BEN CULLEN

Ben Cullen died eight years ago today in Cardigan, Wales. He was only 31.

He had the same birthday as my daughter Molly; died on my parents wedding day.

He was a great friend.

Ben's big idea was that biological organisms and things are not always as radically different as we usually hold. Viral phenomena seem to be in an class of their own, and cognitive science has explored many examples of artificial intelligence that are not living or conscious, but display traits that we would consider as such (I am reading Daniel Dennett's *Freedom Evolves* at the moment – another work drawing on such ideas of emergence and complexity). People are often legitimately classifiable as objects (subjects of research perhaps), and many things are very active in society and culture.

This is not anthropomorphism or some kind of materialist reductionism. It is to deny the radical opposition of consciousness and materiality, people and things.

Here is his paper for the symposium *The Evolution of Complexity: Evolutionary and cybernetic foundations for transdisciplinary integration* – Parasite ecology and the evolution of religion. Wonderful.

Across the river from St Dogmaels. John Knapp-Fisher

Parasite Ecology and the Evolution of Religion

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Abstract: It is argued that the blanket view of religion as a disease, advocated by Dawkins, is inconsistent with the principles of parasite ecology. These principles state that vertically transmitted parasites evolve towards benign, symbiotic states, while horizontally transmitted parasites increase their virulence. Most of the world's established religions are transmitted vertically, from parents to children, and are therefore expected to be benign towards their hosts. Yet, certain horizontally transmitted cults, such as the Aum Shinrikyo, seem to effectively exploit their hosts in a way similar to an infectious disease.

Foreword by the editor

On December 29, 1995, while preparing this paper for publication, Ben Cullen unexpectedly died, apparently from an arrhythmea of the heart. This paper was one of two wonderful presentations which he had given at the conference "Einstein Meets Magritte" the previous summer. The unfinished manuscript consisted basically of the text he had read aloud during his presentation, which means that it lacked the structure typical of texts meant for publication. Therefore, I have edited the manuscript by dividing it into paragraphs and sections, eliminating references to photographs projected during the presentation, adding an abstract and bibliography, and correcting various small errors.

Let me elaborate why I find it important for Ben's work to be brought to the attention of the public. An Australian born in 1964, Ben Cullen graduated from the University of Sydney in 1987, with a degree in Prehistoric Archeology. After a stay as Research Fellow at the University of Wales, Lampeter, he moved to the Queen's University of Belfast a few months before his death. He had just defended his PhD thesis in archeology, in which he developed his "Cultural Virus Theory" (Cullen, 1993, 1995c, 1996), a stimulating new model of the evolution of culture, reminiscent of, but distinct from, the memetics view proposed by Dawkins (1989).

I met him in 1992 in London at a conference, where we were both presenting models of cultural evolution. We were obviously on the same wave length and had several long discussions after the lectures. I was impressed by his sharp intellect and the

depth of his knowledge and understanding. Afterwards, we kept in touch by exchanging papers. Just a few weeks before his death, he sent me a preprint (Cullen, 1995) which he asked me to “really read, not like some others”, which I interpreted to mean that many people misinterpret his ideas. There does not seem to be much danger of misinterpretation with the following paper, which is a jewel of clarity and simplicity.

Francis Heylighen

Introduction

There has been much recent publicity of the idea of religion and chain letters being diseases of the mind, or human information parasites as they are sometimes termed. Prominent amongst these have been pieces by the biologist Richard Dawkins in the London press, and also a piece about the St. Jude Chain Letter in a letter published recently in the leading scientific journal Nature. (Goodenough & Dawkins, 1994). Headlines such as the one about the ‘St Jude’ mind virus, have not excited a great deal of controversy, presumably because few people publically identify with chain letters.

However, other headlines, such as “Is Religion Just A Disease?” in the Daily Telegraph (Dawkins, 1993b), have excited a great deal of vociferous debate, and pricked many egos. Richard Dawkins’s view of religion (1993a,b) as a disease not surprisingly offended members of the Church of England, and various bishops wrote pieces condemning both Dawkins and his view. But most objections to the “religion as a disease” idea have come from the Church acting in self-defense, guarding its cultural capital so to speak. Most defences have come from theologians who submit the general idea that Dawkins is discussing spiritual matters beyond his understanding, a predictable theologian response. Very few objections have come from the sciences, human or otherwise. Few articles have explicitly disputed the scientific credentials of the Dawkins view, or the neo-Darwinian logic behind it.

In this paper I intend to go against this trend, and argue against the “religion as a disease” position, on the grounds that Dawkins has not manipulated neo-Darwinian logic consistently. In other words, I will argue that Dawkins has erected a highly personal view of religion which is in complete conflict with both his own selfish gene theories (Dawkins, 1989), and a growing body of parasite research.

