Journal of Scientific Exploration, Vol. 18, No. 2, pp. 275–282, 2004 0892-3310/04

Intelligent Design: Ready for Prime Time?[1]

ALAN D. GISHLICK

National Center for Science Education
420 40th Street, Suite 2
Oakland, CA 94609-2509
e-mail: gish@ncseweb.org

Abstract—Intelligent design (ID) is outside the mainstream of science. Is it likely to move into the mainstream in the future? Continental drift, reformulated as plate tectonics, did make this move. A comparison of the course and nature of research in the two areas does not suggest that ID is likely to follow suit.

Keywords: intelligent design—plate tectonics—continental drift—fringe and mainstream science—mainstream and fringe science

Introduction

In what is commonly called "fringe science," there are many ideas whose proponents insist that they deserve the attention of "mainstream" scientists. The important question is, at what point should attention be given? When does a piece of "fringe" science become "mainstream?" Nowhere is this question more pertinent today than in connection with "intelligent design." Is intelligent design (ID) a scientific theory deserving an equal place in the scientific community, science funding, and science education? Proponents of ID insist that they offer nothing less than a paradigm shift in biology, and indeed in science as a whole. They demand that the scientific community, and the science-education community especially, take them seriously and give them "equal time." Is this deserved? Is science snubbing ID?

To answer this question, I think it is helpful to compare the scientific productivity of ID in its formative years to that of other scientific fields that have made the transition from the "fringe" to accepted paradigm. I will take as my example an idea that, when first proposed, was called "utter damned rot" (attributed to W. B. Scott). Mainstream scientists warned that those who valued their reputation for scientific sanity should shun this theory, complaining, "If we are to believe this hypothesis, we must forget everything we have learned in the last 70 years and start all over again" (R. T. Chamberlain, quoted in Stewart, 1990).

This criticism sounds quite similar to what has been said about ID over its twenty-year career since the publication of Thaxton, Bradley, and Olsen's *The Mystery of Life's Origin* (1984)—or so claim advocates of ID. Indeed, some advocates of ID have embraced the comparison (Dembski, 2001). The difference is that after fifty years, despite those harsh statements initially made about the

aforementioned theory, it was the dominant paradigm of the field. If ID is to attain the same level of scientific acceptance, it will have to follow the same path.

Continental Drift: Initial Criticisms

The "ugly duckling" theory was, of course, continental drift, now the accepted paradigm of geology (re-formulated as plate tectonics, which considers the crust of the earth not as composed of continents floating on oceanic crust, but instead as a series of tectonic plates). The road to acceptance of continental drift was long and hard. Although Alfred Wegener was the first to codify a theory of continental drift, documenting it with a great deal of evidence, the idea did not start with him (Stewart, 1990). The modern geological idea of continental drift can be traced to the American geologist F. B. Taylor, who suggested in 1910 that drifting continents caused wrinkling of the crust along the leading direction of motion, thus building mountain ranges (Taylor, 1910). He postulated that tidal forces, generated when the moon was captured during the Cretaceous, caused the continents to shift. Following Taylor's work, H. Baker produced a reconstruction of ancient continental positions. Using the shape of the continental coastlines, he postulated that all the continents were once joined together in a super-continent that suddenly broke apart during the Miocene (Baker, 1914). He also proposed a similarly imaginative tidal-force model, in which orbital variations brought Venus and Earth close together, tearing the moon loose from the Pacific basin, whereupon the continents slipped into the void (Baker, 1914). In such writings, the proposed causes of continental displacement were so outlandish that the idea of continental displacement became nearly impossible for scientists to swallow, and thus it was largely ignored.

Alfred Wegener was a well-respected climatologist and an acknowledged expert on polar climates when he became interested in the idea of continental drift. His interest stemmed not just from the corresponding shapes of the continents, which previous researchers had noticed, but also from the geology and paleontology of the continents, particularly the pattern of glaciation in the Permian. The Permian glacial record displays extensive glaciations on the southern continents, extending near the equator to India (Stewart, 1990). Further, the glacial striations (marks left by glaciers that show the direction from which the glacier came) pointed to the center of glaciation being in what are now oceans: a geological impossibility, since glaciers always come from land. But if the continents were aggregated together during the Permian and located over the South Pole, the observed pattern of glaciation would have been geologically possible.

