Bright Air, Brilliant Fire:
The Mind of *Wikipedia*

By David Pendery

I am a believer in *Wikipedia*. Democratic, community-based, Wiki format methods used for the gathering and organization of knowledge are, I feel, highly efficient, pragmatic, comprehensive, integrated and admirably replete and accurate (though admittedly subject to certain errors). On top of this, *Wikipedia* is fun, and a great personal challenge and learning experience.[1] My favorite *Wikipedia* story occurred last semester when a Chengchi University classmate of mine was giving a presentation on an American playwright. In her background information she had some text about the playwright's style that I immediately recognized as having come from *Wikipedia*. But on top of this, I saw that I had written the information as one of my edits on *Wikipedia*! I chuckled and felt pretty good—and don't worry, the information was accurate and well-written, and has remained un-edited.

Wikipedia is of course an Internet phenomenon and methodology. Since the Internet's inception, people have felt that it may constitute a unique new chapter in human epistemology—that its hyper/inter-textuality, multimedia content, and rhizomatic "jungle" of linked knowledge, interpretation, explanation, communication and narrative could

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[1] *Wikipedia* says that it is "not an experiment in democracy," but of course I use the word here in the general sense of active, free involvement by community members, both singularly and in collaboration. See <http://en.wikipedia.org/wiki/Wikipedia:What_Wikipedia_is_not>

change the ways humans communicate, think and understand. *Wikipedia*, as a child of the Internet, has indeed tread these paths, and few would argue that its innovative, even revolutionary, techniques are immensely influential and have shed light on areas of human experience and endeavor that are still being revealed in fascinating and exciting ways.

My purpose, however, is not to review *Wikipedia*'s public face and the use of its effective tools. Instead I want to take a look "under the covers" at *Wikipedia*'s very epistemology, if you will. My argument is that the source (or one of the sources) of *Wikipedia*'s validity and power is that the project is something of a mirror of the human mind and consciousness. My views are based on the work of Dr. Gerald Edelman, winner of the Nobel prize in Medicine in 1972. One area that Edelman has researched is human consciousness, and in fact the title of my paper, "Bright Air, Brilliant Fire" is the title of his 1992 book, in which he presents a theory of human consciousness based on physiology and evolutionary principles.[2] Edelman's theory, which I will apply to the "mind" of *Wikipedia*, is that human consciousness stems from neuronal networks in the brain, which are structured in massively parallel formations of overlapping data maps and circuits. These maps and circuits receive huge amounts of independent inputs, which are managed and "interpreted" by way of reentry signaling and feedback looping mechanisms, all of which distill and assemble information, and strengthen conceptual creation, organization and disposition in the human mind (in a word, these structures and the human mind *evolve*). This entire system, from which the fantastic and mysterious acumen of human consciousness emerges, is dynamic to the extreme, densely complex, entirely self-organizing and highly adaptive to new inputs and outputs.

The *Wikipedia* system virtually mirrors Edelman's descriptions. For *Wikipedia* too, the very basis of the structure is the "map"— each page in the *Wikipedia* library, and above this

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[2] *Bright Air, Brilliant Fire: On the Matter of the Mind*. New York: BasicBooks, 1992.

"global mappings" of higher-level organizational theory and practice, all chock full of existing and newly-inputted information linked in re-entry structures, constantly changing and developing. This "jungle" is comprised of overlapping arbors—not just slices—of information that "give rise to maps and circuits that adapt their boundaries to changing signals" (Edelman 69). These arbors, maps, circuits and boundaries evolve into ever-improved conceptual organization on *Wikipedia*.[3]