Principles of Parasite Ecology

Let me enumerate the basic principles emerging in recent parasite ecology, the rules which the Dawkins view of religion are in direct conflict with, yet also the rules which Dawkins himself helped to articulate.

The first rule is that vertically transmitted parasites, namely, those that tend to pass from parent to child, evolve toward decreasing virulence, ultimately approaching benign or symbiotic configurations. Vertically transmitted parasites find themselves in the same sequence of bodies as the genes of their hosts, generation after generation, and the two therefore share a common future. They are in the same evolutionary boat, so to speak, and if the boat sinks, both parties drown.

One classic example of this type of relationship is that between wood-boring ambrosia beetles and bacteria, an example which Dawkins has featured in discussions of this nature. The bacteria are entirely dependent upon the beetles for food and shelter, and live their entire lives inside beetle tissue, being carried into the next generation inside the eggs which the females lay. This route to the future, however, ensures that they pass from each parent beetle to the beetle’s offspring, and they are, therefore, vertically transmitted. Thus the rule would predict that these bacteria should be symbiotic, and indeed they are, as without them the beetles would be unable to reproduce. This is because male beetles can only develop from eggs in which the bacteria are present. Without the bacteria the beetles would be a race of female individuals who could only reproduce through sexual reproduction, a difficult situation at the best of times.

This general rule linking symbiosis with long term host/parasite cohabitation and vertical transmission also finds support elsewhere, particularly in the field of “Darwinian medicine” (Nesse & Williams, 1995), and in the work of researchers such as Paul Ewald (1990, 1995). For instance, it has been shown that new and less virulent strains of the AIDS virus are proving more successful in human populations where condoms are frequently used, and where viruses therefore have to spend longer periods of time in each host (Ewald, 1994).

Rule number 2 is simply the reverse of Rule number 1. Disease is often connected to horizontal modes of transmission, where parasites are transmitted indiscriminately

with respect to host relationships. Horizontally transmitted parasites are as likely to be passed on between families as within families. Parasites of this kind tend to evolve toward a typical “disease” configuration. The presence of the parasite significantly alters the host body or behaviour in such a way as to improve the parasite’s chances of reproduction, and decrease that of the host. Curiously, this may involve enhancing the host’s chances of survival, while preventing its reproduction, in an attempt to produce a thriving parasite factory. Some barnacles, for example, parasitize crabs by targeting the crab’s sex organs first, and the vital organs last, so maintaining a living resource for the parasite for as long as possible.

One of the most spectacular parasites of all is not an animal, but a plant which hunts other plants. It too is horizontally transmitted, and conforms to the rule. The corpse flower, or Rafflesia, is a family of plants so called because many of them exude a smell of rotting meat, mimicking the smell, colour and texture of a corpse. At 30 to 40 inches or about 1 metre across, it is the largest known single flower, and one of the most extraordinary predators of the plant world. It is an inhabitant of the rainforests of Borneo and Sumatra. The corpse flower has no leaves, no stem, no roots or trunk. It actually lives inside the tissues of another plant, one of the many vines which grow so abundantly in the rainforest canopy, as a net of tiny threads. How it actually gets inside these vines is not known. Thus the stem from which this truly monstrous flower grows does not belong to the flower, but to rafflesia’s victim. Once the parasitic flower grows to its full size, the host vine has usually collapsed into the leaf litter of the forest, and is hidden from view.

The corpse flower is an excellent example of a predator which stalks its prey from within, biding its time in the body of the host vine, before leaping to new victims by means of its extraordinary flowers. To move through the forest, it enlists the help of tree shrews (small arboreal mammals) and insects. Viewed from the inside, the corpse flower is even more remarkable. Exuding a powerful aroma similar to a pile of fish after three days in the hot sun, it not surprisingly attracts flies. The flies crawl down to the sex organs, and there they are daubed with pollen which may then be carried to female flowers. The female flowers produce seeds which are then transported by small tree shrews to new vine hosts, elsewhere in the rainforest.

Religions as Parasites

Rafflesia is particularly relevant to the “religion as a disease” debate because it represents a rare example of a large predator that inhabits the bodies of its prey. It allows us to begin to imagine how an organisation such as a religion could be seen as a life form which inhabits the bodies of people, in the same way that rafflesia inhabits the bodies of rainforest vines. Anatomically, the corpse flower and cultural life forms have much more in common than one might expect.