Wegener summarized a body of evidence for continental drift from patterns of geology, geography, biology, and fossil bio-geography into two scientific papers published in German in 1912 (Wegener, 1912a,b) and into his book, *Die*

Entstehung der Kontinente und Ozeane (*The Origin of Continents and Oceans*), published in 1915. In the first half of his book, he detailed his theory and argued that it was not vulnerable to the problems he saw with the contraction and geosynclinal theories (the generally accepted global models for geology at the time). In the second half of the book, he detailed how continental drift better fit the data from geology, geophysics, paleontology, bio-geography, and paleoclimatology. He also proposed the first reconstruction based on continental-shelf margins rather than on coastlines. He named the hypothetical super-continent "Pangaea" (for "all land") and also suggested that it broke up during the Mesozoic (Wegener, 1915).

Wegener's ideas met with harsh criticism in the geological community. The British Geographical Society and the American Association of Petroleum Geologists (AAPG) separately conducted symposia (in 1923 and 1926 respectively) at which Wegener's ideas were examined and rejected (Stewart, 1990). The general reason for the rejection was not that continental drift lacked a "mechanism," as commonly believed, but because the ideas did not fit with the prevailing theories of the American geological establishment. Continental drift violated the idea that multiple working hypotheses were required to explain geological phenomena; it seemed to contradict the well-tested and accepted ideas of isostasy (how the continents "float") and geosynclinal theory; and it seemed to contradict uniformitarianism. In total, it seemed to fly in the face of the entire basis of geological thought going back to Dana (Oreskes, 1999, 2001). The criticism was not limited to the evidence, however. Wegener was criticized because he was not a geologist yet presumed to advance grand theories about geology (Oreskes, 1999; Stewart, 1990). Owing to the staunch criticism of the most prominent figures of geology at the time, there were few willing to support continental drift in Great Britain and the United States (Stewart, 1990).

While Wegener's ideas were largely dismissed in Europe and America, other geologists in specific areas found the concept of drift useful. Swiss alpine geologists, Spanish and Dutch geologists, numerous South African geologists, and a few British geologists were particularly open to the idea of continental drift because it fit well with the data that they observed in their own work. Principal among these were South African geologist A. L. Du Toit (Stewart, 1990) and British geophysicist John Joly. Joly proposed an early model of convection-driven drift, but his physics background made him suspect in geological circles (Oreskes, 1999). While Joly was a leading theorist of continental drift, Du Toit was its most zealous and outspoken proponent. In his book *Our Wandering Continents* (1937), Du Toit blasted the mostly American geological establishment for its adherence to the orthodoxy of static continents, and criticized in particular the use of such *ad hoc* hypotheses as land bridges to explain the facts of bio-geography (Du Toit, 1937). Unfortunately, Du Toit's almost religious zeal for drift hurt his chances of receiving a hearing in mainstream geological circles (Stewart, 1990).

TABLE 1
Scientific Productivity for Continental Drift[a]

Years	Continental drift *or* continental displacement *or* plate tectonics
1911–1920	4 (0.03%)
1921–1930	35 (0.03%)
1931–1940	113 (0.16%)
1941–1950	184 (0.17%)
1951–1960	156 (0.14%)
1961–1970	1445 (0.47%)
1971–1980	15474 (3%)

[a] Scientific productivity for the first 70 years of continental drift based on a GEOREF search for subject terms "continental drift" or "continental displacement" or "plate tectonics." Numbers in parentheses indicate the percentage of total publications in geosciences for that period.

Continental Drift and Intelligent Design

The fact that both theories received harsh criticism from the scientific establishment is about the only thing continental drift and intelligent design have in common. A scientific theory is more than just rhetoric. The success of a theory ultimately depends on whether it is supported by the evidence, and whether it provides a better explanation for the available data. One way to assess the productivity of a particular theoretical framework is to look at the relevant scientific literature and see to what extent it is pursuing useful research. A rough-and-ready way to compare intelligent design with continental drift is to look at the amount of attention both have received in the scientific literature in the first twenty years after the theories were proposed (Tables 1 & 2). The indexes of the scientific literature show that there was a steady increase in publications dealing with continental drift in those years, particularly after it was published in English in 1924. By contrast, in the scientific literature on intelligent design in its first twenty years, there have been few publications, and most of them are critical or polemical. During this same period, however, ID advocates have produced a flood of internet, popular-press, and opinion-related publications, the utility and number of which are hard to quantify. This is markedly different from the early publications on continental drift, which appeared in the mainstream scientific literature: continental drift was making a contribution to the field of geology even at its earliest stages. This lack of scientific productivity in comparison to continental drift suggests that it is unlikely ID will be productive in the future. In short, ID has yet to demonstrate a long-term research potential and has not generated enough interest to warrant inclusion in curricula or funding.

