CROSSROADS
An interdisciplinary journal for the study of history, philosophy, religion and classics

VOLUME III ISSUE I 2008
ISSN: 1833-878X
Pages 64-68

Short Essay Competition

Postgraduate Section – Commendation

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In Defence of Einstein

ABSTRACT

Einstein's views about nuclear power are often misrepresented in the print media. I argue that Einstein had something important to say on the issue even though it is outside the area of physics in which he made his revolutionary discoveries.

BIOGRAPHY

Gerald has recently had his Doctoral thesis in philosophy at the University of Queensland marked, and is hoping to teach and publish in his areas of interest which are metaphysics, radical political theory and DIY culture.

IN DEFENCE OF EINSTEIN

> Einstein was gone
> His enormous organ
> Would never again say "*guten morgen*"[i]

Amid the hype that surrounds Einstein as the disheveled Elvis Presley of physical theory, it would be a mistake to overlook the contributions Einstein made to the nuclear power debate in demanding transparency and public control. Einstein, everyone is aware, left us a tremendous scientific legacy in the Theories of Relativity. Many are also aware that these theories are not directly concerned with nuclear power generation, but rather with gravity, time and space. As the twentieth century's guru of bathos, Einstein understood the cosmos as no-one ever before had, and then rode a pushbike as if he were Charlie Chaplain, all the while poking out his tongue. As the cheering around centenary of the publication of his breakthrough 1905 papers dies down, some have suggested that the side of Einstein that captured such public attention was not serious, and that he conjectured randomly and irresponsibly about important social issues. However, the more deeply we understand what might be termed Einstein's "frame of reference," the more we find he can tell us not just about the forces that interact in the darkness of outer space, but of those at work on the space-time of our own global village.

Mass print media everywhere seems to pride itself on its own bathos, sliding between the emotive tabloid style declaiming on one aspect of a story, and a "highbrow" approach that relies more on argument. Traditionally, the latter caters to a smaller group of educated readers, the former has broader appeal. We certainly cannot claim that the respective positions are therefore diverse, and in the absence of divergence, we might ask about the relationship between the styles. To begin, more thoughtful material provides the security of argumentative background upon which to rest controversial and unsubstantiated claims. This includes claims about the environment, and it is here Einstein has made an appearance. Attacking Einstein's position on public accountability and control of nuclear power generation, Stephen Matchett's "Theory on Einstein"[ii] is a premier example of a piece positioned to support less-argued editorials and op-eds. Before considering it, let us examine the print media landscape further.

Tabloids are in need of assistance. They often do little more than declare that nuclear power is a nostrum for escalating environmental ills. Locally (and the issue has added importance in Australia due to uranium deposits), examples can be found in most papers, including the *Australian*, despite its higher-brow reputation, and usually excluding the *Courier-Mail*, despite its reputation for stabling print media shock-jocks. What little tabloid argument there is revolves around the claim that nuclear power generation does not create as much greenhouse emissions as fossil fuels, and so should be preferred as a method of generating power. Neglected are concerns such as whether or not, if we factor in the entire process of the mining and distribution of uranium, the construction of reactors and the decommissioning process, there are not more emissions overall. The concern that power generation might play in making nuclear arms races more viable is subject to a rule of *omerta*; the waste disposal is almost as taboo, while the impact on an Aboriginal community of having an open-cut uranium mine next door stands little chance of mention. So it is assumed to be unnecessary to dwell upon the neglect of renewable energy alternatives. This blinkered appeal to only one relevant component of debate is partially carried off by fetishising emissions costs at the point of purchase of kilowattage, and then scapegoating 100 mythically naïve anti-nukenics who are *not* to be heeded when contradicted by savvy nuclear-industry types.

Enter Einstein stage left. Einstein was a master of the pithy saw that could appeal to a print media audience. In *Decision* magazine and *The New York Times Magazine* in 1946 Einstein famously stated 'to the village square we must carry the facts of atomic energy.'[iii] Given the egalitarian content here, it is easy to suspect he was also intervening in more thoughtful print media in order to help sway a wider audience.

This 'let the people decide' position has been misrepresented, providing us with an example of how Einstein's popular image as a larger-than life maverick can overwhelm the fine print. In "Einstein has Left the Building" (note the Elvis reference), John Horgan writes: 'Einstein took advantage of his fame to speak out on nuclear weapons, [and] nuclear power.'[iv] But while Einstein agitated for the abolition of all nuclear weapons, joining Bertrand Russell's "Committee of 100," on the question of nuclear power Horgan's article wrongly creates the impression of simple opposition. Whatever else Einstein thought, he insisted that the public know all the facts, and then they decide how much, if any, nuclear power is to be generated. As we understand more deeply Einstein's "frame of reference," it will turn out we are entitled to conclude that he believed a well-informed public would prohibit nuclear power generation. But, irrespective of that conclusion, Einstein's primary demand is for transparent debate and public control of nuclear technology. Horgan has used Einstein's high-profile

activity to blunt the point, a move made easier by the idea that Einstein acted apparently without justification once he stepped down from his sublime window onto the cosmos.

