THE SCIENTIFIC VIABILITY OF W. A. DEMBSKI'S DESIGN INFERENCE: RESPONSE TO B. FORREST AND R. PENNOCK OF THE *KITZMILLER* TRIAL

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APPROVAL SHEET

THE SCIENTIFIC VIABILITY OF W. A. DEMBSKI'S DESIGN INFERENCE: RESPONSE TO B. FORREST AND R. PENNOCK OF THE *KITZMILLER* TRIAL

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To Maria,

full of patience

and encouragement,

beyond measure

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PREFACE

This research has been exciting, rewarding, and, at times, exhausting. I am very thankful for those who came alongside and helped me carry the load. Most of the time, they carried more than their fair share. My wife, Maria, just like our first years of life together, has been an unbelievable rock of encouragement throughout my higher education. As you read this for the first time, Maria, we made it! I realize that you always believed that we would make it, although I sometimes had my doubts. And now we can look forward to entering another exciting chapter of life, hand in hand.

My parents, Levy and Clodean Belcher, have also gone the extra mile in their love and support. They've supported me unconditionally, despite often having trouble understanding the exact nature of my work and its significance. I thank God for such godly parents who have toiled all their lives to make the best life possible for my two brothers and myself.

Much love and appreciation goes to my church family, Calvary Baptist Church, in Glasgow, Kentucky. They have greatly supported my many years of theological education. I only hope that I am now better able to give something back to them; that I can help in equipping the saints for God's glory.

I will forever be indebted to the superlative faculty at Southern Baptist Theological Seminary—as both M.Div. and doctoral student. I will take with me lasting memories from Dr. James Parker. Not only does he instruct with a wealth of philosophical and theological insight, but Dr. Parker's down home Texas humor has also carried me through many long days with a smile. In addition to Dr. Parker, Dr. Chad Brand is another member of my research committee from whom I have learned much and

can never begin to repay. Most of all, I sincerely thank my committee chairperson, Dr. Ted Cabal. None of this would be possible without his superb academic knowledge, leadership, and encouragement. Dr. Cabal has always challenged me with the perfect balance of tenacity and warmth. There is little doubt that I will return to him many times for his wisdom throughout my academic career.

Special acknowledgment must also be made for other kind, gifted scholars who have guided and advised me during my research. They include Thomas Woodward, Steven Fuller, Bradley Monton, Casey Luskin, and, of course, the primary subject of this dissertation, William Dembski. I had the privilege of studying under Dr. Dembski during his brief time at Southern. It was during his seminar that I began to fathom the true significance of Intelligent Design, how fascinating it is, and the magnitude of Dr. Dembski's work in particular.

This dissertation has required long hours of work and thought, and I have often become lost in the minutia of the content. However, it is fitting that in the final days of this research I am starting to remember what is truly important; all of this work is wasted if it of no use to the Church. I pray that what is presented in the pages ahead will aid many Christians in confronting "every high-minded thing that is raised up against the knowledge of God, taking every thought captive to the obedience of Christ" (2 Cor 10:5). May it somehow contribute to the advancement of his kingdom and to the glorification of his Name.

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CHAPTER 1

INTRODUCTION

On December 20, 2005, Pennsylvania U.S. District Court Judge John Jones concluded that Intelligent Design (ID) was a cloaked form of creationist religion. The judge chastised the Dover, Pennsylvania, school board for their "breathtaking inanity" in adopting such an imprudent policy promoting ID, motivated by in "ill-informed" faction within the board.[1] Therefore, according to his verdict for *Kitzmiller v. Dover School District*, the school board had violated the Establishment Clause of the First Amendment of the U.S. Constitution. The board was ordered to cease the reading of a brief written statement to ninth grade biology students. The statement had informed students of ID research as an alternative to the status quo Darwinian model of origins advocated in public schools. Also within the statement, students were informed that the pro-ID textbook, *Of Pandas and People*, was on file in the high school library.[2] This book had been available to any student who might pursue supplemental investigation of theories that challenge Darwinian natural selection. Such information is now legally prohibited in Dover schools.

A serious issue within academia's debate about origins is whether research that infers Intelligent Design should be considered as scientifically justifiable. Jones's verdict has contributed to growing skepticism of ID within scientific and public discourses; the trial's legal and scientific ramifications, along with its influence on what should be considered as "true science," cannot be overestimated. Nevertheless, another substantial

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[1]Judge Jones, "Memorandum Opinion," Kitzmiller et al v. Dover Area School District et al, 137-38 No. 04cv2688 (M. D. Pa. 2005).

[2]Percival Davis and Dean H. Kenyon, *Of Pandas and People: The Central Questions of Biological Origins*, 2nd ed., ed. Charles B. Thaxton (Dallas: Haughton, 1993).

question is whether the *Kitzmiller* conclusion about the illegitimacy of Intelligent Design is based on an accurate weighing of ID's actual research. If not, then is the ruling grounded in any amount of unwarranted caricature? More specifically, the present research works toward a determination of whether two of the trial's most influential witnesses, Barbara Forrest and Robert T. Pennock, have given fair, comprehensive, and persuasive analysis of one of ID's central explanatory models, William A. Dembski's Design Inference (DI).

Explanation of the Problem

This dissertation will answer to what extent, if any, Forrest and Pennock succeeded in discrediting Dembski's fundamental theory. His DI and its accompanying conceptual tool, the explanatory filter, have proven to be pivotal and catalyzing applications for other important ID hypotheses, and Dembski collaborates closely with other ID researchers. If Forrest and Pennock's collective charges were to hold, they would bring serious doubt about the Design Inference's viability. Such doubt could also cause collateral damage to the broader ID movement.

However, should Dembski's scientific framework remain defensible after the collective criticisms of these two key philosophers, then the scientific community should search elsewhere for any substantive evidence against the Design Inference as a legitimate scientific hypothesis. Furthermore, should Dembski's program maintain, then the *Kitzmiller* ruling, celebrated by opponents of Intelligent Design, should be seriously scrutinized in subsequent research. Such evidential support should also abet Dembski and other ID proponents associated with his Design Inference in carrying forth their programs. This dissertation should be of interest to any researchers who seek information-rich systems in nature as evidence for intelligence behind life and the universe. They could presumably consider the present explication as they determine how

much confidence they should place in the Design Inference as a workable scientific model that can aid in the interpretation of their own data.

Background

Since Phillip E. Johnson wrote the first edition of his groundbreaking *Darwin on Trial* in 1991, a growing body of arguments has been added to his claim that Darwinian macroevolutionary theories are evidentially weak.[3] Therefore, public discourse, including educational curricula, should facilitate open inquiry about such weaknesses and examine viable discretionary theories about life's origins and the variety of species. Johnson was arguably the most prominent spokesman who encouraged many noteworthy scientists, philosophers, and other types of theorists to build substantive alternatives to Darwinism into what has become the contemporary Intelligent Design movement.

During ID's progression, Thomas Woodward, author of *Doubts about Darwin*, eventually surfaced as an expert on the rise of Intelligent Design, chronicling the work of leading ID theorists and the questions they were raising.[4] Woodward's sequel, *Darwin Strikes Back*, then proved useful in explaining the actual *success* of many ID theories.[5] This second book also examines the intense and sometimes vitriolic responses to ID theorists from the Darwinian scientific establishment. However, Woodward's historical research and analyses were limited by space, and he was unable to commit a *thorough* undertaking of any particular ID theorist and how he or she has withstood recent criticism. It is logical to assume that a more exhaustive analysis of all leading ID theorists is on the horizon from Woodward and/or others. Until that work is done,

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[3]Phillip E. Johnson, *Darwin on Trial*, 2nd ed. (Downers Grove, IL: InterVarsity, 1993).

[4]Thomas Woodward, *Doubts about Darwin: A History of Intelligent Design* (Grand Rapids: Baker Books, 2003); *Infra*, chap. 2.

[5]Thomas Woodward, *Darwin Strikes Back: Defending the Science of Intelligent Design* (Grand Rapids: Baker, 2006); *Infra*, chap. 2.

scholarship needs to answer whether the most important ID theories are advancing past their most robust theoretic challenges to date. Few, if any, scholarly works, including books, articles, or dissertations, contain any comprehensive research and analysis of the current state of Dembski's DI in the aftermath of the numerous attacks against it.

William A. Dembski is a senior fellow of the leading ID think tank, the Discovery Institute's Center for Science and Culture, based in Seattle. Dembski himself resides in Texas, where his is a research professor in philosophy at the Southwestern Baptist Theological Seminary (SwBTS). Before moving to SwBTS, he taught briefly at the Southern Baptist Theological Seminary in Kentucky. Prior to that position, from 1999 until 2005, Dembski served as an associate research professor at Baylor University.[6] Dembski's substantive vita lists seven earned degrees, including the Ph.D. in Philosophy (University of Illinois at Chicago), the Ph.D. in Mathematics (University of Chicago), and the M.Div. in Theology (Princeton Theological Seminary).

Of the leading ID theorists, William Dembski is unquestionably among the most influential. His effect within Intelligent Design science is continually confirmed by most involved, whether proponents or skeptics. Notwithstanding, research related to origins science could benefit significantly from an assessment of whether Dembski's primary theoretical framework, the Design Inference, with its explanatory filter for disclosing *specified complexity* within natural phenomena, is surviving substantive criticism.

Dembski wrote the seminal book that explains his fundamental program, *The Design Inference: Eliminating Chance through Small Probabilities* in 1998.[7] One

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[6]Dembski was originally hired at Baylor to establish the Michael Polanyi Center for the development of ID theory. Other members of Baylor's faculty voiced significant opposition to the center, but the university continued to support Dembski's ID research and the center's agendas. Nonetheless, continued disgruntlement between Dembski and other faculty members would eventually lead to his dismissal as the center's director. See Woodward, *Doubts about Darwin*, 179-80.

[7]Wm. A. Dembski, *The Design Inference: Eliminating Chance through Small Probabilities* (New York: Cambridge University Press, 1998).

dissertation could not adequately address the vast number of academic critiques responding to the DI since its inception.[8] Nor could one dissertation sufficiently analyze the responses to the numerous modifications and clarifications that Dembski has made to the DI since 1998. Therefore, it has become necessary to search for a legitimate Dembski critic or body of critics who would be worthy of close examination and analysis pertaining to the strength of the DI.

Any broad research relating to ID must involve, to some degree, the 2005 *Kitzmiller v. Dover* trial, with its impressive body of witnesses who testified against the merit of many major ID hypotheses. A search through the trial's documentation will reveal that Dembski was indeed among the key ID figures whose ideas were sharply scrutinized. The discrediting of Dembski was not a principal issue behind the trial nor the strategies of any of the legal counsel, but his work, along with its motivations and implications, were significant factors in the trial's outcome. The most substantial references to Dembski from written testimony and the witness stand were by Barbara Forrest and Robert Pennock.

Barbara C. Forrest is Professor of Philosophy at Southeastern Louisiana University. In addition to her testimony for the *Kitzmiller* plaintiffs, she is the co-author with Paul R. Gross of *Creationism's Trojan Horse: The Wedge of Intelligent Design* and many scholarly articles that project the ID movement as a form of "creationism."[9]

Michigan State University's Robert T. Pennock does research for Lyman Briggs College and its Department of Philosophy. He also contributes to the Department of Computer Science and Engineering, as well as to the Department of Ecology, Evolutionary Biology, and Behavior. Pennock has received recent attention for his

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[8]Arguably, the most influential critique given directly toward *The Design Inference* is Branden Fitelson, Christopher Stephens, and Elliot Sober, "How Not to Detect Design—Critical Notice: William A. Dembski, *The Design Inference*." *Philosophy of Science* 66 (1999): 472-88.

[9]Barbara Forrest and Paul R. Gross, *Creationism's Trojan Horse: The Wedge of Intelligent Design* (New York: Oxford University Press, 2004).

analysis of the Avida computer program, which, allegedly, is able to test evolutionary hypotheses. Avida was one of the many topics within his *Kitzmiller* testimony.

The impressive credentials of these two philosophers of science make them candidates for serious consideration when assessing origins science, and their respective treatments of Dembski's work could be beneficial in determining the strength of his arguments. More specifically, the respective prestige of Forrest and Pennock within the scientific community was confirmed by their success as expert witnesses for the plaintiffs in *Kitzmiller*; their respective testimonies proved to be instrumental data to be weighed by the judge for his final landmark opinion.

Nevertheless, the present research will conclude that, although they unveil areas of needed improvement within Dembski's program, Forrest and Pennock are ultimately unconvincing in their critiques. Their combined contra-Dembski arguments within the trial and in their supplemental writings lack the sufficient substance needed for offsetting the thrust of his Design Inference. The data, analysis, and argumentation ahead should give relevant and detailed evidence for this conclusion.

Methodology

The research methodology for this dissertation has required a collection of general background data on the subject, then advancement toward explanation, analysis, and conclusions regarding the specific problem. Clarification will now be made of how the present research has developed.

The method first involved research in the general background issues related to the problem. There was little difficulty in obtaining information on both historical and contemporary scientific theories of origins, including Darwinian and neo-Darwinian theories, Intelligent Design theories (especially those from the important Discovery Institute, mentioned below), creation science theories, and philosophies of science. This general background knowledge was then used to determine and to understand the most

important issues related to the demarcation of proper science, since a lack of scientific legitimacy is the primary polemic against ID theorists, including Dembski. Analysis has been made about the strengths and weaknesses of both Darwinian and non-Darwinian methodologies in relation to a logical theory of science. At issue here is whether, on the one hand, the only warranted theories must be those that adhere to a philosophy of scientific naturalism, while, on the other hand, no theory should be admissible if it involves intelligent agency as somehow related to natural phenomena. This debate is very relevant to *specified complexity*, the particular concept most pertinent to the success of Dembski's general theory.

In examining the details and strength of Dembski's thought, a working knowledge of both symbolic logic and probability theory proves helpful, as they are fundamental to the nature of his own methodology. These analytical tools then allow advancement toward a thorough and responsible assessment of Dembski's main thought, especially the Design Inference. First, close examination of DI data within his books and articles are necessary. Secondly, it must be determined whether use of his framework can be effective in discovering *specified complexity* in nature. Thirdly, there must be consideration of whether he adequately proves that *specified complexity* is an actual indicator of design, and whether competing (Darwinian) models could also sufficiently explain *specified complexity* in nature. Fourthly, an ensuing analysis can interpret the data on the DI in relation to a robust theory of legitimate scientific investigation. Such assessment will be then useful later in examining the criticisms of Forrest and Pennock.

Dembski's works are easily accessible from reputable publishers. Among his sizable corpus is his principal writing, *The Design Inference*. The book is published by the highly reputable Cambridge University Press and is part of the Cambridge Studies in Probability, Induction, and Decision Theory. In advancing the Design Inference, he has subsequently contributed several essays to edited collections, including *Debating Design:*

From Darwin to DNA, which he coedited with amiable Darwinist, Michael Ruse.[10] Dembski's works are found not only in pro-ID publications, but also in refereed periodicals such as *Science and Theology News*, *Nous*, and *Perspectives on Science and Christian Faith*.[11] Online resources have also proven valuable, including the new Evolutionary Informatics website that contains his latest work with Robert Marks in critiquing evolutionary algorithms.[12]

Intelligent Design theorists underwent some of their most serious public scrutiny to date during the *Kitzmiller* trial. The present research addresses how ID science was challenged in the trial as a justifiable field of inquiry and how leading figure Dembski was especially criticized by Forrest and Pennock. Information on the proceedings of *Kitzmiller, et al v. Dover School District, et al* comes from various sources. The trial's docket (a list of pleadings, orders, and opinions) and the judge's detailed written decision are available from the website of the U.S. District Court, Middle District of Pennsylvania. Official transcripts of the trial's proceedings, filed depositions, expert witness reports, etc., including those from Dembski, Forrest, and Pennock, are provided online by the National Center for Science Education.[13] There is also sufficient access to media releases and scholarly evaluations of the events leading up the trial, of the trial itself, and of the aftermath.

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[10]Wm. A. Dembski and Michael Ruse, eds., *Debating Design: From Darwin to DNA* (New York: Cambridge University Press, 2004).

[11]Wm. A. Dembski, "Life after Dover," *Science & Theology News* 1 (2006): 1-2; idem, "Randomness by Design," *Nous* 25 (1991): 75-108; idem, "Intelligent Design as a Theory of Information," *Perspectives on Science and Christian Faith* 49 (1997): 180-90.

[12]*Evolutionary Informatics* website [on-line]; accessed 7 August 2009; available from http://evoinfo.org; Internet.

[13]The most comprehensive and best-organized online collection of the *Kitzmiller* transcripts is from the website of the National Center for Scientific Education (NCSE). Although the NCSE was a biased participant in the trial, their online depository of trial documentation proves to be untainted and reliable. "Intelligent Design on Trial: Kitzmiller v. Dover," on the NCSE website [on-line]; accessed 24 August 2009; available from http://ncseweb.org/creationism/legal/intelligent-design-trial-kitzmiller-v-dover; Internet.

Examination of arguments by both Forrest and Pennock will not be confined to their limited trial testimony, but will also extend to other pertinent writings by both scholars. Both have written extensively for the academic community, as well as for the popular market. The thought of each scholar, especially those arguments pertaining to William Dembski, are easily researchable in books by reputable publishers, as well as in professional refereed periodicals. After stating their combined contra-Dembski argumentation and examining how Dembski has responded to their comments, Forrest and Pennock's collective critiques will be analyzed, recognizing strengths and weaknesses.[14] This analysis should then aid consideration of the dissertation's primary question: whether these philosophers of science give sufficient, logical reason for Dembski's main program, the Design Inference, to be discounted as practicable science. These publications prove that Dembski not only attempts to answer his critics, but, in recognition of challenges, he is also willing to make clarifications and modifications to his arguments.

Another valuable resource for this research is direct communication with some of the leading persons behind the issue. Most importantly, William Dembski himself has been very accessible, giving valuable suggestions in determining this dissertation topic. He has helped to clarify issues pertaining to his ideas on numerous occasions. He has also given direct explanation of the continuity between his earlier and most recent thought, along with what his present goals entail. Other scholars relevant to the issue have also proven to be easily approachable via email and telephone, especially during preliminary research. These include pro-ID historian Thomas Woodward, mentioned above. His work helped to stimulate the present writer's initial interest in this

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[14]Evaluation of the problem is informed by Dembski's own response to his critics, especially the types of criticisms promoted by Forrest and Pennock. Such replies are contained in many of his most popular writings, although not in the form of systematic rebuttal. However, Dembski's own written rebuttal to claims by Forrest, Pennock, and other critics that he submitted prior to deposition for *Kitzmiller* is a more systematic response and proves to have much relevance to the present problem. See Wm. A. Dembski, Expert Written Rebuttal, Kitzmiller v. Dover.

specific subject. Steve William Fuller (University of Warwick), a prominent ID supporter who testified at the *Kitzmiller* trial, has also given some detailed perspective about the case and the issue. Michael Ruse, who co-edited *Debating Design* with Dembski, is an evolutionist who has promoted fairness during the origins debate. He has also responded directly and favorably to queries on how to approach this topic.

Chapter Summaries

Chapter 2 will survey the most important thinkers, ideas, and issues behind the Intelligent Design movement, of which Dembski is a major contributor. Beginning with a brief explanation of the design argument from British natural theologian William Paley, the chapter will then transition to contemporary leaders, including the pivotal role of Phillip Johnson and his arguments about Darwinism's substantial methodological and evidential weaknesses. A survey of the modern ID movement also requires a brief mentioning of influential thinkers who followed Johnson's lead after *Darwin On Trial.* Collectively, they have developed an arduous comprehensive critique of Darwinism and the scientific naturalism associated with it. Furthermore, their collective agenda includes a replacement of Darwinism, with its grounding of nature in blind chance processes, as a failing paradigm. They offer in its place hypotheses and evidences that the cosmos and living organisms are results of specific intelligence coming from a purposeful designer.

This chapter will also include special emphases on researchers such as Michael Behe and others whose works are seen as congruous with Dembski's in advancing ID as a successful enterprise.[15] It will also become evident how the present dissertation builds on the historical analysis of Thomas Woodward; his works offer useful data on how various ID thinkers have withstood criticism to date, but direct assessment of Dembski is limited.

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[15]Another landmark book for the modern ID movement is Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Simon & Schuster, 1996).

The historical sketch of ID will then culminate with an examination of the brief and seminal Wedge Document—a manifesto drafted by today's leading ID think tank, the Discovery Institute, of which Dembski is a senior fellow. The controversial document embodies the immediate and long-term agendas of Dembski and his leading ID colleagues. The Wedge has also prompted ardent warnings by critics, including Forrest and Pennock. The chapter will also explore how critics, especially Forrest, have used statements from within the Wedge strategy to impugn ID; they characterize it as little more than religiously motivated creationism and pseudoscience. Such claims tend to be inaccurate caricatures when specifically involving Dembski's work. His program should be taken seriously by anyone seeking scientific answers about origins, speciation, and the possibilities of intelligent design underlying natural phenomena. This should be proven as the present thesis advances.

Chapter 3 will bring the details of Dembski's Design Inference to the fore. The chapter will explain the DI's main analytical framework, the explanatory filter, and how Dembski argues for its reliability in detecting design in natural events. An examiner can determine whether an event is the product of design by using a filter consisting of three primary nodes/questions: (1) Is it contingent? If the event is associated with regularity or laws of nature, the answer is no; it is not contingent but rather a product of necessity and therefore not designed. If the event cannot be related to regularity or to any law of nature, then the answer is yes, it is contingent, allowing for the next node. (2) Is it complex? If it is not highly improbable, then the answer is no, the event is not complex, or at least not complex enough to attribute it to anything beyond chance. If high improbability demands a yes answer, then the event's complexity allows it to pass to (3), Is it specified? In other words, does the highly improbable and complex event correspond to any conditionally independent (not artificially imposed), specific pattern?

If no, then the event is produced by chance. If yes, it passes all the criteria necessary to identify it as the product of intelligent design.[16]

In sum, regardless of how complex and improbable an event might be, it is necessary that the analyst disclose *specified complexity*—basically the same as Complex Specified Information (CSI)—when claiming that an event comes from design. Detecting CSI in phenomena is the central process in Dembski's overall method. He claims that chance hypotheses are deficient in explaining specification and that his critics commonly misunderstand and misrepresent the explanatory value of specification. The present research will disclose how specification, as a proven marker of intelligence, is either poorly accounted for or is altogether ignored by most defenders of Darwinism.

After explaining the concepts of the explanatory filter and how, logically speaking, it can imply design, the chapter will discuss how Dembski's DI can be applied to other fields of scientific inquiry, especially those that involve the discovery of intelligence in phenomena. Dembski's ideas have relevance outside of the biological sciences. However, he is particularly noted as a major contributor to biological research (although, of course, not involved in direct biological experimentation himself). Therefore, special attention will be given to how Dembski has used his DI for criticism of Darwinian evolutionary models. There will also be examination of how he uses the DI to make positive contribution to Stephen C. Meyer's research in discovering signs of intelligence within the DNA molecule, and to Michael J. Behe's theory of *irreducible complexity* in microbiology.[17]

To summarize the goals of chapter 3, it will contain the salient elements of

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[16]Wm. A. Dembski, *The Design Revolution: Answering the Toughest Questions about Intelligent Design* (Downers Grove, IL: InterVarsity, 2004), 87-93.

[17]Meyer's substantive new book could arguably become the definitive resource for researching ID's main arguments. He surveys the step-by-step investigation through his career in answering the information problem in DNA, and he places his research within the broader context of ID science. Stephen C. Meyer, *Signature in the Cell: DNA and the Evidence for Intelligent Design* (New York: HarperCollins, 2009); also see Behe, *Darwin's Black Box*.

Dembski's explanatory filter, with particular attention to his argumentation for the logic and scientific legitimacy of using *specified complexity* in detecting design. It will look at Dembski's application of the filter and the broader Design Inference program to other important scientific fields. Thus, with the scientific potential of *specified complexity* established, this chapter will be of appreciable relevance to the sections on Forrest and Pennock, as the thesis builds towards analysis of their treatment of Dembski's Design Inference generally and *specified complexity* in particular. But before arriving at such an analysis, a chapter must first be devoted to establishing Forrest and Pennock themselves as noteworthy critics.

Chapter 4 will confirm how Barbara Forrest and Robert Pennock are among the most fervent adversaries of William Dembski and the Intelligent Design movement. It will be demonstrated how their success in attacking the overall ID program and its adherents, especially Dembski, in the *Kitzmiller v. Dover* trial, confirms their worthiness of consideration. In order to prove both Forrest's and Pennock's relevance to the overall thesis herein, a survey will be needed regarding the primary elements that led to the trial, what happened during the trial, and the verdict. This will lead to examination of the ramifications of the trial's proceedings and verdict in matters of science, education, and public opinion. Forrest's and Pennock's crucial roles in the trial will then be discussed, especially pertaining to their effects, whether real or potential, on academic opinions about Dembski's program.

It was not part of the (contra-ID) plaintiff strategy to have Forrest or Pennock offer a thorough amount of direct testimony against Dembski's ideas. Instead, the plaintiffs' goals were to (1) prove that the controversial ID policy enacted by the Dover school board was indeed perceived by the school board and the Dover community itself as a promotion of religious dogma, and (2) discredit ID leaders, including Dembski, based on broader arguments related to ID's motivations and implications. The plaintiffs were quite successful at doing so, at least according to the ruling of Judge John Jones.