As the literature comparison shows, those who support ID are not doing scientific research in support of the theory. Their "research," if they do any at all, consists of perusing the professional literature in search of anything they can use to suggest that evolution is a weak theory (Wells, 2000 is a particularly

TABLE 2
Scientific Productivity for Intelligent Design[a]

Years	Intelligent design *or* irreducible complexity
1984–1993	2 (0.00004%)
1994–2003	11 (0.0002%)

[a] Scientific productivity for the first 20 years of intelligent design based on a BIOSIS search for subject terms "intelligent design" or "irreducible complexity." Numbers in parentheses indicate the percentage of total publications in biosciences for that period.

egregious example). They do not even produce original research that suggests that evolution is failing as a paradigm. Here, too, intelligent design contrasts with continental drift. The early literature on continental drift (e.g., Du Toit, 1937; Wegener, 1924) does not focus on failings of geo-synclinal theory; rather, it argues that continental drift better explains data from climate, geology, biogeography, and so forth. Gradually, enough evidence for continental drift was amassed—data from the mapping and drilling of the sea-floor was crucial—to convince many geologists that in fact the continents do move (Oreskes, 1999; Stewart, 1990). Increased research on and understanding of the structure of the crust, particularly the realization that the crustal motion could be viewed as rigid-body (plate) rotations about a sphere, led by 1970 to widespread acceptance of mobile continents (Oreskes, 2001). After that, the scientific research within the framework of the new paradigm exploded (Table 1). In sum, it took nearly 60 years and a lot of scientific research on the part of "continental drifters" and other geologists before drift was generally accepted. Sadly Wegener died in 1930, long before his ideas were vindicated (Oreskes, 1999; Stewart, 1990).

Research on Intelligent Design

In their more candid moments, proponents of ID concede that there is little to no scientific research being done in the ID framework (Dembski, 2002). Two questions suggest themselves. First, why? What are the *barriers* to there being scientific research literature on ID? Second, *what would such research be like*, supposing those barriers to be overcome?

I address the latter question first. In order to gain acceptance, a paradigm must not only explain the existing data better, but must also offer new avenues of research and discovery that were not apparent under the old paradigm. What research would ID foster, and how would it open up new frontiers of knowledge? Dembski (2002) has suggested that an ID paradigm would lead to studying the minimal complexity of organisms; "biotic engineering," i.e., envisioning biological systems from an engineering standpoint; evolutionary computation; and perturbing biological systems to find the limits of evolvability. These are all worthwhile avenues of scientific research. But they are already being pursued,

so they do not count in ID's favor, especially since ID proponents have not made significant contributions to them. However, there is nothing to stop the advocates of ID from researching them and showing how they are better explained by a design paradigm. There is no evidence in published literature that they are doing so.

Dembski (2002) has also suggested some topics that are clearly novel. For example, he suggests compiling a catalogue of irreducibly complex structures and a compendium of topics that evolution claims to explain but does not. Neither of these would really amount to *research*. Despite Dembski's claims to be engaged in the development of methods for detection of design, he has not yet produced testable methods accepted, or even taken seriously, by scientists working in relevant fields (Elsberry & Shallit, 2003; Wilkins & Elsberry, 2001)—Dembski's references to archaeology, cryptography, SETI, or the cinema (*Contact* and *Wall Street*) as *evidence* notwithstanding. Dembski has also written on the TRIZ theory of integrated problem solving, which he gleaned from Russian technological literature. TRIZ as applied to biology would study life as an example of design based on trial-and-error, which sounds strangely like natural-selection-driven evolution. Here again, though, Dembski has failed to produce any scientific research into the topic.

Dembski's remaining suggestions (2002) are even more far-fetched. He wants to scientifically delineate guidance from autonomy (a task surely more suited for philosophy than science) and to search for "steganography"—hidden messages from the designer in the genomes of organisms, where he suggests that one might find the "instruction manual" for life.

The conclusion, then, is that not only is there no ID research in the scientific literature, but nobody knows what it would be like. That instantly suggests a reason why there is no scientific research literature on ID, of course, but it is not a reason that ID advocates are willing to countenance. Instead, they largely blame their paucity of research on lack of funding for ID research and the hostility of the scientific community (Wells, 2002).

Continental Drift and Intelligent Design: Research or Advocacy?

Returning to my comparison, it is interesting to note that Wegner, Holmes, and Du Toit received no funding for their formative continental-drift research. And as anyone who has applied for grants knows, it is hard to get funding even when you do work on *accepted* methods or ideas. Granting agencies usually want proof that the work can produce results before they are willing to put money towards it. A scientific theory that cannot even produce the most basic model is not even remotely ready for funding, let alone for general acceptance, and much less for science classrooms.