I use the verb "evolve," and indeed Edelman views the human mind as a three-stage evolutionary system, wherein, 1) a large number of variables are sifted through in the human mind during its initial development, creating a "primary repertoire" of functioning neural networks; 2) a "secondary repertoire" is slowly developed during processes of synapse development and selection, based on ongoing experience interpreted in the mind; and 3) over time, a final "correlation and coordination" of selective conscious processes and functions is effected, resulting in "strengthening of interconnections between the maps" (all Edelman 85). The end result is a "richly cooperative" environment (Edelman 86), continually developing more polished, more capable human consciousness. If we apply this theory to *Wikipedia*, we see a similar processing. *Wikipedia* by definition has a "large number of variables" that are inputted during its development and functioning. These variables "compete" in a massively parallel and reciprocal environment that ultimately "selects" the "fittest" organization and patterns. Complementing this competition, the development of *Wikipedia*—from its early days in 2001, when there were only a handful of skeletal entries, to its current body of some 5,300,000 articles in more than 100 languages— is, needless to say, "richly cooperative." Overall, the "correlation and coordination" of connectively mapped *Wikipedia* entries, with the aim of ever-more refined information, is

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[3] For those questioning or doubting this interpretation of *Wikipedia,* I will address certain criticisms and objections in the postscript to this paper.

the very essence of the *Wikipedia* project. Even the errors and outright vandalism in *Wikipedia* can be interpreted in this evolutionary light, if we see them as "mutations" occurring in the "gene pool." Such mutations are generally a positive evolutionary force (sometimes, admittedly, they are harmful), providing an important additional source of variation on which *Wikipedia*'s natural selection can act.

Edelman also includes human *memory* in his theory, which is at the center of the conscious learning processes he describes. Memory provides a "bootstrap" effect to perceptual and conceptual categorization, allowing for linkage of past and present data in the mind, and ultimately strengthening the formation of abstract conceptions and understanding. Additionally, memory is a twofold, reentry process and "depends on the constant interaction between self and world systems" (Edelman 121). Yet further, "memory is influenced by evolutionarily established value systems" (Edelman 149), which Edelman sometimes calls "value-category" memory. Value-category memory is a vital link in the emergence of consciousness, and we find that "Primary consciousness is achieved by the reentry of value-category memory into current ongoing perceptual categorizations that are carried out simultaneously in many modalities. It links parallel stimuli in time and space (including those not necessarily causally connected) into a correlated scene" (Edelman 149). Once again we see the "mind" of *Wikipedia* emergent in the above conception—with the application of value-category memory (which I will discuss further, below) to the system's "perceptual categorizations" in "many modalities," with "parallel stimuli in space and time" ultimately yielding a "correlated scene." This very much sounds like the *Wikipedia* knowledge management and organization process!

To continue, value-category memory emerges out of the limbic system of the brain, which is the human emotion and memory center (as opposed to processing of raw data and facts). Similarly, we can see on *Wikipedia* a necessary tallying stemming from emotional

life and lived experience, and which includes the application of learned values—truth, knowledge, authenticity, erudition, learning, worth, propriety and objectivity. These conceptions, which are embedded in *Wikipedia* systems and processes—and perhaps most importantly in *Wikipedia* users—Edelman might term "homeostatic," in that they are those conditions "necessary to continue life" (94)—in this examination, those that bolster and continue the life of *Wikipedia*. To sum up, as *Wikipedia* is working its magic, organizing and strengthening networked information, we can see something like an evolving "memory" in the system. The changes that are made to *Wikipedia* data maps are stored on the system, preserving the memory of where the system has been and how it has developed. Users can utilize this memory as needed, but perhaps we can view the conception of *Wikipedia* memory even more profitably in light of actual *Wikipedia* editors, the most assiduous of which no doubt have extensive memories of the long, sometimes rocky, development processes that yields "learned values." Edelman's theory can nicely sum up the *Wikipedia* process, with single editors at work, accessing and analyzing both individual and community memory, and thence very much "acting on" the *Wikipedia* environment (Edelman 131) and contributing to final aims, the best of which are credible, honest, advantageous and beneficial.