Moreover, Forrest and Pennock also make more specific attacks against Dembski's program in their published writings. Arguments from these writings that pertain to Dembski and his Design Inference will be surveyed in this chapter. The shared objective of Forrest and Pennock will become apparent: to characterize Dembski and all ID researchers as dishonest religionists who use pseudoscientific methodologies to present creationism as legitimate scientific research for classrooms and the public conscience. Do Forrest and Pennock prove this characterization fairly, accurately, and logically in their treatment of Dembski?

Any attempt to survey and respond to every ad hominem argument by these critics—especially those by Forrest and co-writer Paul Gross in *Creationism's Trojan Horse*—would be a detailed, fruitless distraction from the substantive ideas in question. Such distracting, fallacious charges mostly involve Dembski's theological motivation as one who is dissatisfied with predominant Darwinian models of origins; Darwinism's purposelessness in nature, based on scientific naturalism, conflicts with Dembski's Christian convictions, and some of his writings give clear indication of a Christian theistic agenda.[18]

Regardless of these superfluous attacks, both Forrest and Pennock do submit more substantive arguments against Dembski's DI and explanatory filter. These arguments will be examined and their strengths and weaknesses will be assessed. Forrest and Pennock (rightly) rely on much secondary support from experts in fields closely related to Dembski's own hypotheses. For example, among her many anti-DI arguments, Forrest, in her book *Creationism's Trojan Horse*, cites physicist-engineer Mark Perakh to question Dembski's claim that his DI is free from false positives. Also, the explanatory filter supposedly fails to catch occurrences of law and chance working together. Pennock

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[18]For example, see Wm. A. Dembski, "Signs of Intelligence: A Primer on the Discernment of Intelligent Design," *Touchstone* (July/August 1999): 76-84. Most of the arguments in that *Touchstone* double issue are reprinted in the book by Wm. A. Dembski and James M. Kushiner, eds., *Signs of Intelligence* (Grand Rapids: Brazos, 2001). Also see the introduction to Wm. A. Dembski, ed., *Mere Creation: Science, Faith & Intelligent Design* (Downers Grove, IL: InterVarsity, 1998), 13-30.

similarly argues that necessity, chance, and design often overlap without obvious distinctions in natural events. This is one of his many general points against the DI in his book *Tower of Babel: The Evidence against the New Creationism.*[19] Elsewhere, Pennock references computational environments created by the Avida software.[20] These "artificial lives" are used as evidence of how Darwinian evolutionary models can explain the *appearance* of design in what are actually purposeless natural processes. This evidence is then applied against Dembski and other ID theorists.

Although the arguments of both Forrest and Pennock fail to defeat the Design Inference as a functional scientific theory, they do present some areas of needed elaboration and further justification by Dembski and his colleagues, if the ID movement is to advance. Dembski has not ignored these challenges, to be demonstrated in the next chapter.

Chapter 5 contains Dembski's response to direct criticisms posed by Forrest and Pennock and also contains his response to the same categories of criticisms by other scholars. The chapter conveys how Dembski responds to the weightiest extant arguments against his theory. These replies are found in numerous books and articles written since *Kitzmiller* and in his direct expert rebuttal to critics written for the court. Dembski's main (but not the only) apologetic strategy is to preserve the intellectual strength behind the concept of *specified complexity* within the filter and the rest of his argumentation. This focus of his has also been mentioned directly in correspondence with the present writer. He is concerned with how critics (Forrest and Pennock among them) interpret the explanatory filter as implying that necessity, chance, and design are mutually exclusive. This interpretation overlooks the fact that each of these different explanatory factors of causation can be *the primary subject of interest* for the theorist at a particular time and

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[19]Robert T. Pennock, *Tower of Babel: The Evidence against the New Creationism* (Cambridge, MA: MIT Press—Bradford, 1999).

[20]Richard E. Lenski et al., "The Evolutionary Origin of Complex Features," *Nature* 423 (2003): 139-44.

setting.[21] In response, Dembski's intellectual focus tends to be on preserving the locus of his program, *specified complexity*, as a reliable indicator of design. Criticisms that do not deal directly and robustly with *specified complexity* are superfluous and inconsequential. Specification, according to Dembski, pertains to the patterns within nature that signify intelligence to human observers. His critics (Forrest and Pennock among them) have not accounted for specification with any impressive Darwinian model, nor can they discredit specification as a viable concept.

Chapter 6 will be the concluding analysis that will argue for a defensible answer to the problem. The preceding data and evaluations will be assessed, along with consideration of a warranted philosophy of science and scientific methodology. The answer to whether Dembski's Design Inference should continue as a credible scientific model after criticism by Forrest and Pennock is significantly related to their charges of the DI being traced to a religious agenda. The conclusion here will demonstrate that such charges should be dismissed as inconsequential. Even though Dembski has plainly stated a personal, religious motivation behind his search for design inferences, and even if there are religious implications from the potential advancement of Intelligent Design, these matters have little relevance in judging the strength of the DI as a workable scientific hypothesis. Notwithstanding, the conclusion to be drawn is that the DI is scientifically and philosophically strong. Defending this conclusion will involve the assertion that *specified complexity*, Dembski's central concept within the DI, has theoretical strength and is a defensible indication of intelligent design in natural phenomena.

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[21]This is the substance of Dembski's argument in *Design Revolution*, 93. *Infra*, chap. 5.

CHAPTER 2

DEMBSKI AND THE INTELLIGENT DESIGN MOVEMENT

It will serve the present thesis to survey the most important thinkers, ideas, and issues behind the Intelligent Design (ID) movement, of which Dembski is a major contributor. Although there are obvious similarities, ID science has developed new goals and intellectual frameworks since its precursors in British natural theology. This survey will demonstrate the eventual rhetorical shift in the thought and agendas of ID's leaders. Their arguments against Darwinism's substantial methodological and evidential weaknesses cannot be overemphasized; collectively, they have developed an arduous comprehensive critique of Darwinism and the scientific naturalism associated with it. Furthermore, their collective program includes a replacement of Darwinism, with its grounding of nature in blind chance processes, as a failing paradigm for origins studies. They offer in its place hypotheses and evidences that the cosmos and living organisms are results of intelligent, purposeful agency.

It will become evident how the present thesis is indebted to and builds upon the historical analysis of Thomas Woodward. His research contains useful data on how various ID thinkers have withstood criticism to date, but direct assessment of Dembski is limited. In agreement with Woodward, this chapter will defend modern ID science as a legitimate area of research. Two notable realities of the ID movement will prove to be perfunctory regarding the question of whether it should be taken seriously as a field of science: (1) any potential evidentiary weaknesses within particular ID programs; such problems have been and can continue to be addressed by Dembski and other ID theorists

within legitimate yet imperfect methodologies, and (2) the affinities of some ID thinkers, including Dembski, with religious and theological worldviews.

Brief History of ID Thought and Research

This chapter will briefly examine important ID researchers such as Michael J. Behe and others whose discoveries should be deemed as congruous with Dembski's in advancing ID as a successful enterprise. Notice will also be given as to how the Darwinian scientific establishment has responded to the concept of a designing agent in nature. Such response has required nuances of rhetoric and levels of sophistication quite different from those used to combat earlier challenges from religious apologists, such as British natural theologians and biblical creationists.

William Paley's Watchmaker Analogy

No discussion of the historical roots[1] of the contemporary ID movement should overlook William Paley (1743-1805), arguably the most notable of the British natural theologians who responded to the theological skepticism of the Enlightenment era. Paley's enduring theistic and teleological work, *Natural Theology: Or, Evidences of the Existence and Attributes of the Deity* (1802), is his effort to support theistic belief on rational grounds. His watch analogy has endured long in the history of philosophy. The

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[1]Although historical attention is being given here to Paley, it should be mentioned that the idea of an intelligent mind as the originator of the universe goes back to ancient Greece and Rome. See Michael Ruse, "The Argument from Design: A Brief History," in *Debating Design: From Darwin to DNA*, ed. Wm. A. Dembski and Michael Ruse (Cambridge, NY: Cambridge University Press, 2004), 13-16.

Much later, a contemporary of Darwin, Schiller, wrote that "it will not be possible to rule out the supposition that the process of Evolution may be guided by an intelligent designer." F. C. S. Schiller, "Darwinism and Design Argument," in *Humanism: Philosophical Essays* (New York: The Macmillan Co., 1903), 141.

As for the modern resurgence of design theories, Fred Hoyle was among the leaders in physics and cosmology in the middle of the twentieth century. He and others saw various ways in which physics and chemistry were fine-tuned for advanced life to thrive. Fred Hoyle, *The Intelligent Universe* (New York: Holt, Rinehart, and Winston, 1983).

And in biology, present ID leader Michael Behe has been greatly influenced by Michael Polanyi, who, in the mid to late twentieth century, led biologists in unraveling the intricate complexities of DNA and the machinelike irreducible complexity of living organisms. Michael Polanyi, "Life Transcending Physics and Chemistry," *Chemical and Engineering News* 45 (1967): 54-66.

analogy asserts that a reasonable observer would recognize that the natural order, like a watch, has obvious signs of purpose in its properties. Nature and the watch both contain undeniable inferences that a rational creator designed them.

Paley maintains considerable confidence in the design argument in *Natural Theology*. He insists that just one example of design in nature, such as the intricacies of the eye, would be adequate in proving that a mindful creator exists. Any subsequent examples would simply build the argument cumulatively. He says:

> Were there no example in the world, of contrivance, except that of the *eye*, it would be alone sufficient to support the conclusion which we draw from it, as to the necessity of an intelligent Creator. . . . The proof in each example is complete; for when the design of the part, and the conduciveness of its structure to that design is shown, the mind may set itself at rest; no future consideration can detract any thing from the force of the example.[2]

Paley's teleological deduction is appreciable. However, his interpretation of nature begins to demonstrate unwarranted bias as he then argues how observation of nature displays attributes of a benevolent Christian God. While claiming that "[i]t is a happy world after all,"[3] Paley overlooks that nature is also "red in tooth and claw."[4]

Other prominent works of Paley, *A View of the Evidence of Christianity* (1794) and *The Principles of Moral and Political Philosophy* (1785), were required readings at Cambridge for, ironically, Charles Darwin. Even though Darwin generally disliked most of his Cambridge studies, he claimed to be especially "charmed and convinced" by the reasoning of *Evidence of Christianity* and *Natural Theology*.[5] Darwin's acceptance of Paley's theistic proofs from nature would, of course, succumb to the idea of natural

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[2]William Paley, *Natural Theology: Or, Evidences of the Existence and Attributes of the Deity Collected from the Appearances of Nature* (Whitefish, MT: Kessinger, 2003), 44-45. Emphasis from the original.

[3]Ibid., 457.

[4]A much quoted phrase from Tennyson's *In Memoriam A.H.H.*, Canto 56.

[5]Charles Darwin, *The Autobiography of Charles Darwin 1809-1882,* ed. Nora Barlow (London: Collins, 1958), 59.

selection. Yet it has been proposed that Paley's ideas had "served as Darwin's lifelong dialectical base—a sort of intellectual sounding board from which he was able to develop his own diametrically opposed theory of origins."[6]

Just before Paley's own particular arguments had been publicized in *Natural Theology*, David Hume had written *Dialogues on Natural Religion* (1779). Philosophers of science until the present have considered Hume's critique as "a sustained and devastating attack" against the design arguments of natural theologians.[7] This attack points out two apparent weaknesses in design arguments. First, according to Hume, since they are by analogy, they are specious arguments de facto.[8] Secondly, they fall under the weight of Hume's oft-noted skepticism of inductive generalizations that are based on past experience.[9] Paley apparently never made the effort to address Hume's charges. However, William Dembski rebuts both points of Hume's criticism by citing Hume's contemporary opponent, Thomas Reid. First, this rebuttal claims that Hume's criticism against design arguments from analogy misrepresents what are actually very solid appeals to the best explanations, based on typical human experience. Regarding Hume's second point, he has overlooked the common sense understanding that "[o]ur ability to recognize design must . . . arise independently of induction, and, thus, independently of a

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[6]From an analysis of John Campbell by Thomas Woodward, *Doubts about Darwin: A History of Intelligent Design* (Grand Rapids: Baker Books, 2003), 242.

[7]For example, see Charlotte R. Brown, "Paley, William," in *Routledge Encylopedia of Philosophy*, vol. 7, ed. Edward Craig (New York: Routledge, 1998), 188.

[8]In explaining Hume's point, Dembski states, "The problem with arguments from analogy is that they are always arguments from disanalogy. Indeed, if there were no disanalogy, there would be no need to argue from analogy, because in that case we would be dealing with things that are identical and not merely analogous. (Things analogous in every respect are identical.)" See Wm. A. Dembski, *The Design Revolution: Answering the Toughest Questions about Intelligent Design* (Downers Grove, IL: InterVarsity, 2004), 224.

[9]According to the Humean argument, "[W]hile we have past experience of watches being designed, . . . we have no experience of organisms, or for that matter a universe, being designed." Ibid., 225.

Humean inductive framework."[10] Dembski argues that it is a fundamental part of man's epistemic nature to recognize patterns of design.

Twentieth Century Criticisms of Darwinian Theory

There is no exact defining moment or effort that brought about the contemporary chapter of the Intelligent Design story. Nevertheless, the present movement, arguably, was ignited by questions raised in *The Mystery of Life's Origin: Reassessing Current Theories*, with combined editorial work by Harvard science historian Charles B. Thaxton, Texas A & M researcher Walter L. Bradley, and geochemist Roger L. Olson. Their 1984 book criticized origin of life science studies up until that time, exposing the difficulties for theorists to posit a convincing explanation for the emergence of the first life forms in strictly evolutionary terms. As implied by the credentials of *Mystery*'s editors, this critique was certainly not a biblically based or religiously motivated enterprise. The book was sponsored by the Foundation for Thought and Ethics and published by the once prestigious though now discontinued secular press, Philosophical Library.

Soon after *Mystery*, British-Australian biochemist Michael Denton expressed more doubts about prevailing evolutionary models. In *Evolution: A Theory in Crisis* (1985), Denton takes what he calls a "radical position" by viewing the problems within origins science "not as puzzles, but as counterinstances of paradoxes which will never be adequately explained within the orthodox [Darwinian macroevolutionary] framework, and indicative therefore of something fundamentally wrong with the currently accepted view of evolution."[11] The book argues that there are difficulties in various disciplines, from paleontology to molecular biology, that will never be resolved within the prevailing

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[10]Ibid., 229.

[11]Michael Denton, *Evolution: A Theory in Crisis* (Bethseda, MD: Adler and Adler, 1986), 16.

Darwinian approach. Denton draws an explicitly Kuhnian conclusion that the priority of the Darwinian paradigm has resulted in unfulfilled promises.[12]

Denton's explanation of how evolution is beyond the reach of "chance" is a prelude to Dembski's program. Denton argues for the high improbability of life developing from chance mutations. It is analogous to other high complexities attributed to design such as grammatical sentences, watches, computer programs, airplane engines, "and in fact all known complex systems."[13] Denton's work would eventually inspire Dembski to devise more concrete theorems for explaining complexity where chance models fail.

As with Thaxton et al., Denton's groundbreaking work should also not be identified with any motivation associated with biblical creationism or religiously inspired opposition to Darwinism. Even though Denton was once listed as a senior fellow of the explicitly Christian ID think tank, the Discovery Institute, he is no longer a contributor. Furthermore, his proposed alternative for explaining life's origins is not only a departure from the orthodox natural selection model, but it also has little in common with traditional Christian views. In *Nature's Destiny* (1998), the sequel to *Evolution*, Denton suggests that "the cosmos is fit . . . for the origin and evolutionary development of life's becoming" (as opposed to life's "being"). He allows for design, but completely within his own ethereal, abstract nuance of a closed-system, naturalistic explanation.[14]

Nevertheless, as printed on the cover of the controversial *Darwin on Trial* by Phillip Johnson, Denton would strongly endorse a new kind of critic of Darwinism; one more directly tied to evangelical Christianity, but not concerned with advancing any biblical creationist evidences that had been typically associated with evangelical critics.

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[12]In Denton's concluding appeal for a paradigm shift away from Darwinian macroevolutionary theories, he makes substantive reference to Thomas Kuhn. Ibid., 344-58. *Infra*, this chap. n. 59.

[13]Ibid., 313.

[14]Michael Denton, *Nature's Destiny: How the Laws of Biology Reveal Purpose in the Universe* (New York: Free Press, 1998), xiv.

With Denton among his supporters, Johnson would become the leading voice for Intelligent Design's challenge to the instituted paradigm of Darwinism. He would strike hard rhetorical blows, not only against status quo origins research, but also against the scientific materialism forming its basis.

Phillip E. Johnson and His Critique of Darwinism

Thomas Henry Huxley has been commonly referred to as Darwin's bulldog; Phillip E. Johnson could easily be called the bulldog for the entire ID movement, giving it a noticeable hearing in the public arena, while leaving the technical argumentation within the overall program to the scientific experts. In his influential book, *Darwin on Trial* (1991), the University of California at Berkeley law professor admits an evangelical Christian bias; however, this personal religious disposition is basically irrelevant to his thesis and methodology that operate from an expertise in legal rhetoric. He argues that evolutionary science, rooted in methodological materialism, is beset with major discrepancies.

According to this first major book by Johnson, the critical problem is "whether Darwinism is based upon a fair assessment of the scientific evidence, or whether it is another kind of fundamentalism."[15] He strongly concludes that it is the latter. Darwinian science, dogmatically bound to the assumption that extremely complex biological organisms arose through purposeless material processes, has utterly failed to provide any tenable mechanism of chance within nature itself that can produce such complexity.

As a common philosophical theme throughout *Darwin on Trial*, Johnson works toward a defense of the methodology of falsification, as popularized by Karl Popper. Falsification exposes when one wishes to "protect a theory rather than test it."[16]

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[15]Phillip E. Johnson, *Darwin on Trial*, 2nd ed. (Downers Grove, IL: InterVarsity, 1993), 14.

[16]Ibid., 150.

Furthermore, Johnson believes, "Falsification is not a defeat for science, but a liberation. It removes the dead weight of prejudice, and thereby frees us to look for the truth."[17] If evolutionary scientists were actually pursuing truth, they would admit that the obvious complexities in biology must be attributed to teleological design beyond nature; life is beyond the workings of mere chance. And they would have the intellectual integrity to allow their most fundamental premises to be placed under scrutiny.

Popper's demarcation criterion for falsification asserts that a scientist's "[c]riteria of refutation have to be laid down beforehand."[18] Charles Darwin himself acknowledged the kinds of evidences that could seriously damage his theory.[19] Conversely, according to Johnson, modern neo-Darwinists are too eager to cite proof of natural selection to the point of stating tautologies, while having no interest in proposing the circumstances by which the theory would be falsified. Therefore, despite the growing body of evidence in the fossil record, molecular biology, prebiology, and other

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[17]Ibid., 156.

[18]Karl R. Popper, *Conjectures and Refutations* (London: Routledge and Kegan Paul, 1963), 38. Or, as Lakatos interprets Popper, "[T]he scientist . . . must specify in advance under what experimental conditions he would give up his *most basic* assumptions." Imre Lakatos, *The Methodology of Scientific Research Programmes*, vol. 1 of *Philosophical Papers*, ed. John Worral and Gregory Currie (New York: Cambridge University Press, 1978), 141; cf. 146. Emphasis his. Also see Karl R. Popper, *The Logic of Scientific Discovery* (New York: Basic Books, 1959), 78-92.

According to ID theorist Stephen C. Meyer, "Most philosophers of science now recognize that neither verifiability nor testability (nor falsifiability) nor the use of lawlike explanation (nor any other criterion) can suffice to define scientific practice." Stephen C. Meyer, "The Scientific Status of Intelligent Design: The Methodological Equivalence of Naturalistic and Non-Naturalistic Origins Theories," in *Science and Evidence of Design in the Universe*, Proceedings of the Wethersfield Institute, ed. Michael J. Behe, Wm. A. Dembski, and Stephen C. Meyer (San Francisco: Ignatius 2000), 153. Also see Larry Laudan, "The Demise of the Demarcation Problem," in *But Is It Science? The Philosophical Question in the Creation/Evolution Controversy*, ed. M. Ruse (Buffalo, NY: Prometheus, 1988), 337-50.

[19]In *Origin of Species*, Darwin states, "If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down. But I can find out no such case." Charles Darwin, *The Origin of Species by Means of Natural Selection* (Buffalo, NY: Prometheus, 1991), 139. Rather than seeing this as any proto-Popperian form of a falsification criterion submitted by Darwin, Dembski calls it an "impossible test" by which Darwin unfortunately disallows any viable critique of his theory. See Wm. A. Dembski and Michael Ruse, "Intelligent Design: A Dialogue," in *Intelligent Design: Wm. A. Dembski & Michael Ruse in Dialogue*, ed. Robert B. Stewart (Minneapolis: Fortress, 2007), 14. ID historian Thomas Woodward is also reluctant to call Darwin's statement a precise falsification criterion. See Thomas Woodward, *Darwin Strikes Back: Defending the Science of Intelligent Design* (Grand Rapids: Baker, 2006), 21.

disciplines that point to purposeful causes, Darwinists continue to turn away from such evidence. They blindly continue, convinced that real science can only thrive when there is little or no consideration of there being any purpose beyond the mindless processes of the material world.[20]

After *Darwin on Trial*, Johnson would expand his efforts toward discrediting metaphysical naturalism as a general ethos in *Reason in the Balance* (1995). This book criticizes how science and multiple intellectual fields operate under the assumption that only the physical world is real. Yet a candid examination of the facts demands otherwise; it requires a new way of reasoning about nature and whether nature points to truths beyond itself.

Following Johnson's Lead

Thaxton et al., Denton, and Johnson brought what they deemed to be well-founded and crucial questions to consider regarding Darwinism and materialism. Their negative critique of the established paradigm would open the way for new specialists to bring positive theories that could further validate a paradigm shift in origins studies. These new models for design would take little time in generating a wave of response by both academia and the popular media.[21] Michael J. Behe would develop such a constructive program, pointing toward a fascinating phenomenon that strangely resembles an outboard motor.

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[20]To explain further his philosophy of science, Johnson cites Popper's defense of Einsteinian thought as successful science, as opposed to the pseudo-sciences of the social methodology of Marx and the psychological methodology of Freud. Einstein was legitimized through hard experimentation subject to falsification, while the other two were shown to be circular by merely confirming examples and ad hoc flexibility. Johnson contends that the same critical mistakes should be exposed in most evolutionary science methods. Johnson, *Darwin on Trial*, 148.

[21]As for media response, a *New York Times* review of Michael Behe's *Darwin's Black Box* was favorable, but falsely accused Behe of theological motivation, leading to erroneous straw man assumptions of what his work necessarily implies. James Shreeve, "Design for Living," *New York Times Book Review*, 4 August 1996 [on-line]; accessed 22 January 2009; available from http://query.nytimes.com/gst/fullpage.html?res=9A06EFD8143FF937A3575BC0A960958260&sec=&spon=&pagewanted=1; Internet.

Michael J. Behe. An achieved scientist who teaches biochemistry at Lehigh University, Michael Behe claims no metaphysical or religious agenda behind his work.[22] Yet much of his research has brought substantial support to criticisms of macroevolution and metaphysical materialism, especially the criticisms levied by Phillip Johnson. Both men plainly admit close collaboration (along with Dembski and others) for bringing about revolutionary change in science.

While setting forth a plausible alternative to natural selection, Behe posits a clearly expressed demarcation for neo-Darwinian microbiology, exposing events that cannot be explained from within Darwinism or any strictly naturalistic framework that operates on a chance, trial-and-error basis.[23] Behe recognizes that within nature are many multi-part, functionally unified systems in which each minute part of such a system must have precise operational properties and be fixedly in its own place in order for the system to function and provide survivability for the organism it serves. These systems display *irreducible complexity* that never could have developed within the slow, adaptive process of natural selection; evolution, as commonly understood, would never allow this kind of system to survive long enough to achieve and maintain its necessarily complex integration and functionality before the system would die out from evolutionary pressures.

In the landmark 1996 book, *Darwin's Black Box*, Behe conveys how the idea of Darwinian evolution is being forced to its explanatory limits by recent findings in biochemistry, especially in the case of his most notable example, the bacterial flagellum.

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[22]However, as a Roman Catholic, Behe does not avoid discussing the important relationships between origins science and the doctrines of the Catholic Church. Michael J. Behe, "A Catholic Scientist Looks at Darwinism," in *Uncommon Dissent: Intellectuals Who Find Darwinism Unconvincing*, ed. Wm. A. Dembski (Wilmington, DE: ISI, 2004), 133-51.

[23]The "Black Box" of Behe's famous book is Darwin's ignorance of the machinelike functions within a cell that, according to Behe, seem to contradict explanation from random mutation and natural selection. Modern microbiology now allows observance of such functions to which Darwin was not privy. Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Simon & Schuster, 1996).

This is the fascinating swimming machinery with motor-like parts and a whipping tail found in some bacterial cells. In challenging the problematic Darwinian model of extremely slow, incremental, purposeless evolutionary processes, a better explanation of irreducibly complex systems like the flagellum would admit that they are products of an intentional designer. Behe believes that the best way to understand the origins of such systems is in terms of their being placed in nature as fully intact and operational for an organism's survival. After the writing of *Darwin's Black Box*, Behe's example from the bacterial flagellum would also serve as a leading case study for William Dembski's work. Dembski uses it often throughout his own literature and lectures to illustrate how a system built from Complex Specified Information (CSI) is likely not to have evolved through natural selection.

