

# OUR TRANSPA

What life in the primordial oceans can teach us about the



# RENT FUTURE

future of technology and society *By Daniel C. Dennett and Deb Roy*



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**M**ORE THAN HALF A BILLION YEARS AGO A SPECTACULARLY CREATIVE burst of biological innovation called the Cambrian Explosion occurred. In a geologic “instant” of several million years, organisms developed strikingly new body shapes, new organs, and new predation strategies and defenses against them. Evolutionary biologists disagree about what triggered this prodigious wave of novelty, but a particularly compelling hypothesis, advanced by University of Oxford zoologist Andrew Parker, is that light was the trigger. Parker proposes that around 543 million years ago, the chemistry of the shallow oceans and the atmosphere suddenly changed to become much more transparent. At the time, all animal life was confined to the oceans, and as soon as the daylight flooded in, eyesight became the best trick in the sea. As eyes rapidly evolved, so did the behaviors and equipment that responded to them.

Whereas before all perception was proximal—by contact or by sensed differences in chemical concentration or pressure waves—now animals could identify and track things at a distance. Predators could home in on their prey; prey could see the predators coming and take evasive action. Locomotion is a slow and stupid business until you have eyes to guide you, and eyes are useless if you cannot engage in locomotion, so perception and action evolved together in an arms race. This arms race drove much of the basic diversification of the tree of life we have today.

Parker's hypothesis about the Cambrian Explosion provides an excellent parallel for understanding a new, seemingly unrelated phenomenon: the spread of digital technology. Although advances in communications technology have transformed our world many times in the past—the invention of writing signaled the end of prehistory; the printing press sent waves of change through all the major institutions of society—digital technology could have a greater impact than anything that has

come before. It will enhance the powers of some individuals and organizations while subverting the powers of others, creating both opportunities and risks that could scarcely have been imagined a generation ago.

Through social media, the Internet has put global-scale communications tools in the hands of individuals. A wild new frontier has burst open. Services such as YouTube, Facebook, Twitter, Tumblr, Instagram, WhatsApp and SnapChat generate new media on a par with the telephone or television—and the speed with which these media are emerging is truly disruptive. It took decades for engineers to develop and deploy telephone and television networks, so organizations had some time to adapt. Today a social-media service can be developed in weeks, and hundreds of millions of people can be using it within months. This intense pace of innovation gives organizations no time to adapt to one medium before the arrival of the next.

The tremendous change in our world triggered by this

#### IN BRIEF

**Some 540 million years ago** the variety of organisms living in the primordial seas skyrocketed. One hypothesis is that the sudden transparency of the oceans drove this evolutionary frenzy.

**This Cambrian Explosion** provides an analogy for understanding how digital technology will transform society. Transparency of information will put pressure on organizations to evolve.

**Animals adapted** with exoskeletons, camouflage and methods for distracting opponents. With secrets hard to keep, states and corporations will develop analogous armaments.

**The new transparency** will ultimately lead to the creation of new types of organizations. Natural selection will favor the quickest and most flexible among them.

media inundation can be summed up in a word: transparency. We can now see further, faster, and more cheaply and easily than ever before—and we can be seen. And you and I can see that everyone can see what we see, in a recursive hall of mirrors of mutual knowledge that both enables and hobbles. The age-old game of hide-and-seek that has shaped all life on the planet has suddenly shifted its playing field, its equipment and its rules. The players who cannot adjust will not last long.

The impact on our organizations and institutions will be profound. Governments, armies, churches, universities, banks and companies all evolved to thrive in a relatively murky epistemological environment, in which most knowledge was local, secrets were easily kept, and individuals were, if not blind, myopic. When these organizations suddenly find themselves exposed to daylight, they quickly discover that they can no longer rely on old methods; they must respond to the new transparency or go extinct. Just as a living cell needs an effective

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membrane to protect its internal machinery from the vicissitudes of the outside world, so human organizations need a protective interface between their internal affairs and the public world, and the old interfaces are losing their effectiveness.

### CLAWS, JAWS AND SHELLS

IN HIS 2003 BOOK, *In the Blink of an Eye*, Parker argues that the external, hard body parts of fauna responded most directly to the riot of selection pressures of the Cambrian Explosion. The sudden transparency of the seas led to the emergence of camera-style retinas, which in turn drove rapid adaptation of claws, jaws, shells and defensive body parts. Nervous systems evolved, too, as animals developed new predatory behaviors and, in response, methods of evasion and camouflage.