All of these functions, mind-like structures and epistemological sovereignty are in contrast to "instruction-based" systems and static models wherein given "supervisors" (or "programs") govern conscious learning processes. Such an instruction-based system is a faulty view of human conscious for, according to Edelman, consciousness "occurs in terms of *synthesized* patterns, not logic" (152), and comprise a "vast aggregate of interactive events" (69) that compete for conscious attention in the human mind. It is, in a word, anything but a linear or hierarchical system. Ultimately, "beliefs and concepts are individuated only by reference to an open-ended environment, the description of which

cannot be specified in advance" (152). A highly flexible "recursive synthesis" occurs, wherein "events [are] correlated topographically across different maps without a supervisor, [and] *new* selectional properties emerge through successive and recursive reentry across maps in time" (both 89, emphasis in original). Even more specifically and applicably in terms of *Wikipedia*, this multi-layered and manifold process extends beyond technical conceptions, and the very syntheses, interactions, properties and environments "are only individuated […] by reference to *social interactions with others*" (174, emphasis added).

To view consciousness and thought as best dictated by a set of static instructions and "elite" sources controlling the flow of information is at best worrisome, or worse, downright autocratic and deterministic. It is this model, in some respects, which is adopted by traditional works of reference and encyclopedias, and which is in stark contrast to *Wikipedia*. In spite of these stern words, however, I do not wish to dismiss traditional encyclopedias. Although their elitist methods are at times doubtful, they do serve a good purpose, and as much as any credible source of knowledge can be depended on and wisely employed. Even *Wikipedia* recommends using these sources in important research projects, and exercising extreme care in using *Wikipedia*.[4] An intelligent balance is called for, and the joint use of elite sources and *Wikipedia*-esque community knowledge is surely the best approach. My belief is that we are all "elite" sources in different areas (or most of us are), and can plausibly contribute to a reliable body of human knowledge—one of us is not as smart as all of us, and this conception includes the views and knowledge of many people who would normally be excluded from contributing to what humans know and can know. Such exclusion is not only, often, immoral, it can carelessly eliminate valuable data from human knowledge bases. After all, I can point right now to a junior high school student who knows more about computer gaming and hacking than all but the most advanced

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[4] See <http://en.wikipedia.org/wiki/Wikipedia:About#Wikipedia_vs._paper_encyclopedias>

professionals; an undereducated blue-collar worker who can describe in detail the workings, constitution, functionality, and maintenance and repair procedures of a host of technical systems in homes and businesses—electrical, plumbing, structural, etc.; an amateur guitarist/pianist who could write a dissertation on the musical theory and technique of John McLaughlin and Chick Corea; and an exceptionally bright office assistant, working on her master's degree, who has read and can comment informedly on the lives and works of Timothy Leary, Allen Ginsburg and Tom Wolfe. In a word, *Wikipedia*'s nodal, connectionist, egalitarian, networked communities of editors and knowledge are a key step toward truly complete human knowledge and understanding. I believe that *Wikipedia* is an important way we can collaboratively eliminate aporias and unbalanced coverage of our knowledge of the world. Such gaps have plagued humanity since time immemorial, with incomplete, inaccurate and biased sources of information virtually flooding human life. The *Wikipedia* way—individual and combined efforts and widely inclusive development contributing to the assembly, organization and ultimate concretization of knowledge, leading to the "ability to determine by internal criteria the salience of patterns among multiple parallel signals arising in complex environments"—promises a better future indeed (though there will no doubt be many bumps in this road!).[5]

The *pragmatic* value of *Wikipedia* is obvious to its supporters. In this paper I have attempted to shed light on a perhaps less pragmatic view of *Wikipedia*, looking at the project as much more than a "reference work," and viewing it as a new facet of human epistemology that mirrors certain conceptions of human consciousness. As exciting as this promises to be, however, there is more to the *Wikipedia* story, and not everyone is enthusiastic about what the future holds. I now turn to a necessary postscript, to examine certain of these issues, and the other side of the *Wikipedia* coin.