Dean Kenyon. Behe was actually not the first scientist to challenge Darwinism and suggest Intelligent Design from within modern microbiology. The textbook *Of Pandas and People* was first published in 1989, seven years before Behe's book, *Darwin's Black Box*. Pandas was the combined work of Thaxton (as academic editor), along with co-writers Percival Davis and Dean Kenyon. Arguably, Kenyon has received the most attention of the three. Earlier in his career, he would achieve notoriety for attempting to explain the evolution of lifeless pre-biotic chemistry into the most fundamental forms of life by completely unguided natural processes. However, Kenyon would eventually forsake the neo-Darwinian idea he had once proposed, *Biochemical Predestination*, after recognizing that there is no observable mechanism for self-organization of pre-biotic molecules into the building blocks of life; the complexities of living things and life's beginnings can only be adequately explained as the product of an intelligent designer. Kenyon would soon become one of microbiology's most provocative scientific converts into the ID movement.

No book from modern publishing would seriously propose design as a viable alternative to Darwinian evolution until Kenyon et al. would do so in *Pandas*. And this historic textbook contains modern biology's first use of the term "intelligent design" in referring to scientific inquiry into the effects and properties of intelligent agency. The book would eventually become the central element in the battle for design education in the *Kitzmiller* trial, to be explained ahead.

Stephen C. Meyer. Another major ID figure who theorizes in microbiology is Stephen C. Meyer. Instead of directly from the laboratory, Meyer approaches biochemical problems of science from historical and philosophical standpoints. His Cambridge University doctoral dissertation involved origin of life biology and the history of scientific methodologies. Meyer has since co-written or edited various books on intelligent design.[24] He has also contributed articles for major newspapers, such as *The Wall Street Journal* and *The Los Angeles Times*.

Pertaining to his technical publications, Meyer is most noted (or most criticized, in anti-design circles) for his article about the problem of determining the origin of the information that causes biological systems to be built.[25] Complex Specified Information (CSI) brought about by an intelligent designer should be considered as possibly the best explanation for the rapid rise of novel life forms during the fossil-recorded era known as the "Cambrian Explosion." Complex Specified Information is also the centerpiece of Dembski's Design Inference, and the two scholars often work in

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[24]Arguably, Meyer's exhaustive new book could become the most prominent and convincing resource for ID theory to date. Stephen C. Meyer, *Signature in the Cell: DNA and the Evidence for Intelligent Design* (New York: HarperCollins, 2009). Also see John Angus Campbell and Stephen C. Meyer, eds., *Darwinism, Design, and Public Education*, Rhetoric and Public Affairs Series (East Lansing: Michigan State University Press, 2003), and Meyer, *Science and Evidence of Design*.

[25]Stephen C. Meyer, "The Origin of Biological Information and the Higher Taxonomic Categories," *Proceedings of the Biological Society of Washington* 117 (2004): 213-39. The society behind the article is loosely associated with the Smithsonian Institution. The publication's editor, Richard Sternberg, reportedly received heavy criticism from the Smithsonian for publishing Meyer's article because it supports ID. The controversy is explained by Woodward in *Darwin Strikes Back*, 26-27.

tandem.[26] Meyer's research has addressed theoretical conflicts between CSI in biological events and the Darwinian mechanisms that are proposed to account for the CSI, and Dembski's efforts, in articulating the Design Inference, are directed toward the most operable theoretical alternative to Darwinian evolution for explaining CSI in such events.

Gonzalez and Richards. As the intellectual energies of microbiological specialists such as Behe, Kenyon, and Meyer have been advancing ID science, there have been other theorists turning their attention upward to cosmological arguments for an intelligent designer of the universe. Astronomer Guillermo Gonzalez and science philosopher Jay W. Richards have collaborated to refute the common assumption that the earth has no special status within the Milky Way or the universe. To the contrary, they argue that ours is *The Privileged Planet*, according to the title of their 2004 book. Based on the Weak Anthropic Principle,[27] they present compelling evidence that the universe is not only fine-tuned to allow life—even complex life—to exist and thrive within the unique conditions of earth, but earth is also uniquely situated in just the right place in the galaxy for cognizant human beings to make scientific discoveries. This two-fold thesis by Gonzalez and Richards strongly implies the workings of an intelligent designer of the cosmos. However, it is beyond their argumentation in this book (and the book's corresponding video production) to specify whether or not such a designer might be the Christian god or any other particular deity or deities.[28]

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[26]Meyer discusses to his collaboration with Dembski throughout *Signature in the Cell.*

[27]For a brief but useful discussion of physics of the universe related to biological systems, including the various anthropic principles being proposed, see Robert Kaita, "Design in Physics & Biology: Cosmological Principle & Cosmic Imperative?" in *Mere Creation: Science, Faith & Intelligent Design*, ed. Wm. A. Dembski (Downers Grove, IL: InterVarsity, 1998), 385-401.

[28]Much controversy surrounded Gonzalez shortly after *The Privileged Planet* was published. Iowa State University denied him tenure. The reason given was for his weak publication record, although some ID proponents claim he was discriminated against because of his associations with ID and religion. See Richard Monastersky, "Intelligent Design vs. Tenure: Was it antireligious bias when Iowa State took a pass on a scientist with controversial views?" *The Chronicle of Higher Education,* 1 June 2007, sec. A, pp. 9-10.

Jonathan Wells. The ID scientists mentioned above made continual efforts to gather evidential support for their hypotheses in the late 1990s and early 2000s, while others continued on more negative trajectories of criticizing the explanatory failures of Darwinism. Jonathan Wells, associated with the University of California at Berkeley, first as a doctoral graduate, then as a research biologist, has become one of the most recognized and articulate of these critics. His book (and supplemental video) *Icons of Evolution* (2000) is his most influential and controversial.

Wells defends his anti-Darwinism agenda by actually citing support from the most powerful pro-Darwin organization in the United States. He says, "According to a 1998 booklet on science teaching issued by the National Academy of Sciences [(NAS)], 'it is the nature of science to test and retest explanations against the natural world.'"[29] He then notes that this same NAS booklet quotes Thomas Jefferson, insisting that scientific claims be subject to the scrutiny of the average citizen. In the context of such beliefs, Wells is confident that careful examination of Darwinian evidences by the average citizen should clearly expose their inherent weaknesses. "Theories that survive repeated testing may be tentatively regarded as true statements about the world. But if there is a persistent conflict between theory and evidence, the former must yield to the latter."[30] Disclosing these crucial conflicts is the purpose behind *Icons*. Wells says that most people, including biologists, give basically the same list of examples when asked to defend Darwinism, "because all of them learned biology from the same few textbooks."[31] These problematic examples, according to Wells, are the ten *Icons of Evolution* that he refutes in the book. One by one, he probes what he deems to be faulty support for Darwinian macroevolution from the Miller-Urey experiment, Darwin's tree of life

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[29]Jonathan Wells, *Icons of Evolution: Science or Myth? Why Much of What We Teach about Evolution Is Wrong* (Washington: Regnery, 2000), 11.

[30]Ibid., 2.

[31]Ibid., 6.

growing from a common ancestor, perceived homology in vertebrate limbs, and Haeckel's misleading embryo drawings in textbooks. He also discusses *Archaeopteryx* as the so-called "missing link," the debunked example of peppered moths, Darwin's Galapagos finches, four-winged fruit flies, fossil horses and directed evolution, and the evolution from ape to human. The questions raised by Wells have continued to motivate responses by the secularist, pro-evolution National Center for Science Education, and their answers were briefly inscribed in *The New York Times.*[32]

More recently, in 2008, Wells has joined William Dembski in co-authoring an engaging survey of ID research to the present, *The Design of Life.* It is intended to be a sequel, or third edition, to the controversial book at the center of the *Kitzmiller* trial, *Of Pandas and People.*

The ID proponents just surveyed, from Johnson to Wells, could each be considered as theistic, to some degree or another. Each, including William Dembski, has indicated in his writings the plausibility of a creative agent behind the universe's inception and laws; an agent that would, theoretically, be independent of physical nature. But each proponent has also expressed that answering questions about who or what such an agent or agents might be is perfunctory to the task at hand for ID as a scientific program. This demands that an important distinction be understood: as part of a so-called "wedge strategy," Johnson and the Discovery Institute (with Dembski among its fellowship) would plot how to engage culture with a specifically Christian worldview *in response to* growing scientific evidence for a designing agent.[33] The politico-cultural part of their agenda, however, should not be confused with their specific scientific methodology that originally seeks to expose the weaknesses of Darwinism and the materialism in which it is grounded.

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[32]"10 Questions, and Answers, About Evolution," in *The New York Times,* 23 August 2008 [on-line]; accessed 22 January 2009; available from http://www.nytimes.com/2008/08/24/us/WEB-tenquestions.html; Internet.

[33]*Infra*, this chap.

Secularist Support for ID as Real Science

Judge Jones's interpretation that ID is carried forth with explicit religious motivation is fundamentally germane to his final court decision. The present research will examine more precisely how he arrives at such an interpretation and conclusion in chapter 4, which canvasses the details of *Kitzmiller*. However, there is significant proof that theism is no prerequisite for engaging in ID science or even for merely supporting it. Such proof pertains to the rising number of notable scholars associated with ID who are clearly secularist or non-theistic in their worldview, yet recognize Intelligent Design as a paradigm with real potential.

Paul Davies. Paul Davies is a theoretical physicist who echoes many of the observations by Gonzalez and Richards, yet he actually theorizes that the circumstances that led to earth and humans winning the apparent "cosmic jackpot" might be found embedded within the very universe itself.[34] Contrary to the long-term goals of many if not most ID strategists, Davies has little interest in ever engaging in metaphysical concepts outside of physical processes. He does, however, acknowledge design qua design, and he typically avoids the conceptual purposelessness found in most Darwinian chance explanations.

David Berlinski. David Berlinski is the one of the most exceptional counterexamples to the common claim that ID supporters mix religion and/or theistic belief with science. Prior to his association with ID, this seasoned American intellectual taught at prestigious universities throughout the United States and Europe and has written on numerous, varying subjects, including the areas of his extensive doctoral training—

[34]Davies offers an atypical theory, proposing that we might actually be affecting the universe's past evolution by the observations we make in the present. Paul Davies, *Cosmic Jackpot: Why Our Universe Is Just Right for Life* (New York: Houghton Mifflin, 2007). This idea is in keeping with the "participatory anthropic principle." See Kaita, "Design in Physics and Biology," 392-93.

philosophy from Princeton University and mathematics and molecular biology from Columbia University.

Berlinski is a self-described secular Jew and an agnostic pertaining to belief in any deity or personal designer. However, he has written numerous scathing articles against the shortcomings of Darwinism. He was invited to join the pro-ID Discovery Institute after he wrote "The Deniable Darwin" in the July 1996 edition of *Commentary* and its ensuing controversy.[35] Berlinski has since criticized evolutionary psychology's attempt to explain the human mind solely within material categories.[36] Moreover, he is quite skeptical about science having any proven ability to explain how life could have originally developed from mere chemical processes.[37] While criticizing one Darwinian shortcoming after another in his writings, Berlinski considers any workable explanation for life's origins to be beyond his immediate concerns, if not theoretically unattainable.

Steve William Fuller. Another ID supporter averse to any personal theological agenda is Steve William Fuller (University of Warwick). The American philosopher of science critically questions the general legitimacy of science's elevated status in culture.[38] His writings especially criticize contemporary Darwinism's assaults against ID's recent revolution. When looking at history, Fuller believes that modern science has its very basis in humanity's attempt to transcend itself and reach God. He also argues that the concept of complexity in nature distinguishes ID from "other versions of creationism."[39]

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[35]For a chronicling of Berlinski's entry into the ID field, see Woodward, *Doubts about Darwin*, 171.

[36]David Berlinski, "On the Origins of the Mind," *Commentary*, November 2004, 26-35.

[37]David Berlinski, "On the Origins of Life," *Commentary,* February 2006, 22-33.

[38]As an expert on this issue, Fuller has coined the term "Social Epistemology." See Steve Wm. Fuller, *Social Epistemology*, 2nd ed. (Bloomington: Indiana University Press, 2002).

[39]Steve Wm. Fuller, *Science Vs Religion?: Intelligent Design and the Problem of Evolution* (Cambridge, UK: Polity, 2007), 69.

As an expert witness for the Dover Area School District in the *Kitzmiller* trial, Fuller would support the legitimacy of Intelligent Design as a scientific enterprise and give a well-versed handling of ID's key thinkers, especially Dembski. More on Fuller's role in the case will be mentioned ahead in the present work.

Recognition of these three prominent researchers suggests that it would be a gross oversimplification to associate non-theists automatically with stringent scientific naturalism that only accommodates non-teleological theories. Davies, Berlinski, and Fuller have given robust support for ID's viability, although they have personal worldviews in secularism and non-theism.[40] Additionally, Bradley Monton (University of Colorado at Boulder) is an explicitly atheistic scholar who is quickly gaining recognition as a supporter of ID methodology.

Conversely, it would be equally erroneous to associate origins experts who have some degree or another of theistic belief automatically with Intelligent Design and/or biblical creationism. Theorists such as Kenneth Miller and Howard Van Till proclaim belief in God but have absolutely no confidence in ID (much less, biblical creationism) as real science.[41] Notwithstanding, with the worldview grounding of ID's proponents and critics aside, attention will now turn to some of the leading critics and reasons they give for opposition—oftentimes vehement—to ID's continuation.

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[40]The three non-theists emphasized here are well-known, perpetual supporters of ID. However, the conversion of Antony Flew, "one of the twentieth century's most famous atheist philosophers," to philosophical theism—or, more precisely, deism—is certainly noteworthy. Flew was profoundly convinced by recent ID research, especially that of Behe. "Key to his conviction that there must be an intelligent mind behind the universe is the nature of DNA." Gene Edward Veith, "Flew the Coop: How a Prominent Atheist Philosopher Made the Revolutionary Decision to Become a Theist," *World*, 25 December 2004, 22.

[41]Kenneth R. Miller, "Looking for God in All the Wrong Places: Answering the Religious Challenge to Evolution," in *Evolutionary Science and Society: Educating a New Generation*, ed. J. Cracraft and R.W. Bybee, Biological Sciences Curriculum Study (Colorado Springs, CO: BSCS, 2005), 13-21. Also see Howard J. Van Till, "When Faith and Reason Cooperate," 147-63, and "The Creation: Intelligently Designed or Optimally Equipped?" 487-512, both in *Intelligent Design Creationism and Its Critics: Philosophical, Theological, and Scientific Perspectives*, ed. Robert T. Pennock (Cambridge, MA: MIT Press, 2002).

Scholarship's Debate on ID's Scientific Viability

After the most influencial Intelligent Design leaders—especially Johnson, Behe, and Dembski—came to prominence in the late 1990s, it took little time for the Darwinian scientific establishment to attack the movement for lacking credibility as true science. In general, criticisms centered around seven primary claims: (1) ID arguments are not supported by evidence, while (2) the evidence that supports evolution is extremely compelling. (3) Month after month, new discoveries are made that bring further confirmation of Darwinism. While some critics have insisted that (4) ID is not testable, others have said that (5) ID has been put to tests and has convincingly failed. (6) ID has no credibility, since it is merely a political and/or religious movement. And (7), claiming that ID proponants are never published in peer-reviewed journals, critics call it pseudoscience.[42]

These kinds of charges would gain full momentum in the public conscience by the time of the *Kitzmiller v. Dover* trial of 2005. The ruling by Judge Jones would be centered on his conviction that ID does not pass as real science, is steeped in religious motivations, and is therefore not fit for public school consumption. He considered ID to be discredited, first, because of its openness to supernatural causes, which science, he was convinced, has not permitted historically. Secondly was perceived close affinities of the central ID concept *irreducible complexity* with earlier arguments from creation science. And thirdly, he was confident that the scientific establishment has sufficiently refuted ID's negative attacks against Darwinism.[43] Undoubtedly, the trial's outcome

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[42]These seven general criticisms are summarized in Woodward, *Darwin Strikes Back*, 25-26.

[43]A useful analysis of these "demarcation criteria" by Judge Jones and a substantive critique against the Dover decision come from Bradley Monton. Interestingly, Monton, who teaches philosophy at University of Colorado at Boulder and theoretically supports ID's legitimacy, also professes philosophical atheism. Bradley Monton, "Is Intelligent Design Science? Dissecting the Dover Decision," a paper presented at the University of Toledo Science and Religion Conference, April 2006 [on-line]; accessed 30 January 2009; available from http://philsci-archive.pitt.edu/archive/00002592; Internet. Also see Bradley Monton, *Seeking God in Science: An Atheist Defends Intelligent Design* (Buffalo, NY: Broadview, 2009). *Infra,* chaps. 4 and 6.

proved the substantial confidence of Darwin's apologists in their ability to damage ID in legal rhetoric and public perception. A brief survey is now in order of some of the leading scholars and their claims from both inside and outside of *Kitmiller*; scholars with incessant skepticism of ID that support opinions like Judge Jones's.

A leading expert witness, Kenneth Miller (Brown University), wrote *Finding Darwin's God* (1999) and became one of Behe's staunchest opponents before, during, and after *Kitzmiller*. Miller has accused Behe of resurrecting old, defeated arguments from design out of Paley's tradition, although Miller tends to overemphasize the Paley-Behe affinities; the British theologian, as mentioned previously, directly associated the "contriver" of nature with the Christian God, while Behe, in his own scientific conclusions, is intentionally much more ambiguous as to the contriver's exact nature.

Using support from Darwinists such as Richard Dawkins, Miller's main method of critique against Behe has been to explain biological systems that appear to have irreducible complexity as actually arising from non-intelligent processes of natural selection. "What evolution does is to add parts that expand, improve, and sometimes refashion living systems. Once the expansion and remodeling is complete, every part of the working system may indeed be necesary . . . That interlocking necessity does not mean that the system could not have evolved from a similar version."[44] This type of Darwinian rebuttal to irreducible complexity is labeled *co-option*, or *co-evolution*. Responses to the *co-option* theories have been given by Behe himself, as well as by Dembski and Wells.[45]

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[44]Kenneth R. Miller, *Finding Darwin's God: A Scientist's Search for Common Ground Between God and Evolution* (New York: HarperCollins, 1999), 139.

[45]Michael J. Behe, *The Edge of Evolution: The Search for the Limits of Darwinism* (New York: Free Press, 2007), 267-68. Also see Wm. A. Dembski and Jonathan Wells, *The Design of Life: Discovering Signs of Intelligence in Biological Systems*, ed. Wm. A. Dembski (Dallas: Foundation for Thought and Ethics), 151-56.

Also in 1999 came the first printing of Robert Pennock's, *Tower of Babel: The Evidence against the New Creationism*, to be examined in detail ahead. It was Pennock who introduced the label "Intelligent Design Creationism" while attempting to link ID with traditional creationists. He delivers point by point attacks predominantly against Johnson, but also against Behe and Dembski. Later, in 2001, Pennock edited the significantly one-sided book, *Intelligent Design Creationism and its Critics*. The book contains engaging back and forth debate between pro- and anti-ID authors. Far from being a ballanced effort, Pennock uses the majority of the books's arguments, both from selected contributers and from his own entries, to frame the issue in a particular way. He characterizes ID as bringing unwarranted and even dangerous theological intrusions into science when science should remain purely secular.

Commonly associated with anti-theistic arguments, Richard Dawkins would join in the contention against Intelligent Design with ample literature. Noted by the title of one of his more popular books, Dawkins writes that the appearance of design in the universe is just another aspect of *The God Delusion.*[46] Dawkins argues that both chance and design are failing concepts in explaining evolutionary processes; it is natural selection, properly understood, that best conveys how evolution really happened. Life forms of the past *gradually* climbed "Mount Improbable" by completely natural processes. They slowly overcame improbabilities one at a time, leading to today's life diversity that turns out to be theoretically plausible within a purely naturalistic system after all.[47]

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[46]Richard Dawkins, *The God Delusion* (Boston: Houghton Mifflin Co., 2006).

[47]This kind of theorizing is also found in Richard Dawkins, *Climbing Mount Improbable* (New York: Norton, 1996); and in *The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe Without Design* (New York: Norton, 1996). There are similar evolutionary arguments, explaining the continual growth of more favorable probabilities within the process of natural selection, made by other Darwinists, including E. Sober, *Philosophy of Biology* (Boulder, CO: Westview Press, 1993), 37-38; M. Ruse, *Darwinism Defended: A Guide to the Evolution Controversies* (Reading, MA: Addison-Wesley, 1982); and Daniel Dennett, *Darwin's Dangerous Idea: Evolution and the Meanings of Life* (New York: Simon & Schuster, 1995), 104-23. In this kind of explanation, Dawkins prefers the term "cumulative selection" instead of "natural selection," emphasizing the gradual building of probabilites within biological

Arguably, the most vitriolic warnings against the "bad science" of Intelligent Design came in 2004 with two prominent books by Oxford press. Niall Shanks wrote *God, the Devil, and Darwin*, warning that ID is part of an effort by religious extremists to take science back to medieval times and eventually impose a fundamentalist theocracy upon the country. Similar alarmism came from *Creationism's Trojan Horse* by Barbara Forrest and Paul Gross, which will be the subject of detailed analysis in the present work.

From an organizational standpoint, the formation of much of the current opposition to Intelligent Design, especially since the successful rise of Behe, has come from the National Center for Science Education (NCSE) in Berkeley, California. The center's leader, Eugenie Scott, has attempted tirelessly to block the advancement of ID or any program with perceived attributes of creationism. Her work as both lobbyist and scientist is explicitly directed toward discrediting any ideas that might bring skepticism about Darwinism in schools, universities, government institutions—in all effective bodies of education and public policy. Scott's skills are both organizational and rhetorical; she proves a well-rounded knowledge of both ID and Darwinist scholarship and has used such knowledge in many substantive public appearances and media presentations.[48]

The established scholars just mentioned have recently been among the most vocal representatives of the scientific academy that regard Intelligent Design as exceedingly incongruous with proper scientific induction, theoretical advancement, and educational grounding for future generations of scientists. Such scientists and philosophers have become increasingly concerned as ID programs operate in an environment in which scientific data is claimed to correspond to an intelligent agency

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systems that allow for the plausibility of a working Darwinian model. Such thinking, specifically that of Sober, is answered by M. Behe, saying that the proposal is not supported by the evidence and avoids the issue of *specification* in designed systems. Behe, *Darwin's Black Box*, 219-21.

[48]For example, Scott used arguments from Richard Dawkins and other Darwinists in a PBS television interview of herself and Wm. A. Dembski by Peter Robinson. "Darwinism under the Microscope," on the program *Uncommon Knowledge,* filmed 7 December 2001 [transcript on-line]; accessed 22 January 2009; available from http://www.hoover.org/multimedia/uk/3004521.html; Internet.

that would somehow exist beyond nature. As a result of this perceived weakness of Intelligent Design's scientific integrity, members of the National Academy of Sciences took it upon themselves to explain what "real science" should be and how a proper definition pertains to origins studies. This is the primary motivation behind the 2008 NAS-published booklet, *Science, Evolution, and Creationism*. The publication explicitly defines "science" as "the use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process."[49]

Elaborating on what the NAS endorses as a legitimate scientific method of investigation, including a Popperian need for falsification, the booklet says:

> In science, explanations must be based on naturally occurring phenomena. Natural causes are, in principle, reproducible and therefore can be checked independently by others. If explanations are based on purported forces that are outside of nature, scientists have no way of either confirming or disproving those explanations. Any scientific explanation has to be *testable*—there must be possible observational consequences that could support the idea *but also ones that could refute it*. Unless a proposed explanation is framed in a way that some observational evidence could potentially count against it, that explanation cannot be subjected to scientific testing.[50]

However, William Dembski's own work is centered on discovering active intelligence outside of nature's physical systems and creating models that aid in confirming that such intelligence is real. In *Debating Design*, he responds to methodological assumptions like those of the NAS when he insists that "science may not, by a priori fiat, rule out logical possibilities. Evolutionary biology, by limiting itself exclusively to material mechanisms, has settled in advance the question of which

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[49]National Academy of Sciences (U.S.) and Institute of Medicine (U.S.), *Science, Evolution, and Creationism: A View from the National Academy of Sciences and the Institute of Medicine* (Washington, DC: National Academies, 2008), 10.

[50]Ibid. Emphasis in the original.

biological explanations are true, apart from any consideration of the empirical evidence. This is armchair philosophy."[51]

To state this discrepancy more clearly, the NAS indeed contradicts the fact that working Intelligent Design programs, at least in theory, actually do have the potential to refute claims more fundamental for knowledge than the particular hypotheses of evolutionary biology. ID actually confounds the main assumptions of the NAS's overall scientific methodology. Systems and functions derived from certain information-rich sources observed *in* nature could be considered as de facto indicators of realities beyond natural events of both chance and necessity. Such signs of design can refute the assumption that science can tell us nothing of the existence of a mind (or, conceivably, minds) existing *independent from* nature. More specifically, William Dembski claims to have observational evidence against the scientific materialism that is upheld by the NAS and other bodies who deem it important to define "real science." Namely, his evidence of a discernable supernatural designer's imposition on natural processes that challenges the NAS philosophical stance is *specified complexity.*

The Problem in Context of Previous Research: Thomas Woodward

A fundamental purpose of the present work is to build upon the important accomplishments of historian Thomas Woodward and work toward a more specified analysis of whether Dembski's work can survive robust scrutiny. By doing so, the question of Intelligent Design's scientific merit can be answered with better confidence. Thus, a brief examination of Woodward's research is now in order.