By analogy, we might expect organizations to respond to the pressure of digitally driven social transparency with adaptations in their external body parts. In addition to the organs they use to deliver goods and services, these body parts include information-handling organs of control and self-presentation: public relations, marketing and legal departments, for instance. It is here we can see the impact of transparency most directly. Through social networks, rumors and opinions now propagate across the globe in a matter of days if not hours. Public relations and marketing departments face new demands to “join

the conversation”—to respond to individuals on their terms, in an intelligible, honest and conversational way. Organizations that need weeks or months to develop communications strategies gated by slow-moving legal departments will find themselves quickly out of sync. Old habits must be rewired, or else the organization will fail.

Easier access to data has enabled new forms of public commentary grounded in comprehensive empirical observations. Data journalist Nate Silver demonstrated as much during the 2012 U.S. presidential elections. While some news organizations spun why-our-candidate-will-win narratives based on cherry-picked polling data, Silver gave us explanatory narratives grounded in *all* polling data. Not only did Silver predict the elections with uncanny accuracy, but by openly sharing his methodology, he also eliminated any doubt that he merely got lucky. With transparent public polls increasingly available, news organizations and political analysts that spin selectively grounded stories are going to face an increasingly difficult existence.

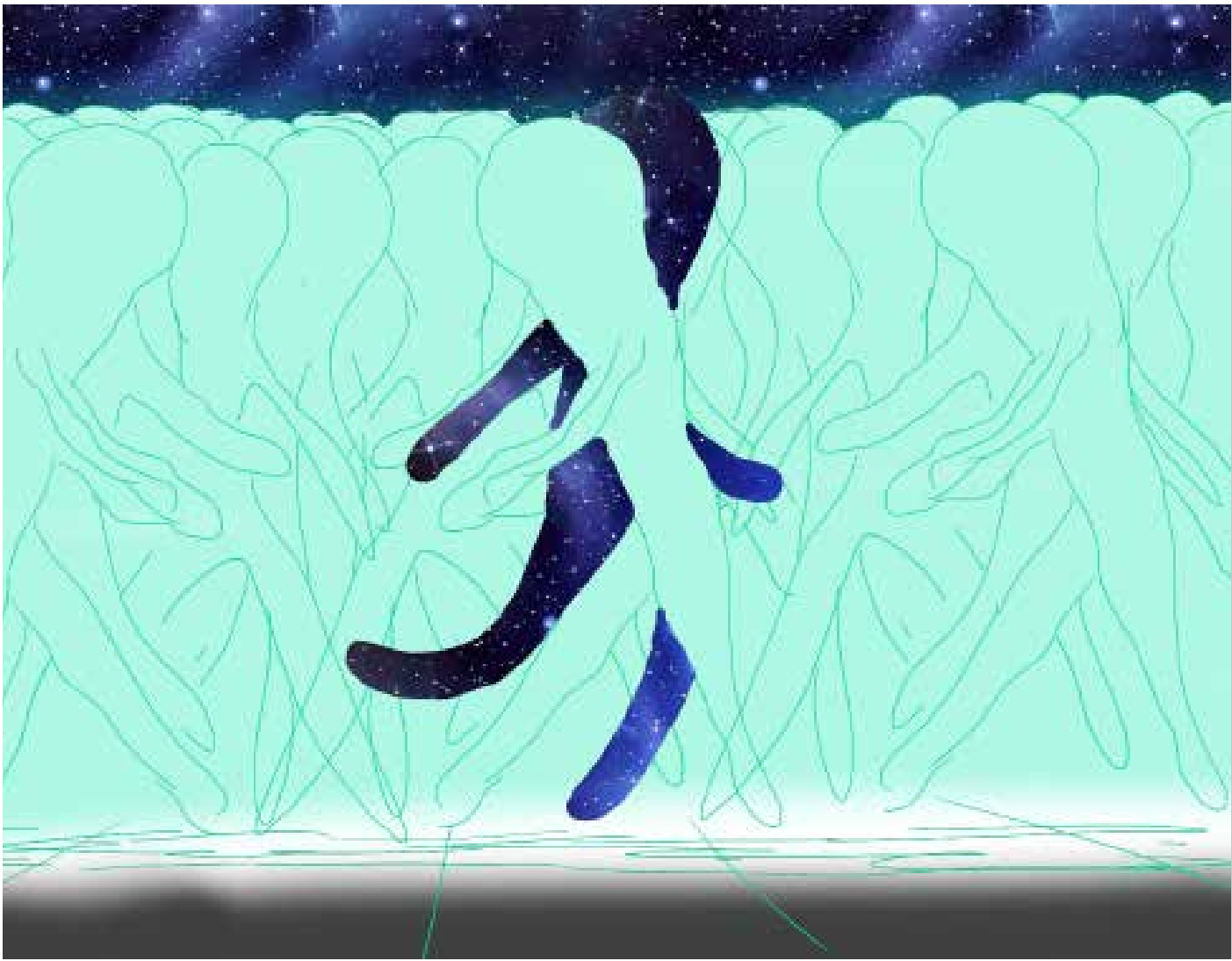
Consumer goods manufacturers face a closely related challenge. User reviews of products and services are changing the balance of power between customers and companies. A brand’s marketing efforts lose influence as the opinions of other consumers become more powerful. Responsive companies are learning to quickly and publicly respond to complaints and negative reviews. And if the reviews are overwhelmingly negative, the only choice is to change or drop the product. Pouring money into marketing mediocre products no longer works.

