

The Bee Hive: Controlling Environmental Temperature with No Brains*

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Bees are very vulnerable to small changes in temperature within a hive – as vulnerable, for example, as humankind is to small changes in global mean temperature. Violent fluctuations in hive temperature could be fatal to bees, just as global heating is already having adverse effects upon agricultural productivity. For honey-bees, "temperature modifies their reactions more than any other [climate] factor" (Dunham 1931). Maintaining hive temperature is a colony activity involving large numbers of individuals (Dunham 1931).

Humankind is not facing changes in temperature (climate) as a colony (globally) because it worries about the cost of reducing greenhouse gas emissions (e.g., Eilperin 2009) and the effect of doing so on economic growth (e.g., Jung 2009). This viewpoint exists despite the deleterious effects of economic growth on the biosphere. Both the honey-bee economy and the human economy are dependent upon the biosphere. Even though the United States should take the lead in climate negotiations, "President Obama's top climate and energy official said . . . that there was virtually no chance that Congress would have a climate and energy bill ready for him to sign before negotiations on a global climate treaty begin in December in Copenhagen" (Revkin 2009).

Bees have existed for 100 million years (Goudaryi 2006) without a brain, but *Homo sapiens* (humans) may commit suicide with excessive greenhouse gas emissions after a mere 160,000-200,000 years despite having a brain. Brains have enabled scientists to provide evidence that rising greenhouse gas emissions could destabilize the climate to a degree that would prove devastating to agriculture (Dumanoski 2009). Shouldn't humankind's intelligence enable it to grasp the catastrophe that will result if "business as usual" continues? Greenhouse gas emissions could be markedly reduced if humankind had the will to do so.

If a catastrophe affects human society, the human economy will probably not survive in any semblance to its present form. Global climate change has already adversely affected the biosphere, which produces the natural resources on which the human economy is based. The biosphere also constitutes Earth's life support system. Humans are a part of the biosphere. The human economy is a subset of the biosphere, without which it could not survive. Perhaps some day humankind will understand this relationship.

If humankind wishes to persist as long as the honey-bee, it would benefit from observing the model of a species with no brain – which knows how to regulate the temperature upon which its survival depends.

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