It is not as though funds were not available. The Discovery Institute's Center for Science and Culture, the intellectual home of ID, has spent substantial amounts of money over the past few years to lobby school boards, state boards

of education, textbook publishers, statehouses and even the U.S. Congress to try to get ID into school curricula and textbooks, and perhaps even for special federal funding for research (Forrest, 2002; Forrest & Gross, 2003) or, failing that, to undermine the teaching of evolution. It is important here again to remember the analogy to continental drift. When faced with the ridicule of the scientific community, what did Wegener, Du Toit, and others do? Did they form a non-profit lobbying organization called the Center for Geosciences and Culture? Lobby local school boards to have "evidence against borderlands" inserted into the curriculum? No. As the philosopher of biology Michael Ruse so trenchantly recommended, the proponents of ID need to "stop whining and do some real science" (Ruse, 2002: 32).

Now it is imaginable that modern biologists, like their early-to-mid-twentieth century geological counterparts, are blinded by the paradigm and thus unable to see the flaws in their own theory. If so, it still does not excuse the proponents of ID from producing evidence *for* their theory and providing a positive research program based on it. Ultimately, scientists are pragmatic. If ID is the best explanation for the data, then it will in the end win out. But it is up to the new paradigm to produce a better model than the current one. It took approximately fifty years for plate tectonics to emerge from continental drift and overturn the accepted geologic orthodoxy; Wegener died before seeing his ideas vindicated. Attaining scientific acceptance takes time, patience, and data. So why do proponents of ID focus on politics instead of science? If the proponents of ID are so sure they are right, why are they so impatient?

Notes

[1] Presented at the 21st Annual Meeting of the Society for Scientific Exploration, Kalispell, MT, June 2003.

References

Baker, H. B. (1914). Origin of continental forms, V. *Annual Report of the Michigan Academy of Sciences, 16, 99–103*.

Dembski, W. A. (2001). Teaching intelligent design: What happened when. A response to Eugenie Scott. Available at: http://www.arn.org/docs/dembski/wd_teachingid0201.htm.

Dembski, W. A. (2002). Becoming a disciplined science: Prospects, pitfalls and reality check for ID. Available at: http://www.iscid.org/papers/Dembski_DisciplinedScience_102802.pdf.

Du Toit, A. L. (1937). *Our Wandering Continents*. London: Oliver and Boyd.

Elsberry, W., & Shallit, J. (2003). Information theory, evolutionary computation, and Dembski's ''complex specified information.'' Available at: http://www.talkreason.org/articles/eandsdembski.pdf.

Forrest, B. (2002). The Wedge at work: How intelligent design creationism is wedging its way into the cultural and academic mainstream. In Pennock, R. (Ed.), *Intelligent Design Creationism and Its Critics* (pp. 5–53). MIT Press.

Forrest, B., & Gross, P. R. (2003). *Creationism's Trojan Horse: The Wedge of Intelligent Design*. Oxford University Press.

Oreskes, N. (1999). *The Rejection of Continental Drift: Theory and Method in American Earth Science*. Oxford University Press.

Oreskes, N. (2001). From continental drift to plate tectonics. In Oreskes, N. (Ed.), *Plate Tectonics: An Insider's History of the Modern Theory of the Earth* (pp. 3–27). Westview Press.

Ruse, M. (2002). Stop whining and do science! *Research News and Opportunities in Science and Theology, 2,* 32.
Stewart, J. A. (1990). *Drifting Continents and Colliding Paradigms: Perspectives on the Geoscience Revolution*. Indiana University Press.
Taylor, F. B. (1910). Bearing of the Tertiary mountain belt on the origin of the Earth's plan. *Geological Society of America Bulletin, 21,* 179–226.
Thaxton, C. B., Bradley, W. L., & Olsen, R. L. (1984). *The Mystery of Life's Origin: Reassessing Current Theories*. Philosophical Library.
Wegener, A. L. (1912a). Die Entstehung der Kontinente. *Petermann's Geographische Mitteilungen, 58,* 185–195, 253–256, 305–308.
Wegener, A. L. (1912b). Die Entstehung der Kontinente. *Geologische Rundschau, 3,* 276–292.
Wegener, A. L. (1915). *Die Entstehung der Kontinente und Ozeane*. Braunschweig, Germany: F. Vieweg.
Wells, J. (2000). *Icons of Evolution: Science or Myth?: Why Much of What We Teach About Evolution is Wrong*. Regnery.
Wells, J. (2002). Design theorist charges academic prejudice is a 'Catch-23.' *Research News and Opportunities in Science and Theology, 2,* 31, 34.
Wilkins, J. S., & Elsberry, W. R. (2001). The advantages of theft over toil: The design inference and arguing from ignorance. *Biology and Philosophy, 16,* 711–724.