If Einstein had ongoing success in helping sway a wider audience, any results today would change, not support, tabloid editorialising. Industry experts are necessarily a part, not the whole of the public, and Einstein wants the latter to make the decisions, not the former. Events since Einstein's death have impacted on public consciousness in a way that threaten to render the current tabloid line implausible, and create a demand for more argued material, and eventually more public input. Three Mile Island and Chernobyl showed that nuclear power generation involves the kind of risks that gives the people a driving interest in deciding what should be done. Further, experts on the construction of nuclear power stations are unlikely to be experts in the other areas that we must acknowledge beyond the fetishised point of sale of kilowattage.

Einstein and the public seem to be right to demand more say, but a tension arises when both parties also seem to be out of their depth. Everyone recognises the eccentric hair style, but not many people would recognise the equations by which the theory of relativity dealt with the Lorenz Contractions. Equally, Einstein may have thought that his popularity meant that the public could understand, and wanted to understand, the risks, but besides panels of experts, how many people will ever have the time, ability or even the inclination to determine whether a proposed nuclear power station will be safe or not? And did Einstein himself?

Matchett uses this tension more subtly than Horgan. With an arrogance born of his highbrow position in print media, Matchett is skimpy on historical and theoretical background, so it is useful to flesh out his potentially influential line of thinking. Matchett agrees with C.P. Snow that the public are educated in literature, not science. As a result of this ignorance they "black box" technology—taking for granted it will work without knowing exactly how. This raises the suggestion that nuclear technology is just another form of benign technology, and should be approached the same as any other innovation. Scientific experts in the nuclear industry reassure us that nuclear energy is safe. For Matchett, that justifies the use of nuclear technology.

In arguing Einstein's own expertise in physical theory prevented him from recognizing this, Matchett has in mind T.S. Kuhn's influential 1962 work *The Structure of Scientific Revolutions*.[v] For Kuhn reliance on textbooks indicates widespread acceptance of particular problems and research techniques in mature science. Kuhn terms these unifying structures 'paradigms.' The study of paradigms allows a student to become the fully-fledged practitioner of a science—the paradigm is a model that scientists further articulate and specify in relation to various cases. Instead of seeking novelty, the humdrum work of what Kuhn terms 'ordinary' science is to flesh out the paradigm, to apply it accurately to real situations.

For Kuhn, acute problems sooner or later dog any normal scientific paradigm. Problem-solving on some problems stalls, either intractably, or requiring *ad hoc* amendments for the proposed solutions to remain aligned with the paradigm proper. Ptolemaic astronomy is a classic case, suffering from an increasing number of epicycles. The late-19th-century physics Einstein inherited was awkward too. For instance, it postulated an undetectable omnipresent ether. What Kuhn terms 'revolutionary' science offers solutions in a scientific framework incommensurable with the old way of thinking. This new paradigm must meet the serious obstacle of debate between new and old, one which is conducted in incompatible languages. Winning adherents by convincing them its language is preferable, the new paradigm eventually ceases to be revolutionary and is specified and applied as normal science. On a Kuhnian reading, Einstein was revolutionary in this way.

What can there be outside the entrenched paradigm that gives the scientist the scientific language she speaks? Kuhn thinks that chance plays a critical role in accessing a new language. Some idea that is out of the ordinary, and that would not usually be associated with the problematic at hand, intrudes upon the scientist's consciousness. This gives her an insight into a brand new language, and the beginnings of a paradigm that can challenge the entrenched one. Einstein had dreamt of trains. In this dream, the motion of the trains was relative to each other, just as sometimes a passenger might think that it is the station moving and not the train that is pulling away. Enlivened by the dream, Einstein could imagine a universe in which space and time were relative to other factors, not absolute facts.

Matchett's idea that Einstein did not properly respect nuclear technicians is informed by this difference between normal and revolutionary science. Just as the cosmos spoke to the sublime Einstein in a dream, so Matchett finds Einstein to be a dreamer. His mind had already trod, and would continue to tread, Empyrean heights. Einstein did not have the attention to the banal that is required for the normal science of designing a nuclear power plant and solving nuclear waste disposal problems. He did not realise how capable normal scientists were of solving problems, and so was led to encourage the general public to scrutinise and even usurp the nuclear

power expert. This is Einstein as the first celebrity scientist. He was listened to because he was a media phenomenon and because his public knew little of science, not because he understood the practical problems. Matchett can then also create the impression that if Einstein the scientist had learned humility by reading about human finitude found in literary culture, he would have felt easier trusting nuclear technicians to get on with their workaday scientific tasks.

To assess this theory of Einstein we might work backwards from this last striking claim. A throw-away "Einsteinism" was that 'gravity cannot be blamed for people falling in love.'[vi] Note that Einstein does not here rule out a literary explanation of people falling in love. We find one in John Donne, for whom the excitement surrounding the explorers of his time renews the excitement of exploring another person, as though they too are an undiscovered continent. Einstein also believed knowledge of the world could impart a true *joie de vivre*, pervasive enough to colour all facets of life. Thus, in his recent high-impact attack on religion, *The God Delusion*, Richard Dawkins mourns the fact that literary culture has all too often in the past turned to traditional theism to for inspiration.[vii] Dawkins looks to Einstein as an earlier version of a new trend, one in which science takes the place of religion as a muse, and in so doing bring the artist and scientist together. This is at odds with Matchett's thumbnail impression of Einstein as unaware of the influence of literary culture. As for the virtue of humility, Einstein would surprise new colleagues by asking them to slow down; apparently he was a slow learner.

