Adaptability

**Despite the massive variation in nature’s security systems, all of their solution’s follow from one very straightforward concept: adaptability. Adaptation arises from leaving (or being forced from) one’s comfort zone. Accordingly, it’s understandable that we might be a little resistant to dive into this strange world where reacting to the previous crisis is no longer good enough and making vague predictions of the future no longer counts as “doing something.” It’s natural that we’d come up with all sorts of excuses for why we can’t be more adaptable. But one of the results of using nature – with it’s relentless ability to solve problems and neutralize unpredictable threats – as a template for adaptability is that it weakens almost every excuse we have for not becoming more adaptable. (Rafe Sagarin, in Learning From the Octopus, as it appeared in The Week magazine, March 23, 2012)**

**Fish don’t try to turn sharks into vegetarians. Living immersed in a world of constant risk forces the fish to develop multiple ways to live with risk, rather than try to eliminate it. The fish can dash away from the shark in a burst of speed, live in places sharks can’t reach, use deceptive coloration to hide from the dark, form schools with other fish to confuse the shark – it can even form an alliance with the shark. All of these things may help the fish solve the problem of how to avoid getting eaten by the shark. But none of these adaptations will help the fish solve the general problem of predation, and it doesn’t need to. The fish doesn’t have to be a perfect predator-avoidance machine. Like every single one of the countless organisms it shares a planet with, the fish just has to be good enough to survive and reproduce itself. (Rafe Sagarin, in Learning From the Octopus, as it appeared in The Week magazine, March 23, 2012)**

**In nature there are wings and eyes and claws and stingers and killer viruses and helpful bacteria, 13-year-long naps and 5,000-foot deep sea dives, suits of armor and solar energy factories, stolen poisons, and secret coded messages all working in some way to aid the adaptability and security of their owners. (Rafe Sagarin, in Learning From the Octopus, as it appeared in The Week magazine, March 23, 2012)**

**With its soft meaty body, the octopus is an attractive target for predators. So it constructs a protective den in the rocks, sometimes with a peephole for it keen eyes to peer out from. If good rocky crevices aren’t available, it will learn to use whatever is around it – a shell, an old crate, or the champagne bottle tossed decades ago from my adviser’s shipboard wedding just offshore from the Hopkins Marine Laboratory in Pacific Grove, California. An amazing video making the rounds on the Internet shows octopuses in Indonesia that have learned to forage the increased numbers of coconut shell discarded from tourist boats and pull together two halves to make a spherical suit of armor. (Rafe Sagarin, in Learning From the Octopus, as it appeared in The Week magazine, March 23, 2012)**

**Octopuses learn not only how to survive but how to thrive in almost any environment. Even in the barren, isolated tanks of a marine biology lab, colleagues have discovered octopuses escaping from their chambers and braving the dry air to scamper across a lab bench and find a snack in a nearby tank before returning to their own. (Rafe Sagarin, in Learning From the Octopus, as it appeared in The Week magazine, March 23, 2012)**

**Taken together, the octopus reveals almost all of the characteristics you would want in a biologically inspired adaptable security system. Its use of tools (the coconut shells) and its well-known ability to wreak havoc on laboratory containment systems show that it can learn from a changing environment. The rapidly changing skin cells show it has an adaptable organization in which a lot of power to detect and directly respond to changes in the environment is given to multiple agents that don’t have to do a lot of reporting and order-taking from a central brain. That it has an ink cloud and camouflage and a powerful bite that it uses both for offense and defense reveals its redundant and multi-functioning security measures. Its ability to deliberately stalk, surprise, and even kill prey much larger than itself shows that it can manipulate uncertainty for its own ends. Finally, its use of deadly bacteria in its own defense reveals that it uses symbiotic relationships to extend its own adaptive capabilities. Not all organisms in nature display these characteristics so prominently as the octopus, but all organisms use them to varying extents to survive and adapt. (Rafe Sagarin, in Learning From the Octopus, as it appeared in The Week magazine, March 23, 2012)**

**The overwhelming success of adaptation in nature practically shames us into at least trying. And everything that seems like a barrier to change has already been crossed in nature. We complain that our bureaucracies are too institutionalized to change, but even organisms whose outer appearance has remained steadfastly unchanged for millions of years can be highly adaptable by farming out that adaptable capacity to semi-independent parts, like immune cells and skin color pigment cells. We argue that there are people we just can’t work with or who will never come to peace with one another, but in nature the meekest organisms form beneficial symbiotic relationships with the most terrifying. We argue that we can’t have guns and butter, but every successful living thing already knows how to balance a way to defend itself, a way to nourish itself, and a way to reproduce itself. (Rafe Sagarin, in Learning From the Octopus, as it appeared in The Week magazine, March 23, 2012)**

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