Woodward's *Doubts about Darwin*. Woodward makes a worthwhile defense of Intelligent Design's legitimacy in *Doubts about Darwin* (2003). The present work

[51]Wm. A. Dembski and Michael Ruse, eds., *Debating Design: From Darwin to DNA* (New York: Cambridge University Press, 2004), 329.

agrees with Woodward that ID science should not be confused with biblical creationism or any belief system that would involve measuring data or hypotheses against any ascertainable religious dogma or worldview. In fact, as a scientific discipline, it should not be seen as having any substantial concern at all about who or what the creative agent(s) of natural phenomena and the universe might be. ID theorists recognize that determining the properties of nature's designer or designers is well beyond the theoretical, inductive, or deductive capacity of their own work or of any scientific program to date. "Echoing Behe, members of the Design Movement say that science can only indicate that some 'intelligent cause' is the agent of biological complexity. Science, by its very nature, is ill-equipped to identify God as the creator."[52] As Woodward has documented, there are both positive and negative results of ID's theological ambiguity—of leaving the idea of "God" open. Positively, it allows various views to be expressed as to the precise nature of the "mind" behind the cosmos. Negatively, this ambiguity leaves "a lack of a coherent alternative paradigm" to counter the advance of Darwinism.[53]

Notwithstanding, when combining what seems superficially to be ID's theological neutrality together with academic credentials often more impressive than those of biblical creationists, some Darwinists have occasionally admitted the formidable strength of their new opponents. Even Eugenie Scott, arguably the most fervent of ID's critics, has acknowledged, "The most striking thing about the intelligent design folks is their potential to really make anti-evolutionism intellectually respectable."[54] Also potentially impressive to ID critics is the willingness of the movement's leaders actually to promote further education of macroevolutionary theory. After the 1999 Kansas Board

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[52]Woodward, *Doubts about Darwin,* 27.

[53]Ibid., 201.

[54]Scott quoted by James Glanz, "Darwin Vs. Design: Evolutionists' New Battle," in *The New York Times,* 8 April 2001 [on-line]; accessed 22 January 2009; available from http://query.nytimes.com/gst/fullpage.html?res=9A0DE1DE113EF93BA35757C0A9679C8B63; Internet.

of Education decision to de-emphasize macroevolution in the classroom, Phillip Johnson was quoted in *The Wall Street Journal* and Michael Behe in *The New York Times*, urging what might be surprising to some readers: "Instead of teaching less evolution, schools should teach 'far more about evolution.'"[55] Such admonition is evidence that ID's leaders have little intention of replacing evolutionary theory in education and public discourse by any means other than persuasion through the evidence. Promotion of Darwinism, however, should be done under the truthful precondition of it being presented as "theory and not fact."[56] Johnson and others are confident that weak evidential subsistence will then cause Darwinism to fall from its own unsupportable weight, allowing room for design alternatives to thrive with a fair hearing. Until then, the misleading association by ID's critics of coupling design theory with biblical creationism continues to be one of the largest obstacles to this fair hearing.[57] According to Woodward, such caricature is also a method of diverting attention away from the evidential crisis that Darwinism is now bearing.

Michael Denton uses the word "crisis" in a Kuhnian sense when discussing Darwinism.[58] Woodward posits the same idea. As the central purpose of his research is "to understand more fully the development of Design's rhetorical vision," Woodward

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[55]Citation of these Johnson and Behe comments are in Woodward, *Doubts about Darwin*, 14. Regarding the Kansas School Board issue, the decision was made to lessen the emphasis on macroevolution in 1999. However, conservative Republicans were then voted out of the school board in 2002, leading to macroevolution being reinstated in Kansas schools in 2001. See Woodward, *Doubts about Darwin,* 17.

[56]This is what was stated in a 1996 Alabama School Board disclaimer pasted on biology books, emphasizing evolution as theory and not fact. The disclaimer was led by the efforts of Norris Anderson with aid of Phillip Johnson. See Woodward, *Doubts about Darwin*, 15.

[57]According to Phillip Johnson, "The greatest rhetorical challenge is to gain a hearing. One must escape the 'Inherit the Wind' stereotype." Quoted in Woodward, *Doubts about Darwin*, 252.

[58]"A Theory in Crisis" is the subtitle of Denton's seminal book about the evidential weaknesses of Darwinism, and he writes in his concluding chapter of how, in line with Kuhn's paradigmatic warnings, "[e]volutionary thought today provides many . . . instances where the priority of the paradigm takes precedence over common sense." Denton, *Evolution*, 352.

joins Denton and others in seeing the "crisis" as an early sign of a definitive rhetorical victory for ID, bringing about a Kuhnian "paradigm shift" in origins science.[59]

Woodward offers much insight in discussing science as rhetoric. However, he is careful to clarify exactly why he believes rhetoricians for Intelligent Design are particularly convincing; their science is truly a "knowledge-building practice," and their growing depository of brute facts about nature continues to strengthen their efforts for a new scientific paradigm.[60] "With moderate rhetoricians," says Woodward, "I argue that Design discourses, intent on presenting true claims, are not rhetorical without remainder but are responding to a network of stubborn realities that drive and constrain the products of the movement."[61] These stubborn realities pertain to what Woodward calls "the recalcitrance of nature" that is made evident from at least four solid facts that are explicated by ID scientists. He lists these facts as (1) the inability of the slow process of natural selection to explain the sudden appearance in the fossil record of diverse, new phyla from the Cambrian Explosion, (2) the absence of numerous transitional fossils by which science could trace the growth of "the tree of life," (3) new fascinating discoveries of cell complexity that were not foreseen by Darwin himself and stretch the imaginations of neo-Darwinists, and (4) the failure of any chemical soup scenarios from neo-Darwinists to account for the specified complexity needed for even the most elementary amino acids necessary for life to form.[62]

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[59]In describing what he sees as a rhetorical shift toward ID, Woodward says, "Thomas Kuhn showed that in general any prevailing scientific metanarrative, or master story, appears to possess infallibility in its field. However, this infallibility remains only during the tenure of a paradigm. It is shattered in the course of a scientific revolution, when the new paradigm is embraced and old stories may completely disappear as textbooks are rewritten." Woodward, *Doubts about Darwin*, 31.

[60]Ibid., 192.

[61]Ibid., 199.

[62]Ibid., 200. Woodward also says he could add "a fifth point of recalcitrance: those seemingly unbridgeable morphological gaps, such as the appearance of the bird lung and other novel structures in Denton's 'Bridging the Gaps' chapter in *Evolution: A Theory in Crisis*." Ibid., 282.

With these and other hard scientific facts entailing "the recalcitrance of nature," Woodward gives his readers reason to understand Intelligent Design as something much more than "creation science in a cheap tuxedo," to use a popular quote.[63] As mentioned earlier in the present work, major ID figures such as Denton, Behe, and Berlinski are clear examples that one can be ambivalent about theological dogma, or even be a confessing non-theist, and still face evidence of design without embarrassment. And even though many if not most ID theorists happen to have personal theological beliefs, such beliefs do not demand any default skepticism from the academy or the public about their handling of the evidence. Therefore, Stephen Jay Gould was guilty of gross misrepresentation and releasing of a red herring when he claimed that "dissenters from macroevolution are 'Protestant fundamentalists who believe that every word of the Bible must be literally true.'"[64] The work of William Dembski, as an important example to the contrary, has remained quite ambiguous on any matters of biblical literalism in defending his Design Inference. Even if statements such as Gould's were to be true, they are, of course, merely ad hominem, and do not begin to prove or disprove whether ID theorists habitually uphold what objective scientific investigation reveals. Yet the same cannot be said for Darwin's apologists, according to Woodward.

> The rhetorical struggle of Darwinists (especially those like Dawkins and Eugenie Scott who are self-described atheists) is to persuade the public and their scientific colleagues that *Design is really a subtle move to sneak a religious worldview through the back door of biology*. The rhetorical struggle of Johnson, Behe, and Dembski (all theists) is to persuade the public and institutional science that *Darwinism is already implicitly theological, grounded ultimately upon a commitment to naturalism rather than to empirical evidence.*[65]

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[63]Woodward citing Glanz, "Darwin Vs. Design" in *New York Times*. Woodward alludes that this article seems favorable to ID, proposing that ID should at least be considered. Woodward, *Doubts about Darwin*, 196.

[64]Woodward, *Doubts about Darwin*, 210, quoting from Gould's column in the March 1997 issue of *Natural History*. This distortion is also discussed in "The Unraveling of Scientific Materialism" in Phillip E. Johnson, *Objections Sustained: Subversive Essays on Evolution, Law & Culture* (Downers Grove, IL: InverVarsity, 1998), 75.

[65]Woodward, *Doubts about Darwin*, 208. Emphasis his.

Eugenie Scott therefore incorrectly assumes, "'Intelligence,' of course, means divine creation, a subject outside of science.'"[66] Such statements by Darwin's defenders cast as straw men the many ID theorists who have significantly extended themselves to downplay any discussion of the divine when carrying forth their work. "In fact, the explanatory filter of Dembski demands that a natural explanation be sought first."[67]

Contrariwise, Woodward strongly criticizes the Darwinian majority for making relevant metaphysical and even theological assumptions within a scientific philosophy of materialism; they banish discussion of any theoretical "contriver" (to use Paley's repeated term), whether it be referred to as "God" or, more ambiguously, as an "intelligent agent" that has affected nature. Woodward warns that such unsupported—and perhaps indefensible—restrictions can only obstruct from science many fascinating truths about life's intricacies and origins.

Woodward's *Darwin Strikes Back*. General rejection by Darwinists of Intelligent Design's approach to science took little time to grow into "fast and furious campaigns of attack."[68] In *Darwin Strikes Back* (2006), his sequel to *Doubts about Darwin*, Woodward chronicles how ID's materialist critics have sharpened their rhetoric against specific ID researchers and their respective arguments. Woodward, in the second book, gives most of his attention to the arguments made against Dembski, Behe, and Wells as the most prominent ID targets in the academy. In keeping with the purposes of the present work, analysis here will pertain to Dembski's critics as reported by Woodward. The strongest of such criticisms claim that Dembski's explanatory filter bypasses mixed causes in nature and that it is also susceptible to producing false positives.

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[66]Ibid., 208. Woodward quoting Scott.

[67]Ibid.

[68]Woodward, *Darwin Strikes Back*, 27

Mark Perakh and Michael Ruse have made comparable responses to Dembski's explanatory filter, claiming that Dembski does not account for mixed causes in the phenomena he examines. Perakh asserts that "Dembski's categorical demarcation between law, chance, and design as the three independent causes does not seem to be realistic . . . as it ignores multiple situations wherein either two or all three causes may be at play simultaneously."[69] Ruse has made a similar critique against the filter, citing Ronald Fisher. Ruse says that biological mutations come about as two or three of these causes are mixed together. Dembski responds by saying that it is "wrong that the Explanatory Filter separates necessity, chance, and design into mutually exclusive and exhaustive categories. The filter models our ordinary practice of ascribing these modes of explanation. Of course all three can be run together. But typically one of these modes of explanation predominates."[70]

Dembski also uses the analogy of a rusty car. It is easily proven to embody signs of necessity, chance, and design simultaneously. The laws (necessities) of weathering and gravity wear down the car over time. And the ways that the rust would deteriorate its appearance and function are certainly chance random processes. But no one would deny that the rusty car also exhibits signs of design, and the design behind it is the *point of interest*. The filter is then useful in the design aspect of the rusty car, without denying the simultaneous (though less interesting) properties involving necessity and chance.

Dembski's process for design detection, according to other critics, is subject to showing false positives. The first supposed false positive that Woodward mentions pertains to a Fibonacci series in leafed plants, argued by Gert Korthof and others. This biological phenomenon is

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[69]Mark Perakh, *Unintelligent Design* (Amherst, NY: Prometheus, 2004), 104.

[70]Dembski, *Design Revolution*, 93.

> a special number series by which some plants space their leaves on a branch. [It is argued that] the daily output Fibonacci numbers, in the spacing of leaves of certain species, represents a designed event. It is equivalent to receiving a string of prime numbers from outer space. Only a computer can mimic such a Fibonacci output, using a mathematical formula. Since we see this complex specified event happening over and over under the botanist's nose, with no one intelligently intervening, it is as if the Fibonacci series emerged from Dembski's filter, labeled "designed," only to realize that it all happened without intelligence.[71]

Dembski's own answer to the false positive charge is similar to the way he addresses the mixed causes criticism: "What is the event of interest that is being detected as designed?"[72] There should be little interest in applying the explanatory filter to the internal workings of the plant's basic system that brings about these patterns arranged in a mathematical complex. Instead, the pertinent question should be what amount of complexity exists in the very cells that bring about the Fibonacci phenomenon in the first place? The plant leaves' prominent features are fascinating, but Dembski's filter can prove that the makeup of the plant's cells are of a staggering complexity specified for a designed purpose, ending as a Fibonacci series.

Niall Shanks and others argue that the filter is further discredited by a second false positive involving Bénard cells. These cells are the forming of a honeycomb-like pattern when water is compressed to a wafer-thin film and encased between two glass plates and heat is applied to the underside.[73] This is supposedly another naturally occurring phenomenon from unintelligent causes that can still pass through Dembski's filter, mistakenly showing contingency, complexity, and specification (even though Woodward claims Shanks proves no connection whatsoever between this phenomenon and any kind of *specificity* that would indicate that it conforms to any targeted function). Bénard cells have order that rises out of regularity—periodicity—but order is not at all

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[71]Woodward, *Darwin Strikes Back*, 148-49.

[72]Ibid., 149, in a summary question explaining Dembski's response to the issue in *Design Revolution*, 90.

[73]Ibid.

the same as information. "Information in the cell [of a *living organism*, on the other hand,] . . . is profoundly aperiodic—it does not contain any simple repeating patterns."[74] So the activity seen in the watery Bénard cell, while interesting to look at in its orderliness, has little to do with Complex Specified Information for which the filter is used to discover. Thus, Woodward asserts that no one who adequately understands the purposes of the explanatory filter would apply it to the Bénard cell phenomenon; again, no false positive applies here. He also refutes the Bénard cell false positive claim by asserting that this watery phenomenon is actually created in an *artificial* environment; it does not work outside of a controlled laboratory structure (i.e., the two glass plates and a man-modulated heat source).

Woodward concludes his treatment of the attacks against Dembski's filter by agreeing with an oft-repeated claim by Dembski himself: "Specified complexity and the design it signifies is [*sic*] information ex nihilo."[75] They are "out of nothing" in the sense that nothing in nature can sufficiently explain them. Therefore, Woodward agrees with a fundamental complaint by most ID proponents: Darwinism is rooted in a scientific worldview of materialism that limits the potential progress of investigation. This is unfortunate, because otherwise the data could potentially take open-minded observers to new dimensions of understanding of nature and its greatest hidden mysteries.

Since Woodward's purposes behind *Darwin Strikes Back* were only to span the current Darwinian-materialist rhetoric against the overall ID movement, his coverage of particular criticisms against Dembski could only be cursory, constrained by insufficient space to report on the important commentary against Dembski from Robert Pennock or Barbara Forrest. The present research will take up such a task of a more specific analysis. In subsequent chapters, a position will be established for Pennock's and

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[74]Ibid., 150. Emphasis added.

[75]Woodward quoting Dembski from *Design Revolution*. See Woodward, *Darwin Strikes Back*, 152.

Forrest's relevance in the debate about design, and it will be determined what impact, if any, their scrutiny of Dembski might present for the overall ID agenda.

The Wedge Strategy

To understand William A. Dembski and other prominent persons and goals within the contemporary Intelligent Design movement, reference must be made to the so-called "wedge strategy," a subject of much controversy since its unintended disclosure on the Internet in March of 1999.[76] The controversial document associated with the strategy articulated by ID's leading think tank, the Discovery Institute, must also be recognized.

The Discovery Institute and the Wedge Document

Barbara Forrest and Paul Gross, unambiguous critics of the wedge strategy, describe it as a conspiracy.[77] Whether the intentions behind it are "to abolish civil liberties and unify church and state" is certainly debatable.[78] Nevertheless, because the goals associated with it involve a complete abandonment of a scientific methodology based on the philosophy of materialism, Forrest, Gross, and many others see the strategy as a serious threat to scientific advancement; that is, the strategy along with the persons, programs, and intentions behind it.

Regardless of the actual number of modern ID thinkers who might explicitly endorse the strategy, it is certainly representative of the skepticism of philosophical materialism adhered to by all of the major ID figures, including Johnson, Behe, Meyer, and Dembski. These four were among those who led the beginnings of the wedge

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[76]Source for this month and year, Barbara Forrest and Paul R. Gross, *Creationism's Trojan Horse: The Wedge of Intelligent Design* (New York: Oxford University Press, 2004), 25.

[77]Their perception of the wedge strategy as conspiratorial is obvious from their reference to it as a "Trojan Horse" in the title of their book. Ibid.

[78]Discovery Institute citing Forrest. See Discovery Institute, "The 'Wedge Document': 'So What?'" [on-line]; accessed 22 January 2009; available from http://www.discovery.org/scripts/viewDB/filesDB-download.php?id=349; Internet.

discussion at a 1992 conference of scientists and philosophers at Southern Methodist University.[79] Johnson explains the meaning behind the metaphor discussed at the conference, along with the agenda that it entails, in his book, *The Wedge of Truth* (2000). He argues that the "wedge" is to be driven into the weakness of the modernist-materialist philosophical "log." This weakness is the crack (of inconsistency) between the "fact-finding" goals of the scientific enterprise and the insistence that any datum can be accepted by science if and only if it is deemed to come from natural, unintelligent causes.[80] In another publication, Johnson says:

> In arguing that we should distinguish between objective empirical testing on the one hand and deductive reasoning from materialist philosophical assumptions on the other, we are making a point of elementary logic that is irresistible once it is understood. The only obstacle to a breakthrough is the longstanding prejudice, so deeply ingrained in educational practice, which says that materialism and science are the same thing, and that there cannot be evidence of design in biology because materialist prejudice forbids it. A prejudice like that can be protected for a while, but in the end reason always breaks through."[81]

Such a breakthrough is hoped for and planned for with the wedge's successful rhetorical "splitting" and ultimate desolation of materialism as the predominate modus operandi of science.

The center of controversy within the wedge strategy involves the unplanned disclosure on the Internet of the "wedge document," written by the Discovery Institute's Center for Science and Culture (CSC). The list of fellows and contributors to the Seattle-based think tank is comprised of practically all of the major leaders in Intelligent Design. Johnson, himself an advisor to the Center for Science and Culture, was not involved in the drafting of this controversial "wedge document," although its contents have close affinities with Johnson's own version of the wedge strategy as explained in his own

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[79]The conference is mentioned in Phillip E. Johnson, "The Wedge: Breaking the Modernist Monopoly on Science," *Touchstone*, July/August 1999, 18-24.

[80]Phillip E. Johnson, "*The Wedge of Truth: Splitting the Foundations of Naturalism* (Downers Grove, IL: InterVarsity, 2000), 14.

[81]Johnson, "Breaking the Modernist Monopoly," 24.

literature.[82]

The unplanned public release of the manifesto immediately led to an outcry, expressed in publications such as Forrest and Gross's *Creationism's Trojan Horse*. Scientists and philosophers of science, dedicated to materialism-only methodologies, feared the CSC's plans were to overthrow the scientific establishment with religious creationism and politically force a theistic worldview into academia and public education. The CSC quickly defended the document's contents and expressed the organization's intentions. Equal to what Johnson has stated in *The Wedge of Truth* and elsewhere, the CSC is concerned about scientific materialism and its implications as a worldview; not about the specific workings of science itself. The CSC supports research programs that challenge materialistic theories of a self-existent and self-organizing universe. They also oppose behaviorism and monistic-physicalistic theories of the mind that bring humans down to the level of mere advanced machines or animals. The following statement from a public CSC memorandum clearly conveys their mistrust of the pervasive materialistic ethos in science:

> Living things depend upon hugely improbable arrangements of matter: information-rich genes, complex three-dimensionally specified proteins, functionally-integrated molecular machines and hierarchically-organized physiological systems and body plans. Yet, according to the logic of neo-Darwinian theory, these entities and systems must arise before natural selection can act to preserve them. But if this is so, how do these complex biological systems and components originate in the first place?
>
> The neo-Darwinian answer to this question—random mutations—now lacks all credibility in the face of the astronomical improbabilities associated with the structures that such mutations must build.[83]

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[82]The Discovery Institute reveals the full contents of the document in "The 'Wedge Document': 'So What?'" 12-18. The president of the Discovery Institute is Bruce Chapman, whose lengthy résumé of public service positions includes former Director of the United States Census Bureau (1981-1983) and Deputy Assistant to President Ronald Reagan (1983-1985). Stephen C. Meyer is the current director of the institute's Center for Science and Culture. The actual person(s) who drafted the "wedge document" and how it was disclosed to the general public remain ambiguous.

[83]Ibid., 11.

Precisely expressing what these "astronomical improbabilities" are and what they entail is the essence of William Dembski's own specific program as a theoretical mathematician and senior CSC fellow.

The CSC members do admit that their program, in challenging materialism, concurs with "favorable implications for theism."[84] As noted later in the present work, Dembski himself is among many CSC contributors who have not avoided discussion of theoretical religious extensions that can come from their work.

However, says the CSC, "that some of our fellows think some aspects of science may support theistic belief, or that science is consonant with theism, does not constitute a threat to the practice of science."[85] In confronting the Forrest/Gross accusations, the CSC insists, "The 'Wedge Document' articulates a plan for reasoned persuasion, not political control."[86]

From examination of the actual contents of the document, it becomes clear that the CSC pursues "the overthrow of materialism and its cultural legacies," and this must be accomplished by engaging in biology, physics, and cognitive sciences with "a broadly theistic understanding of nature."[87] They are confident that reasonable interpretation of scientific data within an open-minded methodology will accomplish this agenda.

The memo expresses the organization's governing goals, along with specified five-year and twenty-year plans for achieving those goals. The governing goals behind the strategy are two-pronged: The first goal is "to defeat materialism and its destructive moral, cultural and political legacies." The second goal is "to replace materialistic explanations with the theistic understanding that nature and human beings are created by

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[84]Ibid., 2.

[85]Ibid., 9.

[86]Ibid., 3.

[87]Ibid., 13.

God."[88] The five-year goals (starting in 1999) have involved obtaining academic, media, and public attention through publications, debates, interviews, etc., influencing textbook changes to include design theory and scientific advancement of design theory beyond the United States. Dembski's *Design Inference* is among the several books mentioned that are instrumental in the strategy's initial short-term progress. Twenty-year goals work toward seeing design theory dominate neo-Darwinism as a scientific and cultural force.

It is beyond the purposes of the present research to offer a vigorous critique of either the CSC expressed strategy or of the CSC's opponents. However, a cursory assessment would argue that critics of the wedge strategy must maintain an intentional separation of the two governing goals just mentioned. It is logically possible that materialism presents a non-comprehensive, incomplete, or indefensible schema for legitimate science.[89] The framework of materialism, in and of itself, must first be defended successfully by its proponents, not only as to whether it is good science, but also as to whether it indeed could have considerable moral, cultural, and political ramifications.

If the predominant materialistic approach to science cannot be adequately supported based on such considerations, then the second question can be brought to the fore: what philosophical framework replaces it or is at least allowed to compete with it? Some type of theologically based system (hypothetically) might or might not be logically defensible. Forrest and Gross, among the "wedge's" most outspoken critics, fail to defend the explanatory power of philosophical materialism and such ramifications adequately. However, if they were to do so, their aversion to any theistic model could then be better appreciated.

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[88]Ibid., 15.

[89]For an ID perspective on scientific methodology and, specifically, the methodological parity of ID and naturalism, see the article by Meyer, a CSC fellow, in "Scientific Status of Intelligent Design," 151-211.

Dembski's Role in the Wedge Agenda

As a senior fellow of the Discovery Institute's CSC, and with no outspoken disagreement with the CSC or Johnson interpretations of the so-called "wedge strategy," it is reasonable to associate William Dembski as an endorser of what the strategy represents. Overcoming science's unwarranted acceptance of philosophical materialism is a transparent agenda seen in much of Dembksi's own literature.[90] However, without recanting such strategic policies or distancing himself from his CSC colleagues, he is certainly aware of the disadvantages raised by the iconic stigma of the "wedge" controversy and has no reservations about advancing past it. In addressing a conference of ID supporters, he encourages ID scientists to assess recent strategic successes and henceforth move beyond the negative yet necessary goal of dismantling materialism; a new milieu is now set for positive advancement of ID research. He says:

> Intelligent design's dual role as a constructive scientific project and as a means for cultural renaissance should raise some concerns over characterizing our movement as a "wedge." Intelligent design's instrumental good of renewing culture hinges on its intrinsic good of furthering science. Unfortunately, the metaphor of the wedge clouds this order of precedence. The wedge metaphor, as Phillip Johnson initially used it, focused on the discrepancy between science as an empirical enterprise that goes where the evidence leads (which is a legitimate conception of science) and science as applied materialist philosophy that maintains its materialism regardless of evidence (this is a bogus, though widely held, misconception of science). According to Johnson, the discrepancy between these two conceptions of science provides a point of weakness into which the thin end of a wedge can be inserted. Pounding the wedge at that point of weakness is supposed to invigorate science, renew culture, and liberate society from the miasma of materialism and naturalism. That's the promise. . . . I submit that the foundations of naturalism are already split (thanks largely to Johnson's efforts). . . .
>
> The wedge metaphor has outlived its usefulness. Indeed, with ID critics like Barbara Forrest and Paul Gross . . . the wedge metaphor has even become a liability. To be sure, our critics will attempt to keep throwing the wedge metaphor (and especially the notorious wedge document) in our face. But the wedge needs to be seen as a propaedeutic—as an anticipation of and preparation for a positive, design-theoretic research program that invigorates science and renews culture.[91]

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[90]For example, see Dembski's introduction to a book that he edited, *Mere Creation*, 13-30.