What then of the idea that as a cosmic-oracle-*cum*-revolutionary-scientist Einstein did not properly value the tellurian expert who could design or run a nuclear power station? There remains also something not-quite-right about explaining the appeal of Einstein's position that the people should decide as solely dependant on his fame. True, the "village square" position is best known via the relevant quotable quote, but somehow Einstein's understanding of science captured people's attention. Later, parallel in time to the development of a mass print media, there formed a public image of zany photographic portraiture and captivating *bon mots*.

So let us consider Einstein's scientific praxis. The assumption that some images are both totally out of the ordinary and have an application that leads to extra-ordinary results allows Horgan to write that Einstein's theories 'resonated with the disorienting work of creative visionaries like Picasso.'[viii] For Picasso, as for any surrealist, everyday people edit out a tremendous amount of imagery to get by in the rat race. There are chance-driven ways to let the flood of images back in, including by recording dream imagery. But the surrealists found much of the flood was random noise rather than masterpieces. Painter Jacqueline Lamba famously recommended you take the garbage can along if you wanted to go about exploring it, and Einstein also had to select only a few ideas that could break with the established paradigm of 19th-century physics. As the surrealists stressed, the dreams of even a single individual could be written up as a huge and esoteric tome. For Kuhn, it is only after constant frustrating confrontation with a problem that chance may provide a scientist with a brand new way of coming to terms with repeated frustration. To be selective, Einstein had to be aware of the strengths as well as the weaknesses of late 19th-century physics. He was a dwarf standing on the shoulders of giants.

Of course, Matchett could point out that Einstein may not have had the same respect for the normal science that gives us nuclear technicians as he did for 19th-century physics. Einstein never contested 20th-century normal science in a revolutionary manner. But Einstein ought to respect such science—he heavily informed what came after 1905. While his effect on the science that produces and runs nuclear reactors is indirect, it is powerful; every schoolkid knows the equation "e=mc^2." It is hard to believe that Einstein thought the normal scientists working in physical theory were lesser persons because of such a revolution. A more plausible reason than Matchett's as to why Einstein distrusted the experts is now in order.

Science does not occur in a supervoid, and the results of it do not vanish down a black hole. Revolutionary scientists can indeed neglect this. Heisenberg tried to build the a-bomb for Hitler; Oppenheimer regretted creating his "deadly toy." However Einstein had a "frame of reference" that not only respected normal science, but that we will find grounded it socially so as to avoid tragic naïveté. Kuhnian paradigms remind us that only by participating in a community of scientists sustained by an entire society can anyone be a scientist. The paradigm relies on funding and educational policies, and these in turn rely upon broader social policies.

Einstein had a sufficiently rich frame of reference to isolate problems that can then arise for the scientist. In "Why Socialism?"[ix] Einstein argues that the free market pressures people to act in ways they normatively consider abhorrent. Einstein gestures at two levels. On an international level, bands of competitors with shared interests need to access customers and cheap resources and labour. Unfortunately, so do other bands. We can think of the ruthless geopolitics of Asia from the 1950s-70s; state run eastern monopolies postured and jostled with Western multinationals for rights to an entire continent. On a local level, competing businesses must

structure their daily operations to stay as far as possible in the black, and those handling the most dangerous of substances are not miraculously exempt from such pressure.

"Why Socialism?" is not directly concerned with the nuclear industry, but it does tell us about the rich frame of reference from which Einstein appraised workaday nuclear power generation. On an international level, the sale of fissile material to the highest bidder and subsequent aggressive "brinksmanship" are unbearably tempting. On a local level so is cost cutting around safety in (power) production. So, for a quite down-to-earth reason, Einstein described the nuclear power industry as "ghostly." The spooky influences of competitive dictates act from a distance, however good the plans for nuclear reactors. And Einstein was always adamant we should regard such long-distance activity with inquisitive suspicion.

From this Einsteinian frame of reference, Heisenberg and Oppenheimer remain better examples of revolutionaries who lost touch with the normal science than Einstein himself, even if (on what was argued) they must have once been more in touch with normal science to be revolutionary. Instead of forming a richer frame of reference from which to understand normal science, both retreated to airy castles, one quite literally. Normal scientists may well do the same, and those in the nuclear industry can not automatically be trusted. Their paradigm is grounded in funding mechanisms beholden to that industry, and they may fail to realise, or fail to care, what the industrial pressures on their practice will be.

Horgan and Matchett show us it is easy to elide the depth of Einstein's engagement with the public, whereupon Einstein's argument that the public engage disappears or seems absurd. But, despite this, Einstein's worries have entered public opinion. To cut costs, Mr. Burns can be found rolling barrels of glowing green slime into the Springfield waterway. The question then remains: who we are going to let play dice with out part of the universe?

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