), but rather how strong is their quality. And quality itself is understood as complex and recursive, especially in places (like England) where crucial institutions of quality-assurance (as those governing school exams) are themselves seen to be incompetent and possibly corrupted.

Under these new circumstances, the inherited faith that the job of Science is simply to 'speak truth to power' has become antique. It offers no protection to scientific integrity against the corrupting influences of other spheres of activity, such as business or government. We are justified in giving it the prefix 'paleo' – a sort of fossil from long ago.

There are various signs whereby we may detect adherence to Paleo-Normal Science. One is a faith in what we might call 'Tinkertoy' science and technology. This is characterised by the assumption that all things and processes in the natural world can be simply taken apart into their components and then reassembled bit by bit. For Tinkertoy, complexity and context do not exist. They are not in the puzzle as presented, and so there is no reason to consider them for the solution. It is most obvious in the case of genetic engineering; there it was assumed that any gene, as for musicality, homelessness, or drought-resistance, could be engineered, and either deleted or inserted as desired. Only when it was realised that there are not enough 'genes' to go around, was it admitted that

the production of a phenotype involves a process rather than a copying, and that complexity rather than simplicity characterises the technology. Now with nanotechnology and its descendants, Tinkertoy rules while regulators and social-scientists play a hopeless game of catch-up.

In the rigid, authoritarian structures of training in Normal Science, the mindset is one of total, automatic acceptance of the ruling doctrines of the day. The alternatives are, for the student immediate failure, and for the researcher relegation to the far margins. Hence when criticisms are raised of dominant technologies, the instant reaction of the fully indoctrinated puzzle-solver, however eminent, is "Surely They wouldn't allow that...". For anyone outside the world of science, such sentiments belong to the Tooth Fairy age. But for those inside the scientific system, to think otherwise would involve attitudes close to treason against their leading colleagues, as well as a threat to the beliefs that had justified their lives' works. We had a perfect example of such Groupthink in England, in the rallying of the scientific community around the official assurance that Mad Cow disease could not spread to humans, even for several years after it was known to infect cats. More recently there was a vivid display in the world of mathematics applied to finance, where every sort of fantasy and corruption combined to create a perfect storm of toxic securities created in large part by a toxic mathematical science.

Such beliefs in the essential simplicity and beneficence of science, that are now paleonormal, did have their positive social function in earlier times, when Science served as a rallying point for those opposing dominant political and conceptual structures enforced by reactionary institutions like churches. This situation persisted until the interwar period in Vienna, and explains the dogmatic style of the 'logical positivist' philosophers of that period. We might still find echoes of such struggles in parts of the Majority World, where institutions of religion enforce uniformity in the name of their special version of the truth. But over here, the balance of forces and problems has shifted.

Now we may ask, what harm does paleonormal science do, aside from leading technically trained people into errors from which they had been sure they were protected? It is because of the location of that sort of science in the systems of knowledge and power that govern our societies. We might first notice that the paleonormal scientist has an ideology that is very similar to that of the mainstream economist. For the latter, the defining axiom is 'what you can't count, doesn't count'. And whatever is external to the monetary transaction between buyer and seller, is, well, an 'externality', a problem for some softer -ology, but not for those who make the decisions that count. Throw in the folk-belief that 'greed is good' and you have all the makings of the Crunch.

Mainstream, neoliberal economics is handmaiden of predatory neoliberal corporate power, and paleonormal scientists are the assembly-line workers in its knowledge factories. Academics who ask awkward questions will risk having a hard time; technical employees don't even have the right to do so. Outworkers in academe are not in a very different situation, and their paleonormal ideology ensures that they will be relatively contented with their lot. They are only solving puzzles, and where the problems come from, and what happens to their solutions, is no concern of theirs. The patron saint of paleonormal science is Tom Lehrer's Wernher von Braun: "I send rockets up / And where they come down / Is no business of mine / Says Wernher von Braun".

A vivid description of the perils of Paleo-Normal Science can be found in the book *Intervention: Confronting the Real Risks of Genetic Engineering and Life on a Biotech Planet* by Denise Caruso. Any lingering sentiments of 'Surely They wouldn't...' are effectively dispelled by her analysis. Health, safety, elementary prudence, are all 'external' to the science practiced in the major corporations. Is all this hard to believe? Then just ask, what are the grounds for believing that the science of major industrial concerns in agribusiness is conducted on more ethical lines than those of big tobacco, big pharma, and big finance? And these activities maintain their plausibility only because of the persistence of paleonormal science as a set of attitudes and expectations.

Given all that bad news, what remains to be said about corruption? Can't paleonormal science just be accepted as doing its own thing, however out of joint with what it should be? Corruption enters the picture because of the mismatch between the confected world of Paleo-Normal Science and the realities experienced by anyone with a concern for society or the environment. In the real world, uncertainty, complexity, unintended consequences and mixed motives are essential aspects of the policy scene. When theory and practice are so radically different, adjustments must be made informally, perhaps even covertly or under Denial. This informal sector of knowledge is where humanity and creativity can flourish, but where also corruption finds a haven. It is possible for research scientists to have the highest level of personal dedication and integrity, while being forced to pronounce and believe things that others see as patently false. They are victims of the 'Surely They wouldn't ...' syndrome. Of course, somewhere along the line, among policy advisors or regulators, sordid realities must intrude. Then we have the seeds of later scandals in safety, health and the environment.

Clearly, the best protection for science against the paleo-normal condition is a lively post-normal presence. When members of the Extended Peer Community can force the attention of scientists and the public to their questions of "What about ...?" and "What if ...?", the light of awareness penetrates to the darker corners of scientific self-deception, and the corrupting tendencies of paleo-normal science are contained.