[91]The aim of this conference was to examine the current state of ID research. Wm. A. Dembski, "Becoming a Disciplined Science: Prospects, Pitfalls, and Reality Check for ID," a keynote

With this disposition, Dembski would then work to compliment ID's broader intellectual and cultural vision; to develop the Design Inference program as much as possible in terms of its logical justification, explanatory capacity, and useful application for likeminded researchers.

Conclusion

To conclude this chapter, it will be reiterated that Dembski and his fellow Intelligent Design visionaries hope to fulfil their foremost goals to invigorate science and renew culture. They seek to do this by demonstrating scientifically that there is purposeful intelligence operating in nature that is likely beyond what science can ever fully comprehend and interpret. They confidently believe that they are about to establish firmly a new paradigm that exceeds the limitations of materialism. The constancy of failed returns on science's investment into materialism has run its course, they argue; it is now collapsing upon its inherent weaknesses as a promising explanatory framework, and is insufficient for taking humanity into viable and exciting realms of truth about the universe, life, and their fascinating beginnings. Therefore, defeating Darwinism is certainly not an end in itself for ID strategists, but it is their most significant and challenging phase in freeing scholarship, society, and culture from materialism's epistemological bonds.

Dembski's continuing efforts as a central ID figure will be to strengthen his Design Inference (DI) explanatory program, making it as convincing as possible to his critics as well as to those who are also skeptical of Darwinism. His most noted applications to date—to Behe's irreducibly complex biological systems and to Meyer's observations of CSI in DNA—are continually criticized, but, arguably, they have not been debunked. Under countless criticisms, the DI continues to be useful in discovering

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address delivered at *Research and Progress in Intelligent Design* [*RAPID*] *Conference*, Biola University, La Mirada, CA, 25 October 2002), 2-3 [on-line]; accessed 22 January 2009; available from http://www.iscid.org/papers/Dembski_DisciplinedScience_102802.pdf; Internet.

the involvement of intelligent agency that designs material systems. Therefore, new applications of his DI should be expected, advancing the new paradigm. Dembski is also venturing deeper into the explanatory power of probability theory, while exposing weaknesses of recent computational evidence for biological evolution. This latest research of his will be addressed in chapters 5 and 6.

According to Dembski, logic dictates that the agency his model detects has an existence independent of matter. Such belief happens to coincide with his Christian theological convictions. The same is true for many, if not most, of ID's leading theorists. However, it is specious for one to assume too quickly that such personal theological beliefs must automatically taint the conclusions of their studies. Intelligent Design's scientific confirmation is far from being synonymous with any theological dogma or agenda. Therefore, Bradley Monton, an atheist supporter of ID, allows the ID paradigm the benefit of the doubt. He says:

> It should be clear that ID is not inherently theistic. The intelligent cause could be God, but it need not be. It may be that living things on Earth were created by a highly intelligent alien civilization, as Raelians believe. It may be that the whole universe we experience is really just a computer simulation being run by highly intelligent non-supernatural beings, as Nick Bostrom (2003) argues is plausible. It takes just a bit of creativity to come up with other possibilities as well.[92]

As Monton's statement indicates, it is one thing for ID theists to prove *design* as more plausible than blind chance macroevolution; it is quite another to demonstrate scientifically the truth of any form of *theism*. ID theists behind the wedge strategy acknowledge this distinction. Phillip Johnson and the Discovery Institute manifesto have clearly expressed that debunking Darwinism is merely *one* step in their arduous *multifold* plan to revolutionize society toward a return to Christian values. Pertaining to both ID methodology and theology, Meyer gives further recognition of ID's limitations. He states:

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[92]Monton, "Is Intelligent Design Science?" 9.

> Theists generally approach their study of nature with a set of background assumptions that would lead them to regard most hypotheses of special divine action as unlikely, though not completely impossible. As such, theism itself constrains design inferences. Theistic background assumptions would generally allow consideration of special divine action as the best or most likely explanation for a particular event only when it seemed empirically warranted and theologically plausible.[93]

Moreover, theistic ID leaders realize that a defeated Darwinism does not necessarily bring about any religious revival. In contrast to the earlier design argument from Paley, they understand that scientific proof of design is far removed from any particularly Christian or biblical truth. And as indicated by the atheistic Monton, defeating Darwinism does not even necessarily debunk philosophical materialism. But a significant number of ID thinkers believe that theism—especially evangelical Christianity—would be a much more promising alternative for explaining design in nature when compared to above-mentioned materialist ideas such as aliens and cosmic computer experiments. William A. Dembski is among such Christians who diligently call for "[a] sustained theological investigation that connects the intelligence inferred by intelligent design with the God of Scripture and therewith formulates a coherent theology of nature."[94]

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[93]Meyer, "Scientific Status of Intelligent Design," 190.

[94]Wm. A. Dembski, introduction to *Mere Creation*, 29.

CHAPTER 3

THE DESIGN INFERENCE

Del Ratzsch has referred to William Dembski's book *The Design Inference* as the "theoretical manifesto of the design movement."[1] Conceptualized by the explanatory filter, it involves a formal deductive process for detecting whether an observed effect in nature is the product of intelligence. Throughout his broader Design Inference program developed even beyond the seminal book, Dembski works to strengthen the premises behind the filter. He does so with grounding in the Fisherian method of statistical reasoning. This is a method of eliminative induction that attempts to legitimize a "rejection region" of probabilities by which the observer rejects a chance hypothesis to explain a particular event. The Fisherian method is distinct from the Bayesian approach, which values a hypothesis based on how it stands comparatively against competing hypotheses. Dembski's defense of Fisherian reasoning over Bayesian will become an important issue in chapter 5, as Dembski answers criticisms by Forrest, Pennock, and their like-minded colleagues.

The Explanatory Filter

How the Filter Discloses Characteristics of Design

Dembski argues that chance is not an adequate explanation of how Complex Specified Information (CSI) is generated. Intelligent activity is the known cause of CSI. Therefore, intelligent design is the best explanation for the origin of CSI. Rational agents

[1]Del Ratzsch, "How Not to Critique Intelligent Design Theory," *Ars Disputandi* 5 (2005): 5 [on-line]; accessed 16 August 2009; available from http://www.ArsDisputandi.org; Internet.

commonly infer that something is an artifact of another rational agent based on the effects left behind. This is the subject of some of Dembski's earliest scholarship.[2]

There are two primary indicators of intelligent agency that set it apart from completely undirected material causes. These indicators are *complexity* and *specification*. Events that are *complex* are of very small probability, are irregular, and cannot be understood to correlate with any simple rule, law, or pattern distinguished from the event itself. *Specification*, on the other hand, *does* have a correlation "between an observed event and a pattern or set of functional requirements that we know independently of the event in question."[3] Dembski's reference to specification generally means the correspondence between a complex pattern of events and a pattern that the observer has independently recognized from the past. Meyer says that specification also applies to the correspondence between a complex pattern of events and its *functional significance*; in other words, the complex series corresponds with our independent, preexisting knowledge of how things work. For example, if one observes another person opening a combination lock on the first attempt, one naturally infers intelligent cause rather than chance, based on knowledge of the low probability of the person opening the lock on the first try without knowing the combination. One also has a prior knowledge of how a lock works and that the person opening the lock produced a *functionally significant* outcome. Whether the pattern (or "target") is recognized from the past or is functionally significant, what matters is that it can be known independently of the event to which it corresponds.

Dembski uses Mount Rushmore as one of many examples of specified complexity. The presidents' faces on the side of the mountain exhibit characteristic features or patterns that give signs of intelligence; they could not have been formed by chance processes such as wind or erosion. The unusual shapes are improbable (at least in

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[2]For example, see Wm. A. Dembski, "Randomness by Design," *Nous* 25 (1991): 75-108.

[3]Stephen C. Meyer, *Signature in the Cell: DNA and the Evidence for Intelligent Design* (New York: HarperCollins, 2009), 352.

the South Dakota wilderness) and therefore complex. The shapes of the faces are also recognized by the observer's *independent* knowledge of the presidents from photographs, drawings, etc. This prior independent knowledge is then matched to the phenomenon, causing the observer to infer design. It is thus important to see that the phenomenon is both "complex" *and* "specified."

Differentiation between Necessity, Chance, and Design

In *The Design Inference*, Dembski posits that human rationality tends to attribute most events of low or intermediate probability to chance; these events also exhibit no discernible patterns. On the other hand, events that are of high probability usually occur in a law-like, repeating fashion and are attributed to "necessity" (regularity; natural law).

Dembski's explanatory filter is used as a process for "filtering out" chance and necessity for explaining an event and thereby determining if the event infers design. It would be technically inaccurate to say that the explanatory filter detects actual intelligence. Instead, it is a method for detecting the *effects* of intelligence—signatures that point to the intelligent agency behind the event.

According to how the filter works, high probability events can be easily dismissed as necessity. But should the event be determined to have low probability—which infers complexity—it is still not enough to infer that the event was designed. (As Barbara Forrest correctly stated—but for a specious argument to be explained in chapter 4—"ridiculously improbable things happen all the time.") As mentioned, there are low probability events that must be attributed to chance because they do not correspond to any independent pattern—they are not specified. But if the observer discerns that a low probability (complex) event matches an independent pattern—that it is "specified"—then design is reasonably inferred.

The two figures below demonstrate two versions of the filter devised by Dembski. Figure 1 is the original version as described in *The Design Inference*.[4] This version conceptualizes the event in terms of a probability criterion.

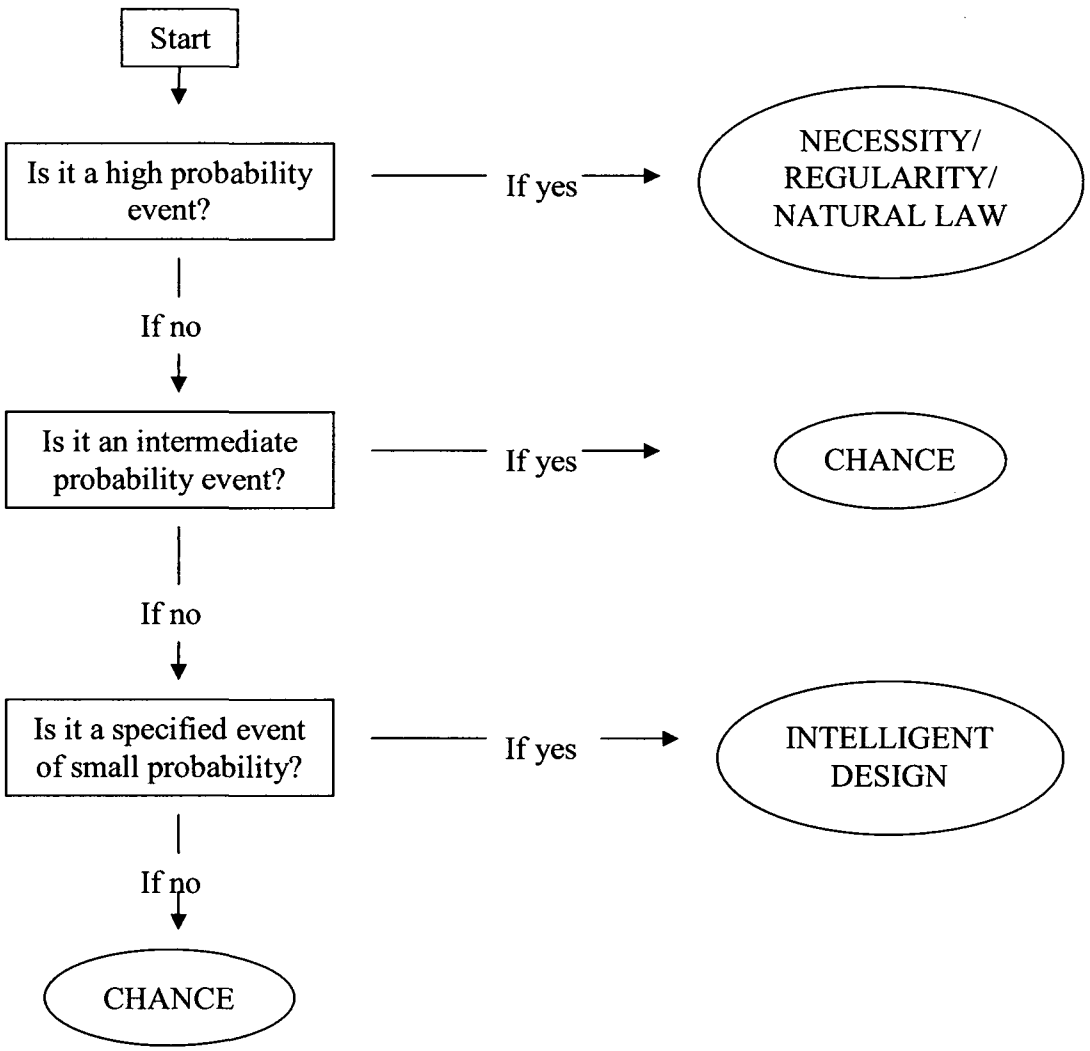

Figure 1. The original version of the explanatory filter

[4]Wm. A. Dembski, *The Design Inference: Eliminating Chance through Small Probabilities* (New York: Cambridge University Press, 1998), 37.

Figure 2 displays Dembski's modification of the filter in *No Free Lunch* and *The Design Revolution*.[5] This newer version conceptualizes the process more directly in terms of a complexity-specification criterion.

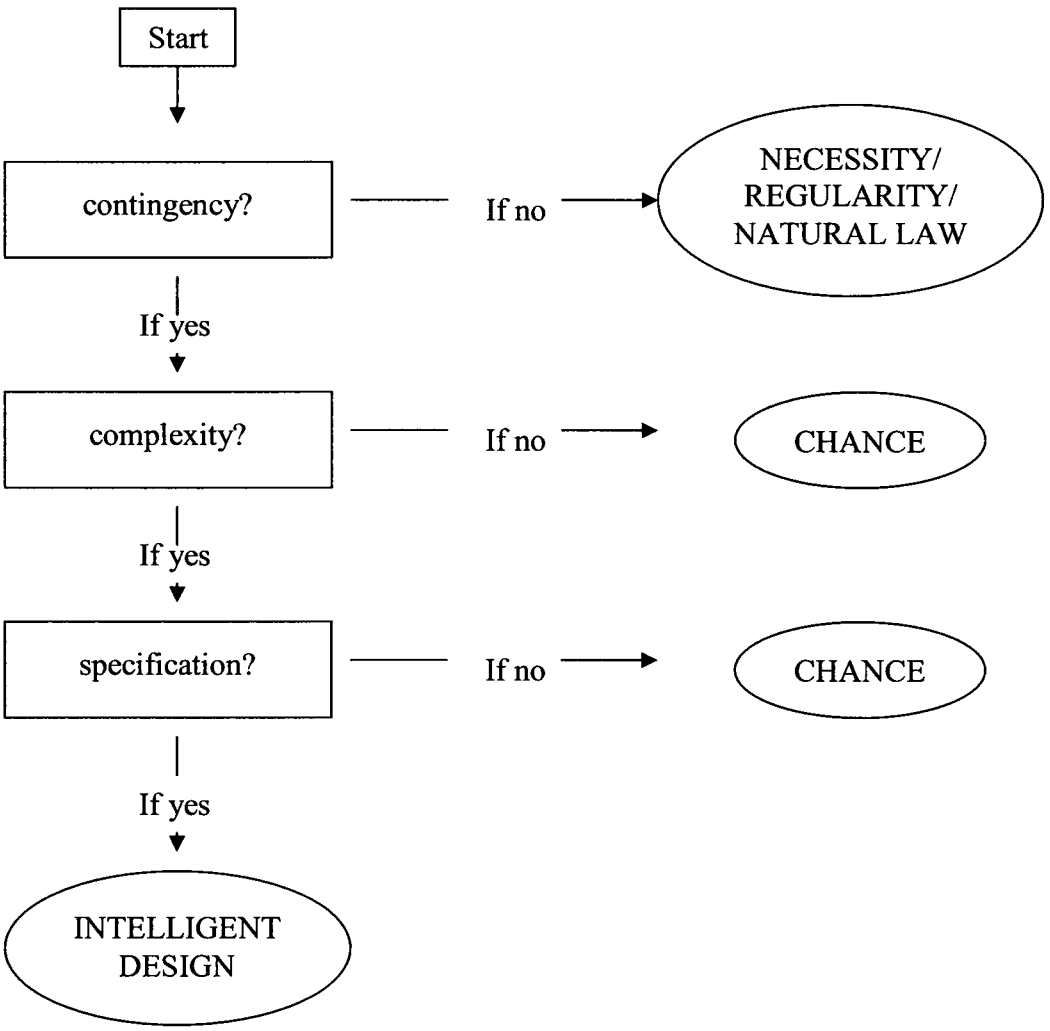

Figure 2. The modified version of the explanatory filter

It is important to elaborate further about a pattern of specification being *independently known* by the observer. The pattern proves to be independently known by

[5]Wm. A. Dembski, *No Free Lunch: Why Specified Complexity Cannot Be Purchased without Intelligence* (Lanham, MD: Rowman & Littlefield, 2002), 13; idem, *The Design Revolution: Answering the Toughest Questions about Intelligent Design* (Downers Grove, IL: InverVarsity, 2004), 88.

the observer if he or she can formulate the pattern without knowledge or observation of the event in question. (That is to say, if the pattern proves to be "detached" from the event in question.[6]) Dembski refers to patterns that are merely perceived in the event alone and *not* independent of the event as "fabrications."[7]

To explain the importance of an event's pattern being independently known by the observer and thereby exhibiting specification, Dembski often uses an example from archery. When one observes an archer shooting an arrow and hitting a bull's eye, one correctly infers that the bull's eye (and in fact a very important part of the target) was hit because of the archer's skill—that is, by design. Contrariwise, if one observes an archer shoot an arrow into a plain wall, then the observer goes and draws a circle around the arrow and calls the circle a "target," the "target" is merely an ad hoc fabrication; the observer can make no inferential claim about the skill or designing intentions of the archer. There was never any true pattern that existed independently of the event, as there would have been if the target were placed on the wall beforehand.

According to the Fisherian school of thought, the target (or pattern) at which an archer aims and then shoots exemplifies the setting of a *rejection region* (also referred to as a *critical region*) that precedes a statistical experiment. If an experimental datum falls within a predefined rejection region, the chance hypothesis is rejected for explaining the cause of that datum.[8] Further explanation of Dembski's preference for the Fisherian method of statistical reasoning, in contrast to the Bayesian method of many of his Darwinist opponents, will be in chapter 5.

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[6]Dembski, *Design Inference*, 14-15.

[7]Ibid.

[8]Dembski and Wells write, "The reason for setting a rejection region prior to an experiment is to forestall what statisticians call 'data snooping' or 'cherry picking.' Just about any data set will contain strange and improbable patterns if we look hard enough. By forcing experimenters to set their rejection regions prior to an experiment, the statistician protects the experiment from bogus patterns that could just as well result from chance." Wm. A. Dembski and Jonathan Wells, *The Design of Life: Discovering Signs of Intelligence in Biological Systems*, ed. Wm. A. Dembski (Dallas: Foundation for Thought and Ethics, 2008), 173.

Probability and Specified Complexity

In addition to conditionally independent patterns described above, Dembski also incorporates the following probabilistic aspects in describing specified complexity: probabilistic complexity, probabilistic resources, specificational complexity, and his own version of a *universal probability bound.*

The first aspect implies that probability can be understood as a form of complexity. Dembski uses a combination lock to illustrate the inverse relationship between complexity and probability. The more combinations that could possibly open the lock, the more complex the lock is, and the lower the probability of the lock being opened by chance.[9]

A second aspect, probabilistic resources, pertains to the number of opportunities for an event to occur and be specified. "A seemingly improbable event can become quite probable once enough probabilistic resources are factored in. On the other hand, such an event may remain improbable even after all the available probabilistic resources have been factored in."[10] The two forms of probabilistic resources are *replicational* and *specificational.* The difference between the two is subtle but important. Replicational resources involve how many opportunities there are for an event to occur. Specificational resources involve how many opportunities there are to specify an event. Dembski explains with this illustration:

> [I]magine that you are standing at a busy intersection and see ten brand new Pontiac Grand Ams each red with four doors drive past you in immediate succession. Did this happen by chance? Sure, you witnessed a lucky coincidence, but what you need to determine is whether this coincidence was *so lucky* that no one could be expected to observe it if it happened by chance. That's the point. It's not just that you got lucky, but that no one else could have gotten that lucky.

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[9]"For instance, a combination lock whose dial is numbered from zero to thirty-nine and that must be turned in three alternating directions will have 64,000 (i.e., 40 x 40 x 40) possible combinations. This number gives a measure of complexity for the combination lock but also corresponds to a 1 in 64,000 probability of the lock being opened by chance (assuming zero prior knowledge of the lock combination)." Dembski, *Design Revolution*, 82. Cf. the same illustration in Dembski and Wells, *Design of Life*, 168.

[10]Dembski, *Design Revolution*, 82-83.

> To determine whether you were indeed too lucky, you need to know how many opportunities there are to observe this event. This requires knowing how many cars and how many makes of cars are on the road (if all cars in the world are brand new Pontiac Grand Ams each red with four doors, there is no coincidence to be explained). It also requires knowing how many people are standing on street corners around the world who might, in the course of a year, see the succession of cars you witnessed. The number of opportunities to observe this event constitutes the replicational resources. Replicational resources determine how likely it is for anyone, not just yourself, to observe the same succession of cars that you witnessed.
>
> But that's not the only thing you need in determining whether the event happened by chance. No doubt, it would be striking to see ten brand new Pontiac Grand Ams each red with four doors drive past you in immediate succession. But what if the body type were altered to two doors? What if the color were changed from red to blue? And why just focus on Pontiac Grand Ams? What if the cars in succession had all been identical Honda Accords or Volkswagen Jettas? These questions point to different ways of specifying a succession of identical cars. Since any succession would have been equally salient if you had witnessed it on the street corner, the number of such specifications must be factored into your judgment of whether the succession you observed happened by chance. This number constitutes the specificational resources. Specificational resources determine how likely it is to observe not just the succession of Grand Ams that you observed but any succession of identical cars.[11]

As will be demonstrated in chapter 5, Dembski's use of probabilistic resources will be relevant in answering Barbara Forrest's claim (with co-author Paul Gross) that "ridiculously improbable things happen all the time," and, "[v]ery low probability does *not* mean impossibility."[12] This claim is a part of their general argument that specified complexity is specious.

A third aspect of specified complexity is *specificational* complexity. (Care must be taken to differentiate between the three terms specified complexity, specificational resources, and specificational complexity. The three terms mean importantly different things). Specificational complexity pertains to how a pattern is described; how long of a description is required to characterize a particular pattern.[13] A pattern therefore has specified complexity if it can be described with relative simplicity

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[11]Dembski and Wells, *Design of Life*, 169-70.

[12]Barbara Forrest and Paul R. Gross, *Creationism's Trojan Horse: The Wedge of Intelligent Design* (New York: Oxford University Press, 2004), 126. *Infra*, chap. 5.

[13]Specificational complexity is a generalization of Kolmogorov mathematical complexity. Dembski, *Design Revolution*, 83. In *Design of Life*, specificational complexity is referred to as "descriptive complexity." Dembski and Wells, *Design of Life*, 168-69.

(low descriptive complexity) while it is highly complex in terms of probability (it has a low probability). An example is the highly complex (low probability) coin sequence of HHHHHHHH, which can "simply" be described as "ten heads in a row." "Moreover, precisely because the descriptive complexity is low, it can be reconstructed independently of any physical events that give rise to it. That is why specifications are rightly regarded as 'independently given patterns.'"[14]

The fourth aspect regarding probability is the *universal probability bound* (UPB). The UPB quantifies the limited probabilistic resources within the known universe by which any chance hypothesis could explain a specified event.[15] Before submitting his own figure for the UPB, Dembski defends his reasoning from precedents of reliable science:

> Scientists estimate that within the known physical universe, there are around 10^{80} elementary particles. Moreover, the properties of matter are such that transitions from one physical state to another cannot occur at a rate faster than 10^{45} times per second. This frequency corresponds to the Planck time, which constitutes the smallest physically meaningful unit of time. Finally, the universe itself is about a billion times younger than the 10^{25} seconds (assuming the universe is between 10 and 20 billion years old). If we now assume that any specification of an event within the known physical universe requires at least one elementary particle to specify it and that such specifications cannot be generated any faster than the Planck time, then these cosmological constraints imply that the total number of specified events throughout cosmic history cannot exceed $10^{80} \times 10^{45} \times 10^{25} = 10^{150}$. Thus, any specified event of probability less than 1 in 10^{150} is therefore a *universal probability bound*.[16]

A UPB such as Dembski's 1 in 10^{150} therefore posits that the universe is not large enough to generate specified complexity. The "sheer exhaustion of possibilities" proves this.[17] Dembski defends his version of a UPB as not arbitrary, while still being conservative; he

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[14]Dembski and Wells, *Design of Life*, 169.

[15]*Design of Life* defines the UPB as a "degree of improbability for which a specified event of probability less than it cannot reasonably be attributed to chance regardless of whatever probabilistic resources from the known universe are factored in. Universal probability bounds have been estimated between 10^{-50} (Émile Borel) and 10^{-150} (Wm. Dembski)." Dembski and Wells, *Design of Life*, 321.

[16]Dembski, *Design Revolution*, 84-85.