Small groups of people with shared values, beliefs and goals—particularly those who can coordinate quickly in a crisis using ad hoc channels of internal communication—will be best at the kind of fast, open, responsive communication the new transparency demands. To draw a contrast with large hierarchically organized bureaucracies, we might call these organizations “adhocracies.” As the pressures of mutual transparency increase, we will either witness the evolution of novel organizational arrangements that are far more decentralized than today’s large organizations, or we will find that Darwinian pressures select for smaller organizations, heralding an era of “too big to succeed.”

### THE HALF-LIVES OF SECRETS

U.S. SUPREME COURT Justice Louis D. Brandeis, an early champion of transparency, is often quoted on the topic. “Sunlight is said to be the best of disinfectants,” he famously wrote. He was right, of course, both metaphorically and literally. But sunlight can be dangerous, too. What if in our zeal for purification we kill too many friendly cells? What about the risk of destroying the integrity or effectiveness of organizations by exposing too much of their inner workings to the world?

Brandeis was an enemy of secrecy. He apparently thought that the more transparent institutions became, the better they would be. More than a century later we can see that the campaign he helped to initiate has had many successes. But in spite of much political rhetoric about the unalloyed virtues of transparency, secrecy in the halls of power is still maintained—and for good reasons.



A biological perspective helps us see that transparency is a mixed blessing. Animals, even plants, can be seen to be agents with agendas. Informed by their sensory organs, these agents act to further their own welfare. A human organization is similar. It is an agent composed of large numbers of working, living parts—people. But unlike the cells that make up plants and animals, people have wide interests and perceptual abilities. An animal or plant does not have to worry about its cells jumping ship or starting a mutiny; except in the case of cancer, the cells composing multicellular life-forms are docile, obedient slaves. People, in contrast, are individually powerful and intensely curious about the wider world.

It was not always so. In earlier times, dictators could rule quite inscrutably from behind high walls, relying on hierarchical organizations composed of functionaries with very limited knowledge of the organization of which they were a part, and even less information about the state of the world, near and far. Churches have been particularly adept at thwarting the curiosity of their members, keeping them uninformed or misinformed about the rest of the world while maintaining a fog of mystery

around their internal operations, histories, finances and goals. Armies have always benefited from keeping their strategies secret—not just from the enemy but from the troops as well. Soldiers who learn the anticipated casualty rates of an operation will not be as effective as those who remain oblivious about their likely fate. Moreover, if an uninformed soldier is captured, he will have less valuable information to divulge under interrogation.

One of the fundamental insights of game theory is that agents must keep secrets. An agent who reveals “state” to another agent has lost some valuable autonomy and is in danger of being manipulated. To compete fairly in an open market, manufacturers need to protect the recipes for their products, their expansion plans and other proprietary information. Schools and universities need to keep their examinations secret until the students take them. President Barack Obama promised a new era of government transparency, but despite significant improvements, large arenas of secrecy and executive privilege are enforced as vigorously as ever. This is as it should be. Economic statistics, for instance, need to be kept secret until they are officially revealed



to prevent insider exploitation. A government needs a poker face to conduct its activities, but the new transparency makes this harder than ever before.

