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# Economics and Fossil Fuel Dependency: An Analogy from Biology

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An economy is the management of the concerns and resources of a community. Can some light be shed on this management by a study of a non-human animal's interaction with its resources? This would seem probable as, after all, humans are also animals. I will take the interaction of a bird and an intervening new food source as an example. It is the principle behind this interaction that is important to my analogy rather than the example itself. Other examples could fill the same purpose.

Imagine an island with a community of flora and fauna. An exotic plant arrives whose flowers contain a rich nectar. Biological theory dictates that there is now a strong 'selection pressure' towards the utilization of this resource. Animals 'moving' in this direction suffer no competition as there are no other animals currently using this food source. Say a bird that previously utilized a number of sources of nectar now predominately uses the new source of nectar. As the plant was in the process of colonizing the island, its increasing numbers gave an increasing source of nectar. Subsequently the population of our new specialist bird also grew.

Animals will move in the direction of a new food source as they select - consciously or unconsciously - that direction which is best for their survival, or at least what they perceived is best for their survival, in their immediate environment. Similarly with humans. The use of horses for ploughing allowed more food to be produced in ratio to human effort. Later, wood put into steam engines allowed an even greater ratio. Fossil fuels soon replaced wood. Horses, wood and fossil fuels are sources of nectar that became available to humans. Humans in using these fuels followed a selection pressure in that direction. Their use eased our survival in the environment at that time. By moving in this way, personal work that would have been necessary for living (such as obtaining food and shelter) was done instead, partially or wholly, by external instruments. This transferral of work to the human environment allowed an increase in food production with a subsequent growth in the population. An increasing growth needed an increasing use of fossil fuels.

We must now consider what this analogy will tell us about firstly, any gradual extinction of the nectar-supplying exotic plant and, secondly, a sudden extinction. With a gradual extinction, the selection pressure will be reversed. Those birds that had become dependent on the nectar will find themselves spending more and more time searching for the flower and through this, other sources of food may seem more favourable. As the plant becomes rarer and rarer the birds rely on it less and less. When the plant has vanished, given that other environmental conditions remained constant during the plant's invasion, the birds

should be back approximately to their condition before the original invasion. The other possibility, a sudden extinction of the plant, may result in the sudden extinction of all those birds whose life has become substantially dependent on the plant. Sudden environmental change is thought to be the prime force causing redistribution, extinction and birth of new species. If, in our case, the nectar producing plant disappears, the more sudden the disappearance, the more likely it is that any specialist species dependent on that plant will also disappear.

The nectar was a resource that, through its decline, threatened the viability of the specialist bird. Similarly, as we are coming to the end of fossil fuels (or as least, finding increasing difficulty in obtaining them) it follows then that we should be lessening our reliance on them to avoid this threat. In other words, because we have specialized in the use of fossil fuels, when they disappear we will be left with a system that requires a large energy throughput, but without that energy source to maintain it (I discount here the use of nuclear fuels as few countries see it as a viable alternative). While environmentalists are advocating a move away from fossil fuels to cyclic fuels (solar, wind, tidal, hydroelectric, ethanol, and so on), economists still suggest that further growth in the economy is necessary. As almost everything is made or carried, either directly or indirectly, by the energy derived from fossil fuels, a suggestion of growth is a suggestion of increased use of fossil fuels. If the analogy advanced above holds, it follows that this is the exact opposite of the direction that we should be taking. Perhaps this underlies the danger of making decisions based on what is economically best in the immediate environment.

A further irony of this situation is that, through the use of fossil fuels, a climate change may be effected that could cause our entrapment as a direct consequence of our specialization in the use of these fuels. This is equivalent, in our analogy, of the nectar producing plant going to extinction and while doing this, in some way poisoning the environment in which the birds live. The birds, in abandoning the declining exotic plant's nectar, must return to the nectar from the original plants. As these original plants also live in the environment being polluted, the birds' situation is made even more perilous. They may go extinct if they cannot readapt to their original (or degraded) environment. Certainly a loss of the supply of nectar will decrease their numbers.

The human species is at or near the peak of fossil fuel consumption and there is a growing movement of people recognizing the need to diminish its use. This mutinous movement is resisted by the shear inertia of our many different behaviours and philosophies characteristic of existing human cultures. The ability to embrace this new movement will be a measure of human adaptability to changing environments.

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