[17]Dembski, *No Free Lunch*, 83.

gives chance a better chance, as it were, than other models. French mathematician Émile Borel's UPB was proposed at 1 in 10^{50}. The National Research Council set a UPB for assessing the security of cryptosystems at 10^{94}. A UPB of 1 in 10^{120} was proposed by computer scientist Seth Lloyd and biological physicist Stuart Kauffman in their respective research.[18]

In further explaining the importance of the UPB, Dembski says, "A universal probability bound is impervious to all available probabilistic resources that may be brought against it. Indeed, all the probabilistic resources in the known physical world cannot conspire to render remotely an event whose probability is less than this universal probability bound."[19]

In sum, if an event E corresponds with a conditionally independent pattern of low specificational complexity, but the probability of E is less than the UPB, thereby demonstrating its high probabilistic complexity, then E is of *specified complexity* and therefore infers design.[20]

Design as Information

Dembski's concept of specified complexity, discoverable via his filter, is the same as *Complex Specified Information* (CSI); specified complexity is actually "a souped-up form of information."[21] Extrapolating from Shannon information theory, Dembski says that the informational aspect of CSI is proven by its "reduction or ruling

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[18]These other UPB estimates are mentioned by Dembski in *Design Revolution*, 85. Dembski gives a detailed defense of his UPB in contrast to the one proposed by Borel in Dembski, *Design Inference*, 4-7. He discusses his own reasoning in contrast to Kauffman's in Dembski, *No Free Lunch*, 83-85.

[19]Dembski, *Design Revolution*, 83.

[20]Again, it is pertinent to note the difference between "specificational" complexity and "specified" complexity in this summary. Many of these probabilistic aspects of specified complexity will be revisited with more detail in chapter 5, and they are significant in determining the strength of Forrest and Pennock's criticisms.

[21]Dembski, *The Design Revolution*, 137.

out of possibilities from a reference class of possibilities."[22] That is to say, CSI, as a form of information, is generated by the process of "identifying one possibility and ruling out the rest."[23] Dembski categorizes information that can be generated as being one of two types: (1) *conceptual information*, which is induced by an intelligent agent that identifies a pattern within the reference class of possibilities, and (2) *physical information*, which is generated by an event produced by a physical process. As opposed to the traditional understanding of information as unary, CSI "depends on a dual reduction of possibilities, a conceptual reduction (i.e., conceptual information) combined with physical reduction (i.e., physical information). Moreover, these dual reductions must be coordinated so that the physical information matches the pattern set by the conceptual information."[24] Although this might seem like a very complicated task, Dembski's illustration from SETI (Search for Extraterrestrial Intelligence) helps to make it more comprehensible:

> Now, what happens when conceptual information and physical information coincide? For instance, what happens if, as a *conceptual* act, SETI researchers identify a sequence of prime numbers and then, lo and behold, as in the movie *Contact*, that very sequence is transmitted, as a *physical* event, to the radio telescopes that these same SETI researchers are monitoring? It's precisely such a coincidence that constitutes specified complexity.[25]

Dembski's Design Inference (DI) is derived from but not the same as Claude Shannon's mathematical use of information theory for cryptography. Shannon's theory is merely concerned with generating information from a reference class of possibilities (that is, managing character strings) and is not meant for determining whether information is agent-induced.[26] Finding specified complexity, on the other hand, extrapolates from

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[22]Ibid.

[23]Ibid., 136.

[24]Ibid., 138.

[25]Ibid., 137. Emphasis added for clarity. (Dembski commonly refers to the movie *Contact* throughout his literature to illustrate CSI and the independent patterns that correspond to it.)

[26]Ibid., 135-37.

Shannon's *mathematical* use of probabilities (the vehicle that transmits messages) to a use of probabilities that finds *linguistic meaning* from transmitted information. In other words, specified complexity is more concerned with the "patterning" or "significance" of information; classical Shannon theory is blind to such concerns.[27]

Specified complexity's low probability has an inverse relationship to its high amount of information. Dembski explains with another illustration:

> Consider [the statement] "It's raining outside." This claim will be more informative (now in a loose semantic sense) depending on how improbable it is. If it refers to weather in the Sahara Desert during the summer, when the chance of rain is very low, then this claim will be both highly improbable and highly informative: it's telling you something you wouldn't otherwise have guessed. But if this claim refers to weather in Seattle during the spring, when the chance of rain is very high, then it will be both probable and uninformative: it's telling you something you could easily have guessed. The mathematical theory of information models this feature of our ordinary understanding of information, making high-probability claims have low information content and low probability (high-improbability) claims have high information content.[28]

This illustration demonstrates that the more possibilities that get ruled out, the more improbable the possibility that actually obtains, and therefore the greater the amount of information generated.[29] Thus, the probability of an event is inversely proportional to the information needed for the event to hit a specified pattern (or "target").[30]

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[27]Dembski and Wells, *Design of Life*, 319-20.

[28]Dembski, *Design Revolution*, 136.

[29]Ibid.

[30]Dembski and Jonathan Wells give a similar definition of information in *Design of Life* that explains its inverse relationship to probability. Information is "[l]iteraly, the act of giving form or shape to something. Because giving form to a thing rules out other forms that it might take, information theory characterizes information as the reduction of possibilities or uncertainty. In classical [Shannon] information theory, the amount of information in a string of characters is inversely related to the probability of the occurrence of that string. Hence, the more improbable the string, the more uncertainty is reduced by identifying it and therefore the more information it conveys. Information defined in this way provides only a mathematical measure of improbability or complexity. It does not establish whether a string of characters conveys meaning, performs a function, or is otherwise significant." Dembski and Wells, *Design of Life*, 314-15.

Dembski's Confidence in the Design Inference

The Logic of the DI

Dembski is both confident and modest in defending the explanatory filter and its "logical counterpart" described below.[31] Dembski asserts that the filter's logical associate is "a valid deductive argument that traces the passage of an event E through the explanatory filter from the initial node labeled 'start' to the terminal node labeled 'design.'"[32] However, while the DI is a "valid deductive argument," its applications will, in most cases, be "probable or assertible" rather than "certain or true."[33]

The logical formulation of the Design Inference—which corresponds to the explanatory filter—can be summarized with six premises and a conclusion:[34]

Premise 1: An event E has occurred.

$$oc(\mathrm{E})$$

Premise 2: E is specified *sp* for all chance hypotheses that relate to the occurrence of E; more specifically, for all chance hypotheses H that are within the collected set of all chance hypotheses $\mathcal{H}$ related to E's occurrence.

$$(\forall \mathrm{H} \in \mathcal{H})\ sp(\mathrm{E};\ \mathrm{H})$$

Premise 3: E has small probability *SP* for all chance hypotheses relevant to E's occurrence (i.e., for all chance hypotheses in $\mathcal{H}$).

$$(\forall \mathrm{H} \in \mathcal{H})\ SP(\mathrm{E};\ \mathrm{H})$$

Premise 4: Dembski modifies Borel's Single Law of Chance to form the *Law of Small Probability* (LSP): *specified events of small probability do not occur by chance.*[35] The LSP asserts "that for an arbitrary event X and an arbitrary chance hypothesis H, if X occurred, is specified with respect to H, and has small probability

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[31]Dembski, *Design Inference*, 48.

[32]Ibid.

[33]Ibid., 54. Dembski further defends the *assertibility* of specified complexity—that is, whether it is a practicable concept—in Dembski, *Design Revolution*, 106-15.

[34]Dembski, *Design Inference*, 47-55. The symbols here are very similar to those used by Dembski in *Design Inference*.

[35]Ibid., 5-7.

with respect to H, then the occurrence of X was not governed by the chance hypothesis H."[36]

$$(\forall X)(\forall H \in \mathcal{H})\ \{[oc(X)\ \&\ sp(X; H)\ \&\ SP(X; H)] \rightarrow \sim ch(X; H)\}$$

Premise 5: There is no regularity (= necessity or law-like imposition) that accounts for E.

$$\sim reg(E)$$

Premise 6: E is due to either regularity or chance or design.[37] This "trichotomy rule" imposed by Dembski in *The Design Inference* was correctly softened later to take into account that some phenomena can be explained by a combination of regularity, chance, and/or design working together. As will be discussed in the chapters ahead, this adjustment is in no way detrimental to the Design Inference's viability.

$$reg(E) \vee (\exists H \in \mathcal{H})\ ch(E; H) \vee des(E)$$

($\exists H \in \mathcal{H}$ is a restricted existential quantifier, to be read "for some H in $\mathcal{H}$").

Conclusion: E is due to design

$$des(E).$$

The above is the basic logical argumentation for the DI. However, Dembski works in some other syllogisms at the end of *The Design Inference* based on arguments throughout the book that further justify the Law of Small Probability.[38]

The Reliability of the DI

In *The Design Revolution*, Dembski confidently asserts, "Where direct, empirical corroboration is possible, design actually is present whenever specified complexity is present."[39] He makes this claim about the reliability of the Design Inference after consideration of two problems with inferring design: potential false negatives and false positives.

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[36]Ibid., 52.

[37]Ibid., 54.

[38]See especially Dembski, *Design Inference.*, 217-23.

[39]Dembski, *Design Revolution*, 96.

One difficulty involving false negatives is that intelligent causes can sometimes be indistinguishable from non-intelligent causes when intelligent causes imitate non-intelligent ones. Another difficulty involving false negatives is that background knowledge is necessary for detecting an intelligent cause. If we do not know enough about it, the intelligence can be missed. Despite potential false negative situations, "those limits do nothing to save the Darwinist from the crucial work" that the explanatory filter can do.[40]

Pertaining to false positives, Dembski asserts that finding specified complexity is a reliable criterion for *detecting* design, although it is not reliable for *eliminating* design. Dembski is confident in making a straightforward inductive generalization about the filter: "in every instance where specified complexity is present and where the underlying causal story is known (i.e., where we are not just dealing with circumstantial evidence, but where, as it were, the video camera is running and any putative designer would be caught red-handed), it turns out that design is present as well. This is true even where the person running the filter isn't privy to the firsthand information."[41]

Specified complexity's reliability for marking design must be understood in relation to all material mechanisms that might be working to bring about a particular event. Therefore, the filter can reliably detect design, "provided all material mechanisms that might be operating in the given circumstance are eliminated."[42] Design can certainly work in tandem with material mechanisms. However, *probability distributions* must be assessed to determine if known mechanisms of chance and/or necessity can produce a particular event in isolation from design. Yet the scientist can only eliminate the material mechanisms he knows about. Throughout his corpus, Dembski argues that we cannot claim to know about a Darwinian mechanism that explains specified complexity apart

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[40]Ibid., 95.

[41]Ibid., 95-96.

[42]Ibid., 99.

from intelligent design. The evidence is too weak (despite arguments made by ID opponents discussed in the chapters ahead). Dembski's latest work is to use No Free Lunch principles to track the continual weakness of Darwinian models, especially in recent evolutionary computer simulations, and to expose these weaknesses in terms of information theory.

The Application of the DI

Outside the biological sciences. Dembski does not presume that his program brings forth a novel concept. Apart from biology, detecting design inferences has also been a significant practice within various other sciences. A prominent example that Dembski repeats throughout his literature is the 1985 election fraud case in which Essex County, New Jersey, election clerk Nicholas Caputo was accused of ballot line rigging. Probabilistic information ruled out the option that lines on the ballot heavily favoring Caputo's political party were listed that way by chance.[43] Entire industries are established for discovering design inferences. These include intellectual property protection, actuarial firms that compute risks for insurance companies, statistical consultants, cryptographers, forensic scientists, detectives, and others.[44]

Within intellectual property protection, patent and copyright offices use design detection to find and confront plagiarism.[45] Another example is forensic science. Detectives, lawyers, and insurance fraud investigators depend on fingerprints and DNA samples—among other things—to make design inferences that place suspects at crime scenes and/or associate them with relevant tools used to commit crimes.[46] Design inferences have also impugned research scientists. After undergoing probabilistic

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[43]Dembski, *The Design Inference*, 9-20.

[44]Ibid., 20.

[45]Ibid., 20-22.

[46]Ibid., 22-24.

analysis, scientific data has proven to be "massaged" or blatantly plagiarized to advance the careers of researchers.[47] Design inferences are relevant in cryptography, beyond the practice of merely devising and deciphering codes, but also in determining whether coded language is being passed along channels in the first place. Dembski refers often to the cryptographic nature of the SETI project. As discussed above, SETI is a good theoretic example of the use of *independently known* patterns that correspond to design. Additionally, according to Dembski:

> If the SETI program ever proves successful (something it has yet to do), its success will consist in drawing a successful design inference, matching radio transmissions it has monitored with patterns it deems clear and reliable indicators of intelligence. As it monitors millions of radio channels, SETI attempts to match patterns it has specified in advance. Insofar as SETI fails to specify the patterns employed by [extraterrestrial intelligences], SETI will fail to detect them—their presence will slip past the SETI researchers' sieve. Regardless whether one thinks SETI constitutes an ill-fated research program, it raises important questions about the nature of intelligence, the possibility of detecting intelligences other than human, and the role of design inferences in detecting intelligence.[48]

The factor of independently known ("detached") patterns is certainly relevant in Dembski's application of his design criterion to biological science. How these detached patterns in biology infer design instead of Darwinian chance causes will be discussed ahead—specifically in the patterns observed in Meyer's and Behe's respective research. First, attention will be given to biology's central problem and whether Darwinism provides any adequate solution.

Within the biological sciences. William Dembski thinks that the main problem in biology remains an information problem. Biologists, especially those dedicated to purely materialistic explanations, have made little progress in answering questions such as Where did the information necessary for life come from? Can it be determined whether purely natural processes are sufficient for bridging the chasm between inorganic reality (information) with organic forces operating from necessity and

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[47]Ibid., 24-26.

[48]Ibid., 31.

chance? Can some kind of continuity also be explained regarding the varying amounts of complexity within the organic world? And if these fundamental questions are answered in the positive, exactly how does science go about validating such connections? Dembski asserts that design can work as an explanatory compliment to material causation behind life's origin and subsequent development. Design, detected in specified complexity, is the necessary bridge connecting the organic to the inorganic, thus making the information problem solvable.

Although "no biologist questions whether the functional systems that arise in biology are specified," no purely natural mechanism, including that of Darwinism, has begun to manage the vast improbabilities encountered in biology.[49] Dembski mentions four failed strategies. First is "spontaneous generation." This explanation appeals to pure chance in order for life to erupt suddenly from nowhere. The idea was common 150 years ago in explaining the spontaneous appearance of flies and mice from rotting meat. However, some origins researchers still appeal to similar explanations today regarding less complex biological structures; perhaps, they say, the advent of self-replicating biological molecules could have initiated life by pure chance.[50]

Secondly is Darwinism's mechanism of random variation and natural selection as a failing "divide and conquer" strategy. In answer to the highly improbable idea of spontaneous appearance, Darwinism depends on the numerous small "conquests" made by nature's trial-and-error process. The concept is aptly conveyed by the title of Richard Dawkins's book, *Climbing Mount Improbable*, which explains Darwinism in terms of gradual, cumulative selection, making the "improbability" of complex life seem much more "probable."[51]

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[49]Dembski, *Design Revolution*, 142.

[50]Ibid.

[51]Richard Dawkins, *Climbing Mount Improbable* (New York: Norton, 1996).

However, to extend the "climbing" metaphor, Dembski argues that a Darwinian mechanism fails to overcome seven "hurdles" to account for the sequential evolutionary changes required for a biological organism with specified complexity to evolve.[52] (More specifically, these hurdles demonstrate Darwinism's failure to explain the irreducibly complex systems of microbiology, explained in chapter 2.) These hurdles are:

1. *Availability*. The parts needed to evolve an irreducibly complex system must be available.

2. *Synchronization*. The parts must be available at the right time so that they can be phased into the evolving system when needed.

3. *Localization*. Even assuming the parts are available at the right time for inclusion into the system, the parts must be able to break free of the systems from which they are currently integrated (without harming those systems) and be made available at the evolving system's "construction site."

4. *Interfering Cross-Reactions*. Even if the right parts can be phased in at the right time and place, what would keep out other parts that would disrupt the new system's construction?

5. *Interface Compatibility*. The parts that are being phased into the evolving system must be mutually compatible; they must interface tightly so that all necessary parts work together for the system's function.

6. *Order of Assembly*. Assuming all the right parts are in the right place at the right time, and assuming full interface compatibility, the parts must be assembled in the right order to construct a functioning system.

7. *Configuration*. Assuming all the right parts to be assembled are ordered properly, they must still be arranged with just the right precision. (As an example, when building a brick wall, it is not enough for a mason to assemble his material in the right order. He must also skillfully configure the bricks and mortar so that the wall will never slant or fall.)

Among many interesting examples of life's complexity, Dembski and co-writer Jonathan Wells use the TEM-1 β-lactomase as evidence that larger proteins are too irreducibly complex to evolve by a Darwinian mechanism.[53] Molecular biologist

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[52]Dembski and Wells explain in detail in *Design of Life*, 183-89.

[53]Shorter proteins, on the other hand, are much simpler to fold for functionality, and experiments have demonstrated the ability of their amino acids to evolve new protein functions. However, "generalizing this result to larger proteins is unwarranted." Ibid., 198.

Douglas Axe's research "demonstrates that the best evidence is now on the side of his β-lactamase domain standing beyond the reach of Darwinian processes, exhibiting specified complexity, and therefore being designed."[54]

A third failed strategy is "self-organization." Rather than understanding chance to be the creative force behind life's complexity, self-organization relies on necessity. "[T]he image of self-organization is a whirlpool that orders a fluid and inescapably carries it downward. Chance still operates with a whirlpool. For instance, how the whirlpool oscillates around its center will be determined by chance. The global self-organizational 'whirling' behavior of the whirlpool is a matter of necessity and not chance."[55]

Dembski refers to a fourth failing strategy as "pass the buck." Instead of theorizing about how complex systems necessary for life could have arisen here on earth, "the buck is passed" to cosmological possibilities *outside* our planet. Francis Crick devised what is perhaps the most famous theory of this sort with "directed panspermia." While other panspermia theories posited that developing microbes latched onto asteroids that then crashed on the earth and introduced basic life, Crick thought it was more tenable that space aliens intentionally planted the microbes here. The "buck was passed" as the serious problems of probability and time for life's development were extended into the cosmos.

Dembski concludes that all such strategies are extraordinarily weak and do not begin to explain specified complexity in biological systems. However, the criterion of design detection, actualized by the explanatory filter, has explanatory power that has already proven fruitful in solving biology's information problem. Dembski is confident that the filter detects specified complexity within the fascinating wealth of information in

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[54]Ibid., 203.

[55]Dembski, *Design Revolution*, 143.

the DNA molecule, within the intricacies of the bacterial flagellum, and in other promising applications.

Detecting Information-Rich Systems in Microbiology

Darwin himself wrote, "If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down."[56] It is reasonable for this quotation to be cited often by ID proponents. The irreducible complexity of systems such as the bacterial flagellum and the unfathomable amount of specified information in the DNA molecule were beyond the facilities—therefore beyond the empirical comprehension—of Darwin's time. However, in the present era, Dembski is confident that our new ability to see into the rich complexities and low probabilities of these and other phenomena necessitates serious questioning of Darwinism's strength, especially *macro*evolution as an explanatory model. The Design Inference can provide a viable alternative, with its proven ability to disclose the abundance of specified complexity in these kinds of phenomena.

Meyer's DNA analyses. Stephen C. Meyer has dedicated many years of intense research and analysis about revolutionary new discoveries in the DNA molecule. The dividends of his work give further evidence of the explanatory weakness of Darwinism and the increasing appeal of Intelligent Design for explaining DNA's specified complexity. Obviously, Dembski's theoretical work would become a valuable asset in Meyer's analyses. Dembski's thought has aided Meyer in answering the question Do the sequences of nucleotide bases in DNA match a pattern that is known by the scientist "independently from some other realm of experience?"[57] As mentioned above,

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[56]Charles Darwin, *The Origin of Species by Means of Natural Selection* (Buffalo, NY: Prometheus, 1991), 139.

[57]Meyer, *Signature in the Cell*, 364.

when Dembski discusses independent patterns, or "targets," that correspond to a specified event, he is usually referring to something that is known independently of the event, based on what has been "seen" in the past. Meyer extrapolates the concept of "independent patterns" to include also "functionally significant outcomes." In DNA, such a functionally significant outcome from the DNA's coding sequence is *the synthesis of protein*. Meyer says, "[A]ny nucleotide base sequence that directs the production of proteins hits a functional target within an abstract space of possibilities."[58] Therefore, "Because the base sequences in the coding region of DNA do exemplify such independent functional requirements (and produce outcomes that hit independent functional targets in combinatorial space), they are specified in the sense required by Dembski's theory."[59]

Moreover, in addition to Dembski's thought applying to DNA's function of hitting a specified target, his theory also applies to the cell's information processing system. According to Meyer, "[W]e recognize design patterns in the cell's information-processing system that match one's we know from an independent realm of experience, in particular, from our own information technology. We recognize a match or, rather, several of them."[60] Meyer is referring to design patterns commonly recognized by software designers and other engineers. Thus, Meyer's own use of Dembski's theory identifies specified independent pattern recognition from both "past experience knowledge" (Dembski's usual understanding of independence) and "functionally significant outcomes" (Meyer's logical extrapolation of independence).[61]

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[58]Ibid., 365.

[59]Ibid.

[60]Ibid., 368.

[61]In the present writer's personal correspondence with Dembski, he has acknowledged high regard for Meyer's work and the logic of Meyer's extension of his Design Inference into DNA analysis. Dembski briefly compliment's Meyer's work and touches on their theoretical affinities in Dembski, *No Free Lunch,* 151, 332, 356; Dembski, *Design Revolution*, 114. Cf. DNA's coding for protein as a design inference in Dembski and Wells, *Design of Life*, 234-38.

Behe and *Irreducible Complexity*. The phenomenon of *irreducible complexity* is another way in which Dembski's theory can be "actualized in [a] concrete physical system."[62] In various places throughout his literature, Dembski discusses the relationship between specified complexity and irreducible complexity—most commonly associated with Michael J. Behe.[63] Briefly stated, the relationship between the two concepts is that "irreducibly complex systems can, under certain circumstances, be shown to exhibit specified complexity."[64] Dembski further explains:

> The irreducibly complex systems Behe considers require numerous components specifically adapted to each other and each necessary for function. Such systems are not only highly improbable . . . , but also specified in their function. . . . in the sense required by the complexity-specification criterion. But highly improbable specified structures are the key trademark of intelligence—they exhibit specified complexity. Behe therefore takes irreducible complexity as a reliable empirical marker of design in biology.[65]

In terms of an independently known pattern as a criterion for specified complexity, the irreducibly complex bacterial flagellum is a simple, logical example. The flagellum and its associated parts clearly correspond to our known experience of a functional human invention—an outboard motor. The flagellum also corresponds to functionally integrated patterns seen in Behe's other examples, such as a mousetrap. Our experience tells us component systems like these depend on the *designed* integration of each part into the system all at once—any missing or dysfunctional part makes the whole system useless. Therefore, an irreducibly complex biological system is difficult to contemplate within macroevolutionary concepts, since such a system must be fully

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[62]Dembski, *No Free Lunch*, xix.

[63]As mentioned in chapter 2, irreducibly complex systems like the bacterial flagellum defy the typical Darwinian model of extremely slow, incremental, purposeless evolutionary processes. A better explanation of irreducibly complex systems like the flagellum would admit that they are products of an intentional designer. Behe believes that the best way to understand the origins of such systems is in terms of their being placed in nature as fully intact and operational for an organism's survival.

[64]Dembski, *Design of Life*, 165.

[65]Dembski, *No Free Lunch*, 251-52.

integrated from the start to maintain survivability; this is conceptually out of step with a continual, gradually evolving pathway as proposed by Darwin.

The seven hurdles for Darwinism mentioned above pertain to its weakness in explaining irreducible complexity in microbiological systems.[66] In both *No Free Lunch* and *Design of Life*, Dembski gives critical focus to those failures. He attempts to prove that there are workable (though not precise) probability calculations of a Darwinian mechanism to account for irreducibly complex systems—thereby further legitimizing specified complexity as a more plausible concept that is not just abstract but is also relevant to real natural phenomena. In working this calculations, Dembski understands that "[t]he challenge of irreducible complexity is to show that there are instances of biological complexity that must be attained all at once . . . and thus for which gradual Darwinian improvement offers no help in overcoming the improbability."[67]

In the more detailed analysis within *No Free Lunch*, Dembski calculates probabilities of origination (similar to "availability" mentioned above), localization, and configuration. He adds the problem of "perturbation" probabilities.[68] Based on these probability factors (relating to Darwinian "hurdles" for chance as described above), Dembski makes a prediction: "that at all these levels of complexity and organization, save at the lowest level for the very simplest building blocks (i.e., amino acids and nucleotide bases), these probabilities will be extremely small and regularly fall below the universal probability bound [of 1 in 10^{150}]."[69]

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[66]Dembski clarifies that systems of irreducible complexity are provably inaccessible by *direct* Darwinian pathways, and it is logical to assume that *indirect* pathways are also unlikely. Dembski and Wells, *Design of Life*, 156-58.

[67]Dembski, *No Free Lunch*, 290.

[68]Using texts as an analogue of complex biological systems, perturbation probabilities involve a *perturbation tolerance factor* that asks what proportion of characters in a text can be randomly altered while still preserving the text's meaning. Perturbation probabilities also involve a *perturbation identity factor*, which is the percentage of random changes that on average still allow the text to convey its meaning. Ibid., 295.

[69]Ibid., 302.

Chapter Summary

This chapter has examined William Dembski's central contribution to Intelligent Design—the Design Inference, with its conceptual framework expressed in the explanatory filter. Examination has also been made of why Dembski is confident in his primary proposition: that specified complexity, which is detectable through the explanatory filter, is a reliable indicator of intelligent design.