Edward Snowden's revelations about the inner workings of the National Security Agency demonstrate how in the era of transparency, a single whistle-blower or mole can disrupt a massive organization. Although Snowden used traditional news organizations to leak information, social-media reaction and amplification assured that the news stories would not die, putting sustained widespread pressure on the NSA and the federal government to act.

The NSA's outer "skin" is adapting dramatically in response. The mere fact that the agency publicly defended itself against Snowden's accusations was unprecedented for an organization that has long resided behind a veil of complete secrecy. Big changes within the organization are inevitable as it sorts out what kinds of secrets it will be able to keep in this more transparent world. As Joel Brenner, former senior counsel at the NSA recently reflected on the sudden shift of the agency's operating environment, "Very few things will be secret anymore, and those things that are kept secret won't stay secret very long. The real goal in security now is to retard the degradation of the half-lives of secrets. Secrets are like isotopes."

As optimists, we would like to believe that this period of turmoil will push us toward organizations better aligned with the moral codes of civil society and powerful novel ways to correct deviant organizational behavior. But we cannot rule out the permanent weakening of our intelligence organizations that will reduce their abilities to identify threats.

### INFORMATION CHAFF

IN THEIR EVOLUTIONARY ARMS RACE, the Cambrian fauna invented a bounty of evasive measures and countermeasures, and this arsenal of tricks has grown ever since. Animals have developed camouflage, alarm calls to warn of approaching threats, bright markings that falsely advertise them to potential predators as being poisonous. The new transparency will lead to a similar proliferation of tools and techniques for information warfare: campaigns to discredit sources, preemptive strikes, stings, and more.

Nature has inspired devious armaments before. The cloud of ink released by cephalopods fleeing a predator was reinvented in aerial warfare as chaff—confusing clouds of radar-reflective metal scraps or dummy warheads that could attract defensive missiles. We can predict the introduction of chaff made of nothing but megabytes of misinformation. It will quickly be penetrated, in turn, by more sophisticated search engines, provoking the generation of ever more convincing chaff. Encryption and decryption schemes will continue to proliferate as well, as organizations and individuals struggle to preserve their privacy and reputations.

### SPECIATION OF ORGANIZATIONS

A FINAL IMPLICATION of our Cambrian analogy is that we should soon witness a massive diversification of species of organizations. It has not happened yet, but we can look for early signs. In the U.S., a new class of corporation, the B Corp, was recently created to recognize the need for ventures with double bottom lines optimized for both profit and social purpose. Google and Facebook broke with tradition by enacting unusually powerful voting rights for their founders, yielding publicly traded compa-

nies that remain privately controlled, enabling the founders to steer their companies based on their long-term plans with relative indifference to the quarterly whims of Wall Street. The organized protests during the Arab Spring, enabled by social media and unrivaled in their combination of scale and speed of formation, are perhaps also a new kind of (ephemeral) human organization. Time will tell, but it appears that we might be at the cusp of a radical branching of the organizational tree of life.

The speed with which transparency will shape an organization depends on its competitive niche. Commercial companies are most exposed to the effects of public opinion because customers can easily switch to alternatives. If left untended, a consumer brand built over decades can unravel in months. Churches and sports leagues are somewhat more protected because of the deep-rooted cultural habits and network effects of faithful churchgoers and sports fans. But when child abuse or head injuries that quietly persisted through the pre-Internet ages surface under the glare of mutual transparency, even the mightiest churches and sports leagues must adapt or perish.

Most sheltered from immediate evolutionary pressures are underlying systems of government. Protests fueled by social media can topple rulers and ruling parties, but the underlying organs of the state tend to continue relatively unperturbed by changes in political leadership. State machinery faces little competitive pressure and is thus the slowest to evolve. Yet even here we should anticipate significant change because the power of individuals and outsiders to watch organizations will only increase. Under popular pressure, governments are opening access to vast new streams of raw data produced by their internal operations. Coupled with advances in large-scale pattern analysis, data visualization, and data-grounded professional and citizen journalism, we are creating powerful social feedback loops that will accelerate transparency of organizations.

There is a self-limiting aspect to this emerging new human order. Just as ant colonies can do things that individual ants cannot, human organizations can also transcend the abilities of individuals, giving rise to superhuman memories, beliefs, plans, actions—perhaps even superhuman values. For better or for worse, however, we are on an evolutionary course to rein in our superhuman organizations by holding them accountable to individual human standards. This self-regulating dynamic, enabled by accelerating human-machine communicative capabilities, is as unique to our species as human language itself. ■

#### MORE TO EXPLORE

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