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[5] Quote from Edelman 133.

Postscript

Some will no doubt find the above analysis (overly) idealistic. This is a valid view, and I will here air some important criticisms of and objections to the *Wikipedia* project and approach. It is not, however, my intent to give an in-depth analysis of these objections, but simply to provide a brief foil (some will say "antidote") to the views expressed in this paper.

One experienced *Wikipedia* user nicknamed Hoary has voiced a key criticism of my ideas. He notes in a response to my call for comment on *Wikipedia*, that the information arbors, maps, circuits and boundaries I posit may not be all that I claim, and may not necessarily evolve into improved conceptual organization. Hoary writes, "I don't get the impression that the 'conceptual organization' is improving at all. There is [instead] increasing dogmatism about the inclusion of certain trivial information at the start of any article."[6] Hoary's point is that the composition and content of *Wikipedia* often seem to branch in all directions, with the project ultimately resembling a threatening many-headed Hydra. No doubt there is truth to this, and in fact even during my preparation for this paper and presentation, as I navigated the *Wikimania* websites in order to post my ideas and seek additional comment, I found that I was sometimes lost amid layered redundancies. Such disorder is in some senses perfectly natural, and it will with time smooth out and evolve into better-organized content—as consciousness takes a vast input of initially confusing material and organizes it into place. Nevertheless, some users, like Hoary, are understandably dismayed by Wikimania's dense foliage, and we find that the very lack of an administrating authority, an "editor-in-chief," may in fact be a weakness. This makes us wonder if perhaps

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[6] Find Hoary's complete comment at:
http://en.wikipedia.org/wiki/Wikipedia:Village_pump_%28proposals%29, or in the associated *Wikipedia* archive.

there should be some kind of "controlling authority" outside or above the *Wikipedia* community effort. After all, there is no reason to believe that we could not find skilled, committed and dependable editors to aid in improved organization on *Wikipedia*, to correct errors, improve layout and formatting, and shore up weak boundaries in the project. Many *Wikipedia* purists would no doubt disagree with this possibility, but it could and probably should be explored.

A connected idea comes from Andrew Keen, who argues that the current culture and content of the WWW—*Wikipedia* as one element of the entire "wiki" movement included—is little more than a "cult of the amateur" stemming from "digital narcissism," and "having a profoundly destructive impact upon media, culture and society" (Keen 3). This is the "dumbing down" thesis, with the WWW nothing more than a crassly disorganized pile of information falsely purporting to be a "library" or "reference source," but with no viable organizing principles and controls. And after all, *organization* is what cognition is all about, and the true denouement of the ornate and hugely-skilled functions of human consciousness. Keen and other WWW contrarians have a valid point. But to retreat into an overly-pessimistic outlook is, I think, for several reasons an error, and would result in lost opportunities.[7] To return to Edelman, he writes of consciousness that there is indeed, "no final cause, no teleology, no purpose guiding the overall process" of human conscious organization of information and knowledge (74). The manifold mindful associational progressions and responses "occur *ex post facto* in each case" (74). I argue here that such *ex post facto* results—the results of interaction, learned behavior and associated output—can largely (if sometimes cautiously) be depended on. Children, for example, are initially faced with a dizzying mixture of data inputs that can take years and years to organize. But who

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[7] I should note that Keen is not entirely pessimistic, and in fact sees much good about web culture and epistemology.

could argue that they do not fully have "the ability to determine by internal criteria the salience of patterns among *multiple parallel signals arising in complex environments*" (133, emphasis added)? This is our hope and belief with *Wikipedia.*

In the final analysis, is something like all I have described going on on *Wikipedia*? My argument is that yes it is, and that the platform constitutes a unique development and learning environment and horizon, which, although problematic, should not be dismissed. Ultimately we can, if admittedly with a dose of healthy skepticism, look forward with hope and enthusiasm to the project's future establishment of ever-greater and more reliable sums of valuable human knowledge.

Sources Cited

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