Details were given of how the filter discloses characteristics of design. Its three simple nodes facilitate the observer in differentiating between necessity, chance, and design. The correspondence between probability and specified complexity was explained, describing probabilistic complexity, probabilistic resources, specificational complexity, and a *universal probability bound.* It was also explained that design is information, and specified complexity is discovered as conceptual information is aligned with physical information; this relates to a specified-complex event corresponding to a pattern that is independent, or "detached," from the event itself. It was also explained how Dembski derives his own concept of Complex Specified Information from Shannon information theory.

It was discussed how Dembski is confident in the valid logic of the Design Inference. He also assures of the DI's reliability because proper eliminative induction can protect the design theorist from false negatives and false positives.

Dembski asserts that the DI can be effectively applied to scientific areas both inside and outside the biological sciences. Within the biological sciences, four failed strategies in addressing biology's information problem were examined. They were (1) "spontaneous generation;" (2) Darwinism's "divide and conquer" strategy (a Darwinian mechanism of gradual, sequential evolution fails to overcome seven explanatory "hurdles" to account for how an irreducibly complex biological organism could evolve); (3) "Self-organization;" and (4) "pass the buck," which has led to implausible ideas such as "directed panspermia." Therefore, Dembski argues that the only strategy that can

manage the vast improbabilities of information encountered in biology is Intelligent Design, with the explanatory filter as a useful scientific framework.

Finally, the chapter briefly examined the Design Inference's application in detecting information-rich systems in microbiology, with Meyer's DNA theories and Behe's work in irreducibly complex systems among the most promising.

This chapter should provide a sufficient background of Dembski's main body of work that has come under substantial criticism by Barbara Forrest and Robert Pennock. Before assessing their respective critiques of Dembski, a chapter must now establish Forrest and Pennock themselves as influential philosophers of science. This will be proven within the context of the landmark trial that materially disputed Intelligent Design's legitimacy—the *Kitzmiller v. Dover* trial.

CHAPTER 4

DEMBSKI, FORREST, PENNOCK, AND THE *KITZMILLER* TRIAL

Expert testimony during *Kitzmiller v. Dover* from philosophers Barbara Forrest and Robert Pennock proved that they had thoroughly and thoughtfully researched the Intelligent Design (ID) movement, including the ideas of William Dembski. They also demonstrated that they were among ID and Dembski's most ardent critics. Forrest and Pennock (among other people and arguments presented before his bench) consequentially influenced the final decision by Judge John Jones. Therefore, consideration of Forrest's and Pennock's arguments would have significant relevance for analysis of ID and Dembski's Design Inference.

A survey of the *Kiztmiller* trial will contribute to establishing both Forrest's and Pennock's bearing on the present thesis. This survey will address (1) important events that led to the trial, (2) the proceedings within the trial that relate to the question of ID as legitimate science and especially Dembski's relevance in that debate, and (3) the verdict and brief analysis of it that should advance the main thesis herein. Brief examination will also be made of the academic and public responses to Jones's verdict that are associated with scientific methodology and science education. Focus will then be given to Forrest's and Pennock's important contributions to the trial, especially their critique of Dembski within their arguments. Dembski and his Design Inference were not of primary concern in the plaintiffs' overall rhetorical strategy. However, it will be demonstrated that it was important for the plaintiffs' council to discredit Dembski and other ID leaders based on their broader religious motivations and implications that

supposedly make ID incompatible with true science. Based on Jones's final opinion, the plaintiffs were unquestionably successful.

It is also necessary in the present research to investigate more specific analyses and criticisms in other published writings by Forrest and Pennock against Dembski's thought. This will aid in answering a broader question within philosophy of science: is it accurate to identify Dembski and most ID researchers as dishonest religionists who use pseudoscientific methodologies to present creationism as legitimate scientific research? Forrest and Pennock answer definitively. They consider ID a new form of religious creationism; it is improper for classrooms, and it is dangerous rhetoric for anyone seeking legitimate scientific answers about biological systems and human evolutionary development.

Events Leading to the Suit

From January, 2002, until April, 2003, leaders of the school board of Dover, Pennsylvania, expressed concern to the Dover High School's science department about creationism not being taught to students.[1] Alan Bonsell, curriculum committee chairman, said that creationism needed "to share equal time with evolution" in biology classes.[2] Even though the board approved purchase of the Darwinian textbook *Biology* by Kenneth Miller in June, 2003, within a year, unrest began to develop from within the board about the book's support of Darwinian theory. This concern was most clearly articulated by William Buckingham, then current curriculum chairman. He complained in the presence of his committee that the Miller book did not discuss the "theory of creationism with God as creator of all life."[3]

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[1]Events leading to the suit are taken primarily from *Kitzmiller v. Dover Area School District* in "Editor's Note: Intelligent Design Articles," *Montana Law Review* 68 (2007): 1-5

[2]Ibid., 2.

[3]Ibid.

After learning of the Dover Area School District's (DASD) growing concerns and agenda, an attorney from the Seattle-based, pro-ID think tank, the Discovery Institute, warned Buckingham of potential legal hazards that could result from the teaching of creationism. He even advised him not to mandate the teaching of Intelligent Design, but rather to explain weaknesses in Darwinism and to promote robust critique of it in biology curricula. To help explain this more legally safe approach, Discovery sent to Buckingham a copy of the Jonathan Wells book, *Icons of Evolution*, and its accompanying video. However, the high school biology teachers, disapproving of the board's new agenda, refused to use the video in their classes.

In the summer of 2004, another book was recommended to the board. Richard Thompson of the Thomas More Law Center suggested the pro-ID biology book by Percival Davis and Dean Kenyon, *Of Pandas and People*. Thompson also offered to represent the board, should there be any litigation as a result of their policies. The board presented *Pandas* to biology teachers, who reluctantly agreed to use it as a reference text.

In October and November of 2004, DASD Assistant Superintendent, Michael Baksa, drafted the policy statement that would become the center of controversy. After the high school biology teachers refused to read the statement to ninth grade students, school administrators would take up the task. The statement asserted that Darwinian evolution "is not a fact. Gaps in the Theory [*sic*] exist for which there is no evidence. . . . Intelligent Design is an explanation of the origin of life that differs from Darwin's view." The statement also referred to the availability of *Pandas* for students interested in investigating ID further.[4] Dover parents, who alleged that the policy was unconstitutional, then immediately filed litigation.[5]

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[4]Ibid., 4.

[5]"The plaintiffs asked for an injunction to stop the policy from being implemented in the first instance. It was to be implemented in January of 2005 after it had been enacted in 2004." Explained by

The Court Setting

Judge John E. Jones, III

The Hon. John E. Jones, III, was assigned as judge of the *Kitzmiller v. DASD* trial in the Middle District of Pennsylvania. This was a bench trial that did not require a jury.[6] Jones, a Lutheran, is a native of Pottsville, Pennsylvania. He studied law at Dickinson College and Dickinson School of Law. From the time of his Dickinson education until the time that the *Kitzmiller* plaintiffs filed suit, Jones had never heard of Intelligent Design. Regarding evolutionary theory, he has stated, "I never had a crises of confidence about evolution or a reason to doubt that it constituted a valid theory and good science."[7]

He was appointed by President George W. Bush to sit as judge in the Middle District and was unanimously confirmed by the U.S. Senate in 2002. Shortly after his *Kitzmiller* verdict, he would be listed as one of *Time* magazine's one hundred "People Who Shape Our World."[8]

By the end of the three-month proceedings, Jones would preface his verdict by saying:

> [T]he Court is confident that no other tribunal in the United States is in a better position than are we to traipse into this controversial area. . . . [W]e will offer our conclusion on whether ID is science not just because it is essential to our holding that an Establishment Clause violation has occurred in this case, but also in the hope that it may prevent the obvious waste of judicial and other resources which would

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Judge Jones in an interview with Jane Gitschier, "Taken to School: An Interview with the Honorable Judge John E. Jones, III," *PLoS Genetics* 4, no. 12 (2008): 1.

[6]Jones explains that "it was a bench trial, and not a jury trial, . . . because when you ask for an injunction, only a judge can grant an injunction. Had they [the plaintiffs] asked for money damages, it would have been brought to a jury. They were never interested, it appeared to me, in money damages. They were interested in stopping the policy from being implemented. That was their real goal throughout the litigation." Ibid.

[7]Ibid., 3.

[8]Matt Ridley, "The Judge Who Ruled for Darwin," *Time,* 8 May 2006, 82.

> be occasioned by a subsequent trial involving the precise question which is before us.[9]

Immediately after the verdict, the Discovery Institute would accuse Jones of judicial activism, based on this admitted interest in "traipsing" into issues of scientific methodology. "One federal district court judge cannot, and should not presume to settle a contested scientific issue for all other courts."[10]

Yet Jones, in a later interview, stated that these kinds of issues were a necessary part of his judicial analysis:

> What was [the Dover policy] all about? It was about Intelligent Design. And to try to determine the effects on the recipients you have to determine what does that concept or phrase stand for? Hence, we got into a search and examination of what exactly does ID say, what is its basis, what are its scientific bona fides or lack thereof. That opens the door for a determination of whether ID is in fact science. And that is what that part of the opinion was.
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> People shouldn't mischaracterize it and say that I am the arbiter of what science is broadly. It's not what I wrote about in the opinion. I wrote about whether ID, as presented to me in that courtroom . . . was science, and I said it was not. That it was the progeny, the successor to creationism and creation science. That is was dressed up creationism.[11]

The plaintiffs' legal council was effective in proving to the judge that ID would be reasonably considered as religiously motivated content within the Dover community, that the school board perceived it to be so, and therefore the board was enacting unconstitutional school policy.

The Plaintiffs and Their Representatives

In December of 2004, the American Civil Liberties Union (ACLU) and Americans United for Separation of Church and State filed suit on behalf of eleven Dover

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[9]Judge Jones, "Memorandum Opinion," Kitzmiller et al v. Dover Area School District et al, 63-64 No. 04cv2688 (M. D. Pa. 2005).

[10]David K. DeWolf, John G. West, and Casey Luskin, "Intelligent Design Will Survive *Kitzmiller v. Dover*," *Mont. L. Rev.* 68 (2007): 14. A more thorough response is by DeWolf et al. and Jonathan Witt, *Traipsing into Evolution: Intelligent Design and the Kitzmiller vs. Dover Decision* (Seattle: Discovery Institute, 2006).

[11]Gitschier, "Taken to School," 4-5.

parents[12] against the DASD board in the U.S. District Court for the Middle District of Pennsylvania. The National Center for Science Education (NCSE) would act as "a formal, pro bono consultant for the plaintiff's attorneys on the science and science education aspects of the case."[13] As such, the NCSE, led by Eugenie Scott, was instrumental in selecting the attorneys who would present the arguments of complaint. The plaintiffs' legal council would thus be led by Eric Rothschild and Stephen G. Harvey from the Philadephia-based firm of Pepper Hamilton LLP. The plaintiffs' allegation was that the Establishment Clause of the U.S. Constitution had been violated by the DASD's policy.

The Defendants and Their Representatives

In answering the allegation, the DASD was represented by the Michigan-based Thomas More Law Center, directed by Thompson.[14] The firm's official stated purpose is "to be the sword and shield for people of faith, providing legal representation without charge to defend and protect Christians and their religious beliefs in the public square." In their opposition to judicial activism occurring in what they see as America's "culture war," they specify the ACLU as one of their primary legal advocacy opponents.[15] When Judge Jones would issue his final opinion for the case, he would refer to the More firm as "a national public interest law firm eager to find a constitutional test case on ID, who in

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[12]School parent Tammy Kitzmiller's name represents the plaintiffs.

[13]Gordy Slack, *The Battle over the Meaning of Everything: Evolution, Intelligent Design, and a School Board in Dover, PA* (San Francisco: Jossey-Bass, 2007), 47.

[14]The think tank behind the editing of *Pandas*, the book at the center of the controversy, is the Foundation of Thought and Ethics (FTE). The foundation's late motion to intervene was denied by the judge. See Judge Jones, "Memorandum Order" denying the FTE motion to intervene, Kitzmiller v. Dover.

[15]"About Us" section, Thomas More Law Center website [on-line]; accessed 15 July 2009; available from http://www.thomasmore.org/qry/page.taf?id=23: Internet.

combination drove the [DASD] to adopt an imprudent and ultimately unconstitutional policy."[16]

Proceedings of the Trial

Expert Witnesses from Science and Philosophy

The bench trial was from September 26 through November 4, 2005. Several amicus briefs were submitted, and the court called thirty-three witnesses. Attention here will be given to expert witnesses from academia and will include pertinent comments from their direct testimony and filed expert papers.

For the plaintiffs. Head attorney Rothschild began arguments for the plaintiffs in the first morning session and reminded the court of what he considered to be a clear precedent for their case:

> Eighteen years ago, the United States Supreme Court, in *Edwards versus Aguillard*, held that public schools could not teach students creation science because that proposition's core concept of a supernatural creator is religious, not scientific, and therefore violates the establishment clause of the First Amendment to the United States Constitution. The Court recognized that the teaching of creation science was motivated by a religious and cultural agenda, not the improvement of scientific education.[17]

Rothschild then explained how the plaintiffs' complaint is based on their understanding of the DASD policy on Intelligent Design as having the same characteristics and constitutional vices of the policy struck down in *Edwards*.

The plaintiffs then began to present expert testimony with Brown University biologist Kenneth R. Miller. Legal council understood that Michael Behe's *irreducible complexity* would be a fundamental ID concept that would have to be debunked in order to demonstrate ID as pseudoscience. Miller, as a leading critic of Behe's theory, would

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[16]Judge Jones, "Memorandum Opinion," Kitzmiller v. Dover, 137-38

[17]Day 1, morning session, Kitzmiller v. Dover, 4.

be a major contributor in the effort to dismantle the credibility of Behe and therefore Intelligent Design.[18] In addition to oral testimony, Miller also provided a written report containing his stance on the scientific status of evolutionary theory, the language of the Dover statement, ID's illegitimacy as an alternative to evolution, and a brief but damaging critique of *Pandas*.

Philosopher Robert T. Pennock (Michigan State University) testified at the trial on September 28. He explained to the court particular weaknesses he found in ID's scientific methodology, and also presented evidence of ID as a predominantly theological and specifically Christian enterprise—unfit for serious scientific consideration. Pennock also gave testimony in written form, further defending his opinion that ID is unscientific, and, as a form of creationism, it is inherently religious in nature. His testimony, especially as it pertains to Dembski, will be disclosed in detail ahead.

Georgetown University theologian John F. Haught was then brought to the stand on September 30. With oral and written testimonies similar to those of Pennock, Haught told the court that Intelligent Design, as a religious idea with "special sensitivity to 'mystery,' . . . is not fully accessible to ordinary or scientific experience."[19] In his theological reflections, Haught has written extensively about how religious belief can survive, despite convincing evidence for Darwinism.[20] Later, in 2008, he would receive the "Friend of Darwin Award" from the NCSE.

The second of the two primary Darwinian philosophers to be analyzed in detail within the present thesis, Barbara Forrest (Southeastern Louisiana University) testified

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[18]The strategy is described in Slack, *Meaning of Everything*, 47.

[19]John F. Haught, Expert Witness Report, Kitzmiller v. Dover, 2. Haught cites Michael Barnes, *In the Presence of Mystery*.

[20]John F. Haught, *Deeper Than Darwin: The Prospect for Religion in the Age of Evolution* (Boulder, CO: Westview, 2003); idem, *Responses to 101 Questions on God and Evolution* (Mahwah, New Jersey: Paulist, 2001); idem, *God After Darwin: A Theology Of Evolution* (Boulder, Colorado: Westview, 2000); idem, *Science and Religion: From Conflict to Conversation* (Mahwah, NJ: Paulist, 1995).

for the plaintiffs October 5 and 6. Her (ultimately successful) assignment by plaintiffs' council would be to convince the judge of a conflation of Intelligent Design with the more explicitly religious idea of "creationism."[21]

In addition to her testimony from the stand, she intensified her rhetorical offensive against ID with her own written analysis for the judge, explaining her area of expertise as "the nature and strategy of the intelligent design creationist movement."[22] In divulging the "wedge strategy" (discussed in detail in chapter 2 of the present thesis) as a superlative guide to the ID movement, her argument was that the movement is undeniably religious. Forrest drew this conclusion by deducing that, since ID leadership is integrally opposed to philosophical naturalism and the naturalistic methodology of research, it logically follows that ID only appeals to *supernatural* explanations of natural phenomena. In a later supplemental report, she also provided a detailed analysis of various drafts of *Pandas*. Her survey of the word and style modifications from the book's drafting process, she believed, exposed an inseparable link between ID and creationism, therefore giving further proof of ID as a supernatural, religious idea.[23]

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[21]A motion filed *in limine* (pre-trial) by the defense to exclude her testimony was denied by the judge. In the request, they claimed that "she is little more than a conspiracy theorist and a web-surfing, 'cyber-stalker' of the Discovery Institute and its supporters and allies—none of whom are affiliated with the DASD. Through her testimony, Plaintiffs seek to introduce immaterial and impertinent matter masquerading as expert opinion. It is Plaintiffs' attempt at achieving 'guilt by association' without the association." Defendant's Brief in Support of Motion *In Limine* to Exclude the Testimony of Barbara Forrest, Ph.D.," document 159-1, Kitzmiller v. Dover, 1.

[22]Barbara Forrest, Expert Witness Report, 1 April 2005, Kitzmiller v. Dover, 1.

[23]A typical example from Forrest's analysis is how the book's terminology evolved from the concept of an *intelligent creator* in 1986 to an *intelligent agency* of design by the 1993 draft: "Creation means the various forms of life began abruptly through the agency of an *intelligent creator* with their distinctive features already intact—fish with fins and scales, birds with feathers, beaks, and wings, etc." (from *Biology and Creation*, the originally-intended title of the book in 1986). Cf. "Intelligent design means that various forms of life began abruptly through an *intelligent agency*, with their distinctive features already intact—fish with fins and scales, birds with feathers, beaks, and wings, etc." (from a 1993 draft of *Pandas*). Barbara Forrest, Supplement to Expert Witness Report, 29 July 2005, Kitzmiller v. Dover, 6. Emphasis Forrest's.

Material evidence found by Forrest would be of major importance in Rothschild's team solidifying the association of ID with religious creationism, despite efforts by the DASD and publishers of *Pandas* to conceal such connections. During closing arguments, Rothschild would state:

> The Dover board discussed teaching creationism, switched to the term "intelligent design" to carry out the same objective, and then pretended they had never talked about creationism.
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> As we learned from Dr. Forrest's testimony, the intelligent design movement used the same sleight of hand in creating the *Pandas* textbook. They wrote it as a creationist book and then, after the *Edwards* decision outlawed teaching creationism, simply inserted the term "intelligent design" where "creationism" had been before.[24]

The present research will later address Forrest's criticism of William Dembski from within the trial and from her other publications.

Science education expert from McGill University, Brian J. Alters, testified October 12 that Intelligent Design should be understood as creationism and not as legitimate science. Alters said the foremost reason for this understanding is that its use of supernatural causation breaks the most foundational ground rules of science. Furthermore, educators must understand that science and religion present "different ways of knowing."[25] He commented in his written report that the DASD policy was harmful to students' scientific literacy.

Kevin Padian is a scientist from the University of California at Berkeley and, at the time of the trial, was president of the NCSE. His lengthy testimony from the stand lasted most of the day on October 14. From a paleontologist's perspective, Padian said that ID "provides some misleading definitions of evolution. In doing so, it sets up a straw

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[24]Day 21, afternoon session, Kitzmiller v. Dover, 38.

[25]Day 8, morning session, Kitzmiller v. Dover, 87. Alters writes on the conflict that instructors recognize when students take courses on evolution. Brian Alters, *Teaching Evolution in Higher Education: Methodological, Religious, and Non-religious Issues* (Sudbury, MA: Jones & Bartlett, 2004); Brian J. Alters and Sandra M. Alters, *Defending Evolution in the Classroom: A Guide to the Creation/Evolution Controversy* (Sudbury, MA: Jones & Bartlett, 2001).

man" and lends to the confusion of biology students.[26] He also explained in detail how he sees ID theorists in general and the authors of *Pandas* in particular as misrepresenting scientific evidence and drawing conclusions much in the same way as traditional creation scientists. As the defense cross-examined him, Padian made brief mentions of William Dembski and his book *The Design Inference*. Since the book was published by Cambridge University Press, the defense used it as an example to contradict Padian's earlier claim that ID publications lack peer review. Also during this cross-examination, the defense attempted to bolster Dembski's credentials as a scholar by mentioning his degree of Ph.D. in mathematics from the University of Chicago.[27]

In his expert brief, Padian wrote, "Intelligent Design Creationism . . . is an ideologically motivated, sociopolitical movement with no science content," while "the order of appearance of the major groups of plants and animals accords with the expectations and patterns of the evidence and theory of contemporary evolutionary biology."[28]

Moreover, in an explicit attempt to discredit William Dembski's own written testimony and academic character, the plaintiffs acquired written rebuttal by computer scientist and mathematician Jeffrey Shallit (University of Waterloo in Ontario) in deposition. Shallit insisted with no hesitancy that "[b]y any reasonable standard, Dembski is not a scientist."[29] Since Dembski withdrew his testimony before deposition, Shallit likewise did not testify in the trial.

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[26]Day 9, morning session, Kitzmiller v. Dover, 75.

[27]Day 9, afternoon session, Kitzmiller v. Dover, 93.

[28]Kevin Padian, Expert Witness Report, Kitzmiller v. Dover, 3, 15.

[29]Jeffrey Shallit, Expert Rebuttal, Kizmiller v. Dover, 2. In his rebuttal, Shallit concluded, "William Dembski has not made a significant contribution to a mathematical or scientific understanding of 'design.' His work is not regarded as significant by information theorists, mathematicians, statisticians, or computer scientists. He does not present his work in the generally-accepted fora for results in these fields. His mathematical work is riddled with errors and inconsistencies that he has not acknowledged; it is not mathematics, but pseudomathematics." Ibid., 11.

For the defendants. The first expert witness for the DASD was Michael J. Behe (Lehigh University). Thompson and his legal team's strategy depended strongly on proving how Behe's theory of *irreducible complexity* exhibits ID's operation from within practicable scientific principles and not from within religious dogma. He was first called to the stand October 17, and the direct and cross-examination of Behe lasted for three continuous days.

In addition to his testimony on the stand, Behe submitted various written briefs to the court. The first report explained weaknesses in Darwinian evolution, why Intelligent Design should be considered a legitimate alternative theory, and why discussion of difficulties within Darwinism is age-appropriate for ninth grade students. Attached to the report were copies of several of Behe's own articles—for both technical and popular publications—that convey his major ideas and research results.

After his initial written report, Behe continued with written rebuttals against some of the plaintiffs' leading experts. He addressed what Miller had written earlier about the scientific status of evolutionary theory, claiming that Miller had obscured the meanings of the word "evolution."[30]

In a rebuttal to Padian, Behe attempted to clarify for the court the crucial question of a tenable Darwinian mechanism for evolution and the weaknesses in proving it. He strongly insisted that "in this dispute we must strive to make it abundantly clear that the critical scientific argument concerns Darwin's proposed *mechanism* of evolution: that is, random mutation and natural selection. The pivotal question is, has Darwin's unintelligent mechanism been *demonstrated* to be sufficient to explain all of the

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[30]In this rebuttal, Behe claimed that Miller "slides back and forth between the various definitions of the word 'evolution:' (1) 'life has changed over time,' (2) 'living things share common ancestors,' (3) 'biological change . . . is driven by forces observable in the world today,' in particular, 'a process known as natural selection.' Yet these three propositions are logically separable. There is no reason why all three have to be correct. Further, the amount of evidence supporting one proposition may be greater, the amount supporting another proposition much less or nonexistent." Michael J. Behe, Rebuttal to Miller, Kitzmiller v. Dover, 2.

complexity of life . . ., or is there legitimate room for skepticism?"[31] Since Behe concludes that there is indeed room for skepticism, he believes that it is good pedagogical practice to demonstrate these uncertainties to students.

Sociology professor Steve William Fuller (University of Warwick, United Kingdom; Fuller is from the United States) was brought to the stand by the defense on the fifteenth day of the trial, October 24. Fuller has recently been associated with "social epistemology," which has relevance in the ID debate.[32] Fuller speaks as an intellectual secularist with no religious proclivity. He asserts that "Intelligent Design is something more than just a kind of fig leaf for the idea of God or some other kind of religious entity."[33]

The defense used Fuller's expertise to argue that ID is legitimate as a field of science and that it is not inherently religious. Furthermore, Fuller discussed how ID's inductive thinkers (led by Behe) and deductive thinkers (led by Dembski) are attempting to make the most sense of design inferences within nature; they are working towards a positive framework though which the *appearance* of design can be explained as *literal* design, whereas the status quo evolution literature has tended to treat design appearances with ambiguity and as mere metaphor.[34] Pertaining to any possible correlation between ID programs and the personal religious stances of it adherents, Fuller stated that "it's possible to discuss [ID] theory and criticize it without actually making reference to its

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[31]Michael Behe, Rebuttal to Padian, Kitzmiller v. Dover, 2. All emphasis his.

[32] "Social epistemology" generally pertains to questions such as, "Given what we know about the nature of knowledge and how it's developed, what sorts of policy should we be setting for it, and how, and for whom?" It also asks, "[H]ow exactly does consensus form in the scientific community?" Day 15, morning session, Kitzmiller v. Dover, 11. Mentioning Thomas Kuhn, Fuller explained his own work in terms of examining how intellectual paradigm shifts can be brought along by new thinkers within a specific scientific field without necessarily proving the truth or falsity of any particular theory. Ibid., 12.

[33]Ibid, 10.