This is a representation of the anatomy of a religion and its material products, in this case the megalithic tombs of Neolithic western Europe (Cullen, 1994). The outer ring of structures represent megaliths, but they could just as well be churches, or mosques or cathedrals. The central structures of the religion are composed of people, which are represented by the figure in the bottom corner—a circle for a head and a monk’s robe for the body. There is an outer ring of acolytes or novices, whose heads are represented by circles A, B, C, and D their bodies by a robe, and the actions they perform in service of the religion by arrows. Finally there is an inner circle of priests or clergy, whose heads are represented by circles 1, 2, 3, and 4, their bodies by robes, and their actions by arrows. The religion or cultural organism consists solely of the shaded black areas and their material products – the people involved in the organisation may perform many other roles in society, some of these roles might work against the religion. So this schematic diagram gives us some idea of what a cultural life form looks like.

Now, using the rules of parasite ecology discussed a little earlier, we can begin to predict which religions will evolve toward disease-like states, and which religions should evolve toward benign or symbiotic states. Vertically transmitted religions, like vertically transmitted viruses and other parasites, should evolve toward symbiotic or benign states. This immediately disqualifies most of the world’s established religions from the “disease” scenario, because they are generally passed on from generation to generation within the family. Family dependent religious affiliation should therefore evolve toward benign or symbiotic configurations. Dawkins actually points out the vertically transmitted nature of religions, although he does not connect it to any prediction of symbiosis.

For the same reasons, we would expect the religions of small scale, kinship based

societies, such as those of indigenous Australian cultures and their associated artistic traditions, to evolve toward symbiotic configurations. When a religion occupies of small community in which members of subsequent generations are of close genetic relationship to previous generations, a pathological religion would tend to plunge itself and its community into oblivion.

But this is not to say that there can be no such thing as a parasitic religion. However, if we are to find a truly pathological religion, we will have to look for examples where the pattern of transmission is horizontal, or essentially indiscriminate with respect to genetic relatedness of new recruits. Established world religions cannot be totally excluded from the picture, as while congregational membership may be essentially vertically transmitted, membership of the priesthood is not so rigid. Nor can the religions of kinship based communities be totally excluded, as kinship is often employed as a means of social categorisation for both strangers or newcomers and family alike. So called "fictive" kinship of this kind can and often does follow a line of descent which does not conform to strict lines of genetic inheritance. So we might expect occasional parasitic forms of religion to arise in the established traditions.

But are there any more dramatic examples around? I think that we may not have to look too far. Religious cults would appear to be a good candidate. Chizuo Matsumoto, better known as Shoko Asahara, is the leader of the doomsday cult of Aum Shinrikyo or Way of the Divine Truth. The Way of the Divine Truth organisation was apparently responsible for the recent nerve gas attack on the Tokyo subway system.

The Aum Shinrikyo doomsday cult undoubtedly follows a horizontal pattern of transmission, selecting its recruits more for what they can do for the cult than for their relatedness to existing members. The rate at which it acquired members, many of them outside Japan, is testimony to the non-vertical nature of its reproduction. In the space of a decade or so, the cult acquired some 30,000 members in Russia, presumably none of them related to Asahara himself. Within Japan the cult boasted a surprising number of members from all walks of life. Asahara carefully chose the most talented individuals for his priests, recruiting lawyers, scientists, chemists and engineers. With so many thousands of members in such a short time, it is clear that the cult did not rely on the fecundity of its members for its expansion. Clearly, then, the Aum Shinrikyo doomsday cult was a horizontally transmitted phenomenon.

Parasite ecology, then, would predict that it would exploit some or all of its members. Is there any evidence of this? It would appear that there was. One recruit had to provide a list of her assets and promise that they would be passed over to the cult on her death. The most privileged were allowed to drink Asahara's blood or semen, but actually had to pay an incredible 74,000 pounds for the pleasure. Cult members received very little in return for these immense financial contributions to the cult. Apart from the lucky few allowed to drink a little blood or semen, they received dormitory or boarding school style accommodation, and two meagre vegetarian meals per day. The 53 children moved from the cult's commune proved to be suffering from severe malnutrition, while Asahara himself lived in luxury. An older recruit related how he was told to drink several gallons of water and vomit them as part of his training. So it would seem that the Aum Shinrikyo doomsday cult of Shoko Asahara does indeed conform to principles of parasite ecology.

In conclusion, then, it would appear that the blanket view of religion as a disease, as advocated by Dawkins (1993a,b), is not consistent with recent research into the nature of parasite evolution. Many religions are being vertically transmitted or family dependent, and we would therefore expect them to evolve toward symbiosis or at least benignness. As Dawkins has remarked, it is an extraordinary fact that if we adhere to a faith at all, it is overwhelmingly likely to be the same as that of our parents. This simple fact ought to ensure that if a religion which followed this pattern of transmission ruthlessly exploited its congregation, it would eventually plunge both itself and its people into extinction.

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