[34]Ibid., 38.

religious motives."[35] The personal religious views of Behe and Dembski were examples that he mentioned when explaining how such ambiguity can be maintained when analyzing ID arguments.

Fuller briefly mentioned Dembski again during cross-examination by the plaintiffs, and he attempted to justify possible accommodation for a design revolution. Quite possibly, Dembski's explanatory filter, among the few *foundational* concepts within modern ID science, could expose a plausible *mechanism* for life; his work implies that science can "[think] about biology as if it were like technology."[36]

However, plaintiffs' attorney Witold Walsczak posed to Fuller the question of whether Dembski, in attempting to move ID out of metaphysical space and into mathematical-probabilistic space, has adequately addressed counter-examples offered by his critics:

> Q. And you would agree that people have suggested counter-examples to his hypothesis and that he's failed to address those?
> A. Well, he has tried to address them. I mean, it's a very—it's a very kind of tough game he's playing, because the idea is to come up with a notion of design that cannot be reduced to either necessity or chance. And so the counter-examples are along the lines of saying, well, you know, this could be seen as chance or this could be seen as necessity, where is that middle space that you're going for.
> But that's kind of to be expected, it seems to me, given that if he is able to come up with this, this would be quite a radical departure from, let's say, the way we think about evolution, which is a combination of necessity and chance.
> Q. If we can—if he can come up with this. But as you say, his failure to address some of the counter-examples to this very difficult hypothesis that he's making, I mean, in your estimation right now is really damning?
> A. Well, no, he's been trying. I mean, it's just he doesn't satisfy all of his critics.
> Q. But the fact that he has failed to address some of the counter-examples is damning to his theory?
> A. I mean, he's trying. He doesn't do it to everyone's satisfaction. But he is—I've seen responses to his work—his responses to his critics' work, and he is trying.
> I mean, there aren't a lot of—see, if there were more people working in this area, you know, there would be kind of support and there might be some way of

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[35]Ibid., 115.

[36]Day 15, afternoon session, Kitzmiller v. Dover, 45.

> developing this a little faster and on more different fronts, but he's pretty much doing it himself.[37]

Walsczak also questioned ID's testability and whether any idea like Dembski's of devising some type of design detector is even plausible. Throughout this exchange in the afternoon of day fifteen, Fuller repeatedly asserted that ID needs a level playing field in academic resources and a fair representation in peer-reviewed publications, thus it might successfully challenge the prevailing chance-necessity evolutionary paradigm.

An attempt was made in Walsczak's questioning to conflate Intelligent Design science with the explicitly religious field of creationism. He even attempted to get Fuller to admit close affinity between the two fields based on quotes from Fuller's own older publications. Notwithstanding, Fuller admitted that he was somewhat unfamiliar with ID during his earlier writings. He now understood the significant difference between the two, stating that as ID began to flourish, "Behe and Dembski weren't part of the old creationist crowd. . . . they were different people. They're sort of like a new generation of people who may be religiously inspired but who are sort of playing by the rules of science and have proper scientific training."[38]

Fuller gave a written rebuttal countering the arguments of the plaintiffs' experts. The essence of this brief was that "ID is a legitimate scientific inquiry that does not constitute 'religion' in a sense that undermines the pursuit of science more generally or, for that matter, undermines the separation of State and Church in the US [*sic*] Constitution."[39]

Scott A. Minnich was the final expert to give testimony, called to the stand from the afternoon of November 3 until the morning of November 4. Minnich is a leading ID research scientist from the University of Idaho and an expert in the molecular

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[37]Ibid., 48-50.

[38]Ibid., 88-89.

[39]Steve Fuller, Expert Rebuttal, Kitzmiller v. Dover, 1.

genetics of microorganisms. He explained his entrance into ID-related science: he was attracted to Behe's research in *Darwin's Black Box*, since Behe's work with the bacterial flagellum and conclusions for irreducible complexity were similar to his own. Minnich's interest in Intelligent Design research should be understood as having no creationist or religious predisposition, and he stated that this is the way science *should* be conducted. He clearly believes that ID science and creationism are two distinct, unassociated entities. He also posits that Darwinian evolution, with its theoretical holes, is not proven as fact. Therefore, it is beneficial to expose students to other alternatives, including the use of *Pandas* in the classroom, although it would fall short of a primary textbook.

Intelligent Design, according to Minnich, works as inference to the best explanation. Such inference should logically follow after one observes the purposeful arrangement of independent parts within molecular machines.[40] Minnich explained this position in his answers to the defense council:

> Q. Sir, is intelligent design science?
> A. It is. Again just to restate, it's looking at the empirical evidence, the public evidence.
> Q. And from this empirical evidence it makes inferences, is that correct?
> A. Right, using standard scientific reasoning of cause and effect we see machines that in every aspect look like machines that engineers produce. We don't have a Darwinian mechanism to explain these things in terms of the intermediates. So we can infer that these are the product of intelligence.[41]

Interestingly, Minnich also said that by far the greatest advances in biology in the last half century have come from the molecular level—the level at which evolutionary theory is the most inconsequential.[42]

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[40]Minnich made the same general arguments in his written expert testimony for the court. He refers to the simplest biological sells as "nanomachines." Scott Minnich, Expert Witness Report, Kitzmiller v. Dover, 1.

[41]Day 20, afternoon session, Kitzmiller v. Dover, 51-52.

[42]Ibid., 67-68. For example, Minnich stated that "molecular biology is focusing primarily on E. coli first and then extrapolating what we learn there to more difficult systems, eukaryotic systems, . . .it's been an incredible period." Ibid., 67.

Under direction from the defense council, Minnich also argued against claims that ID is not true science because it is not falsifiable. Citing Behe, he explained the open possibility of placing a bacterial species under selective pressure to see if a flagellum or equally complex system would develop. Such experimentation, should it be properly funded and carried forth, could plausibly confirm or rebut Intelligent Design.[43]

During cross examination of Minnich, plaintiff council made further attempts to associate ID with creationism, showing how ID depends on basically repeating creationism's arguments with new terminology, especially in using the irreducible complexity of the bacterial flagellum. Creationists might not have been familiar with the exact term "irreducible complexity," but their arguments are the same at their core.

The defense also collected written opinions from various other experts to prove the legitimacy of teaching Intelligent Design in public schools. Dick M. Carpenter, II, of the University of Colorado at Colorado Springs, an expert in educational policies and approaches, provided a written disclosure defending the pedagogical benefits of making students aware of alternatives to the theory of evolution, such as Intelligent Design. Carpenter also provided a written rebuttal to arguments made by Alters and Padian. His rebuttal further defended the legitimacy of the Dover policy by asserting that the disclosure of weaknesses in evolution as a *theory* fosters healthy critical thinking among students.

University of North Carolina philosopher of religion Warren A. Nord provided written argument for the defense, saying that questions remain open as to *how* evolution occurred. Thus, he defended ID as scientifically, educationally, and constitutionally justifiable.

Discovery Institute members William Dembski, Stephen C. Meyer, and John Angus Campbell provided written documents on behalf of the defendants before their

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[43]Ibid., 119.

testimony was withdrawn preceding deposition. Dembski filed both a written report and a substantive written rebuttal against anti-ID witnesses. The rebuttal responded to the claims of Forrest, Pennock, and Haught in their entirety. He also addressed the logic in the arguments made by Miller and Padian and defended his own mathematical work on design detection in response to their criticisms. The contents of this rebuttal will be an important subject in chapter 5 of the present work.

The purpose behind the withdrawn written testimony of Meyer was to rebut the report filed by Pennock. Meyer wrote, "The 'demarcation' criteria Pennock employs to deny the scientific character of intelligent design do not distinguish the scientific status of the theory from its chief rivals (such as neo-Darwinism or chemical evolutionary theory). Moreover, other attempts to do so have inevitably failed."[44] Meyer also attempted to demonstrate weaknesses in Pennock's claim that teaching ID violates the Establishment Clause of the U. S. Constitution; it is unjustifiable to assert that ID is religion.

Campbell, in addition to his involvement with the Discovery Institute, is also communications professor at the University of Memphis. In his withdrawn report, Campbell refrained from giving explicit support of an ID curriculum in schools but preferred to endorse teaching the controversy in evolutionary biology. Campbell stated in his brief that science is argument, and there are pedagogical benefits to making students aware of challenges coming from ID when teaching in the context of a class on Darwinian theory.

Why Dembski, Meyer, and Campbell withdrew testimony. Briefs for the defendants written by Discovery Institute associates Dembski, Meyer, and Campbell were withdrawn because they opted not to testify prior to deposition. The scholars claimed that the Thomas More Law Center, which represented the DASD, "made

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[44]Stephen C. Meyer, Revised Expert Report, 19 May 2005, withdrawn from Kitzmiller v. Dover, 5.

unacceptable demands regarding their testimony."[45] According to a statement by the Discovery Institute, the three were willing to testify, however, their request to have their own legal counsel present at the trial was denied by the Thomas More firm. The three were concerned that their own rights would lack adequate protection, thus they refused to participate in the deposition.[46]

Additionally, "Institute leaders also did not see how they could fairly defend a policy with which they disagreed without being tainted by it, a position they made clear in an amicus brief."[47] Discovery made continual appeals to the Dover school board against implementing the controversial policy involving ID; they advised them instead to teach the strengths and weaknesses of neo-Darwinism, while allowing teachers the freedom to present information about ID, should they so choose. The DASD rejected this advice.

Closing Arguments

The plaintiffs. Lead attorney Rothschild's main strategy was to convince the judge of a direct association between the DASD's proven religious agenda and the ultimate goal of Intelligent Design's main representatives; that is, to connect persuasively the board's Christian cultural motivation and resulting policy (symbolized by the *Pandas* book) with the Christian cultural agenda of the Discovery Institute. Such an agenda is set forth in the think tank's controversial "wedge document." Barbara Forrest proved to the court her professional expertise in researching and interpreting the accidentally disclosed

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[45]DeWolf et al., *Traipsing into Evolution*, 74.

[46]Discovery Institute staff, "Setting the Record Straight about Discovery Institute's Role in the Dover School District Case," Discovery Institute's Center for Science & Culture website [memorandum on-line], accessed 15 July 2009; available from http://www.discovery.org/a/3003; Internet.

[47]DeWolf et al., *Traipsing into Evolution*, 74.

contents of the document, making her a more than significant influence in the judge's decision.

In closing arguments, Rothschild effectively used the divisiveness conveyed by the term "wedge" to elicit sympathy from the judge for the Dover community. Even though the Discovery Institute originally intended that the term "wedge" be used to illustrate their agenda of "breaking up" methodological materialism by separating its assumptions from the actual evidence, Rothschild reinterpreted it for rhetorical advantage. He changed it in his closing arguments to mean "the wedge that has been driven into [the Dover] community . . . by the Dover School Board's anti-evolution, pro-intelligent design policy. . . . Dover is now the thin edge of the wedge."[48]

Rothschild also reminded the court of what was arguably one of the most implicating pieces of evidence against the DASD in the entire case. He submitted various quotes of board leader William Buckingham that demonstrated a clear Christian motivation for enacting and defending the board's controversial policy. Rothschild recalled the evidence from a board meeting and a media interview: "Mr. Buckingham . . . made the unforgettable statement [in a meeting] that, quote, 2,000 years ago a man died on a Cross, can't we take a stand for Him now, and after one meeting said to a reporter that we are not a nation founded on Muslim ideas or evolution, but on Christianity, and our children should be taught as such."[49]

Furthermore, argued Rothschild, the DASD board understood Intelligent Design to have close affinities with, or even to be a form of, creationism. The board also understood the biology textbook at issue in the trial, *Of Pandas and People*, to represent creationism. Therefore, the DASD policy was not only given to pseudoscience, but more importantly in relation to the law, it was carried forth with a religious bias and in

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[48]Day 21, afternoon session, Kitzmiller v. Dover, 28-29.

[49]Ibid., 30.

violation of the separation clause of the U.S. Constitution. In summarizing the testimony of several teachers, dissenting board members, and newspaper reporters, Rothschild then accused the DASD board of lying as they attempted to cover up their understanding of ID's association with creationism. And this was done with "an explicitly religious purpose."[50]

Rothschild used quotations by ID's main leaders, including Phillip Johnson, Michael Behe, and William Dembski, in further disclosing an unambiguous connection between ID and religion to prove the board's violation of the Establishment Clause. Forrest, Pennock, and other experts, attempting to underscore Dembski's explicitly Christian basis for ID, had earlier oft-cited one of his statements. Rothschild repeated it again in the closing arguments:

> William Dembski: "In its relation to Christianity, intelligent design should be viewed as a ground-clearing operation that gets rid of the intellectual rubbish that for generations has kept Christianity from receiving serious consideration." William Dembski again, "Intelligent design is just the logos theology of John's Gospel restated in the idiom of information theory."[51]

The defense. In the defense's closing statements, attorney Patrick Gillen argued that the plaintiffs failed to prove that the main purpose behind the DASD's policy was to advance religion instead of properly educating students. Board members thought that providing ID literature would benefit students by helping them understand the potential for a paradigm shift in origins science and that exposure to such ideas would foster their critical thinking. In explaining this potential scientific paradigm shift, Gillen stated, "[I]n fact, at every stage in the history of science, as recounted by Steve Fuller, is the dissatisfaction with the cumulating problems which have been testified to in this court

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[50]Ibid., 37.

[51]Ibid., 40.

which has become the spur for scientific advance. It's not just all fall in line and work by the guidelines established in a dominant theory."[52]

Regarding the conspiratorial objectives of the Discovery Institute, Gillen argued that it is irrelevant to the motivations of the school board. "[T]here is no evidence that the defendants had ever seen this so-called Wedge strategy or discussed the so-called Wedge strategy with anyone at any time before they learned about it in the plaintiffs' complaint."[53] This is somewhat of a red herring argument by the defense, however, since presentation of the wedge strategy (with expert aid from Forrest) was not to disclose the school board's intentions as much as to discredit Intelligent Design's overall enterprise. The same applies to the religious motivations of the authors and editors of *Pandas*. The plaintiffs attempted to discredit them, and therefore ID as an enterprise. Gillen argued that the DASD was ignorant of these metaphysical commitments behind the book's development.

Gillen also defended the philosophical position of ID against that of the plaintiffs. Instead of being committed to the unwarranted philosophy of methodological naturalism that dominates evolutionary theory, ID is open to the possibility of supernatural causation. According to Gillen, "Intelligent design theory's refusal to rule out this possibility represents the essence of scientific inquiry, precisely because the hypothesis is advanced by means of reasoned argument, based not on the Bible, but on empirical evidence and existing knowledge."[54]

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[52]Ibid., 69-70.

[53]Ibid., 79.

[54]Ibid., 86.

Judge Jones's Ruling; Brief Analysis

The ruling by Judge John E. Jones was made in favor of the plaintiffs, Kitzmiller et al, on December 20, 2005.[55] The court held that the DASD's policy involving Intelligent Design violated the Establishment Clause of the United States Constitution's First Amendment and that it also violated the Pennsylvania State Constitution.[56] He said that the board transgressed governmental neutrality in a way that conveyed religious endorsement. "We conclude that the religious nature of ID would be readily apparent to an objective observer, adult, or child."[57] Furthermore, according to Jones, an objective student and an objective Dover citizen would view the school board's announced disclaimer as an official *endorsement* of religion.[58] Jones's opinion came after consideration of how Dover school board members carried out their ID policy. He also considered the oral testimony from the board members, parents of students, members of the Dover press, and expert witnesses from scholarship.

Regarding some of the expert testimony that had the most influence on Jones's perception of ID as religion and not science, he stated:

> The only apparent difference between the argument made by [William] Paley and the argument for ID, as expressed by defense expert witnesses Behe and Minnich, is

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[55]According to a *Time* article, Jones reprimanded ID's proponents and said Dover's students, parents, and teachers "deserved better than to be dragged into this legal maelstrom." Ridley, "Judge Who Ruled for Darwin," 82. Cf. Judge Jones, "Memorandum Opinion," Kitzmiller v. Dover, 138.

[56]In addition to *Edwards v. Aguillard*, another precedent was relevant to Jones's ruling. In his opinion, the DASD failed the "purpose prong" of the "Lemon test" (*Lemon v. Kurtzman*) because the purpose of the board's ID policy was predominately religious. Gitschier, "Taken to School," 5.

[57]Jones, "Memorandum Opinion," Kitzmiller v. Dover, 24.

[58]Explicating how an objective Dover citizen would perceive the issue based on reports from the local media, Jones stated, "The letters and editorials are not offered for the truth of what is contained therein, but they are probative of the perception of the community at large. They reveal that the entire community has consistently and unwaveringly understood the controversy to concern whether a religious view should be taught as science in the Dover public school system." Ibid., 59. The use of such reasoning by Jones to reach his verdict is problematic. It does not take into account how the public's perception of the scientific issues at hand could plausibly be misguided to the point of obscuring the veracity of ID's scientific strengths.

> that ID's "official position" does not acknowledge that the designer is God. However, as Dr. Haught testified, anyone familiar with Western religious thought would immediately make the association that the tactically unnamed designer is God, as the description of the designer in *Of Pandas and People* . . . is a "master intellect," strongly suggesting a supernatural deity as opposed to any intelligent actor known to exist in the natural world. . . . Moreover, it is notable that both Professors Behe and Minnich admitted their personal view is that the designer is God and Professor Minnich testified that he understands many leading advocates of ID to believe the designer to be God.[59]

In further explanation of ID's problematic religious agenda, Jones also referenced William Dembski. "Dembski has written that ID is a 'ground clearing operation' to allow Christianity to receive serious consideration, and 'Christ is never an addendum to a scientific theory but always a completion.'"[60]

Pennock was also directly cited as an expert who adequately proved to the court ID's inherently religious, non-scientific nature. Jones said, "Robert Pennock, Plaintiffs' expert in the philosophy of science, concurred with Professor Haught and concluded that because its basic proposition is that the features of the natural world are produced by a transcendent, immaterial, non-natural being, ID is a religious proposition regardless of whether that religious proposition is given a recognized religious label."[61]

The plaintiffs' disclosure of the wedge strategy—with incisive research assistance and testimony by Forrest—made an obvious impression on Judge Jones; he made significant reference to the strategy and the Discovery Institute's goal to defeat scientific materialism and replace it with theism. Jones referred to Dembski on this matter, saying, "Dembski agrees that science is ruled by methodological naturalism and argues that this rule must be overturned if ID is to prosper." This quote of Dembski used by the judge was also supplied by Pennock.[62]

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[59]Ibid., 25.

[60]Ibid., 27.

[61]Ibid., 30-31, referencing Robert Pennock's expert testimony, Day 3, morning session, Kitzmiller v. Dover, 55-56.

[62]Jones, "Memorandum Opinion," Kitzmiller v. Dover, 30, using Pennock's expert testimony, Day 3, morning session, Kitzmiller v. Dover, 32-34.

Forrest's testimony was utilized by the judge to accuse the *Pandas* editors of covering up known connections to religious creationism in the book. They did this by changing cognates of the word "creation" to "intelligent design" in successive drafts. In the judge's opinion, it was obvious that the changes were made in response to the *Edwards* trial decision that ruled against the teaching of creationism in public schools.

Summarizing his answer to the central question about Intelligent Design's scientific legitimacy, Jones's decision contains the following conclusions:

> We find that ID fails on three different levels, any one of which is sufficient to preclude a determination that ID is science. They are: (1) ID violates the centuries-old ground rules of science by invoking and permitting supernatural causation; (2) the argument of irreducible complexity, central to ID, employs the same flawed and illogical contrived dualism that doomed creation science in the 1980's; and (3) ID's negative attacks on evolution have been refuted by the scientific community. . . . [I]t is additionally important to note that ID has failed to gain acceptance in the scientific community, it has not generated peer-reviewed publications, nor has it been the subject of testing and research.[63]

Since it was religiously motivated, according to Jones, the defendants presented no convincing proof that the DASD policy in question had any truly secular purpose.[64] Therefore, the ramifications of ID's theological basis should be unambiguous: Intelligent Design "has utterly no place in a science curriculum."[65]

In analyzing Jones's decision, response by philosopher Bradley Monton should not be overlooked. First, in response to (1) of the above synopsis by Jones, Monton argues that it is unjustifiable to prohibit supernatural causes from scientific inquiry (yet Monton also suggests that ID science does not necessarily require supernatural explanations). Although divine causation and the existence of God might never be

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[63] Jones, "Memorandum Opinion," Kitzmiller v. Dover, 64.

[64] Ibid., 130-31.

[65] Ibid., 89.

scientifically *proven*, it is still logically coherent to hold that some theistic hypotheses can be scientifically *tested*.[66]

Secondly, in reference to argument (2) by Jones, Monton rightly maintains that just because the concept of irreducible complexity could be considered as *flawed*, it does not necessarily follow that it is also *unscientific*. Furthermore, a major portion of the *Kitzmiller* trial was devoted to criticism of irreducible complexity, yet it is only one of several types of arguments made in support of ID. There are other biologically based arguments within ID, such as the low probability of prebiotic conditions being able to develop the first life forms. Monton also mentions "the fine-tuning argument from the fundamental constants of physics, which [has] nothing to do with irreducible complexity."[67]

And thirdly, pertaining to statement (3), one could logically concede that ID's *negative* attacks against evolution have been refuted. However, such conditions would not force one to conclude logically that ID's *positive* arguments are false or even unscientific. It is rational to assume that both Darwinism and ID sciences could advance simultaneously with positive evidences, with neither paradigm being able to debunk the other successfully.[68]

In further response to the reasoning behind Jones's verdict, the contention here is that he should have treated induction and deduction of ID research more fairly. ID attempts to identify information in nature; information that can only be explained as

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[66]Bradley Monton, "Is Intelligent Design Science? Dissecting the Dover Decision" (paper presented at the University of Toledo Science and Religion Conference, April 2006) [on-line]; accessed 30 January 2009; available from http://philsci-archive.pitt.edu/archive/00002592; Internet, 4-5. Monton posits a "pulsar example" similar to the one Dembski uses to refute Pennock's claim that supernatural explanations are not testable. *Infra*, this chap. n. 156. Additionally, Monton mentions that even the parameters of "science" given by that time from the National Academy of Sciences, referred to by Jones himself, did not preclude supernatural explanations, yet Jones mistakenly assumed that such preclusion indeed was in the latest NAS definition. Ibid., 5.

[67]Ibid., 3.

[68]Ibid., 2-3.

coming from intelligent, purposeful agency. ID's leaders, in their actual scientific practices, are not concerned with identifying who or what the agent or agents of this intelligence might be. This was adequately explained by Steve Fuller's expert testimony. In his decision, Jones failed to maintain a necessary dichotomy between ID's scientific analysis of intelligence in nature and the particular religious extrapolations made by some of its Christian leaders.[69]

Reaction to the Trial and to the Jones Decision

There was extensive public criticism against the DASD in the aftermath of the trial. This criticism was in addition to the board's difficulties involving the bill of one million dollars in legal fees to be issued to the plaintiffs' attorneys. The bill was considered acceptable by the Pepper Hamilton firm, although they stated that they were entitled to twice that amount.[70]

Media response. The *York Daily Record/York Dispatch* is the local Pennsylvania newspaper near Dover that not only followed the trial's proceedings in detail, but also provided testimony for the court about progression of the DASD's policy in question. Immediately after the judge's decision, the *Record* printed a definitive opinion piece. It argued that during the trial, board leaders "William Buckingham and Alan Bonsell wanted to bring God into high school biology class, and in the process, they lied" when it came to their motives, actions, and what they did and did not say at public

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[69]The Discovery Institute's criticism is logical: "Judge Jones arbitrarily treated the religious implications of intelligent design as if they were primary effects, not secondary or incidental effects. . . . ID makes its claims based upon empirical data and scientific reasoning. Thus intelligent design should have been treated like Darwinian evolution, as a theory that should be assessed on its own terms, ones involving empirical evidence and appeals to the cause-and-effect structure of the world." DeWolf et tal, *Traipsing into Evolution*, 64-65.

[70]Christina Kauffman, "Dover Gets a Million Dollar Bill," *The York Dispatch*, 22 February 2006 [on-line] accessed 15 July 2009; available from http://yorkdispatch.inyork.com/searchresults/ci_3535139; Internet.

meetings.[71] Such sentiments were not limited to the local community immediately after the verdict. Well after the trial, Jones himself also claimed that board members had intentionally lied under oath during testimony.[72]

Further scrutiny against the board came from the national media. *Time* magazine stated that "the recently ousted members of that board were relative unsophisticates, snookered by the intellectual scam that calls itself 'intelligent design.'"[73] In a subsequent printing, *Time* writer Matt Ridley included Jones among the most important one hundred "People Who Shape Our World." According to Ridley, "Intelligent design was indeed a euphemism specially intended to get around judges. . . . Perhaps now, after Jones, people will accept that if they want to teach children about God, they should do so in church, not in science classes."[74]

On November 13, 2007, the Public Broadcasting Service's (PBS) television series *Nova* originally aired a two-hour documentary, "Judgment Day: Intelligent Design on Trial." The program presented interviews with the most important individuals involved in the Dover controversy. It also included detailed arguments by the trial's lawyers, with many events reenacted in courtroom scenes.

The program's producers supported status quo evolutionary research and methodology and opposed Intelligent Design. Their unhidden bias was expressed within the program's content, within the supplemental website material promoting the

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[71]Editor's opinion piece, "Our Opinion: Investigate perjury in Dover ID case Judge Jones issued a broad, sensible ruling—finding that some board members lied," *York Daily Record*, 21 December 2005 [on-line], accessed 15 July 2009; available from http://bit.ly/hWdzp; Internet.

[72]Gitschier, "Taken to School," 4.

[73]Michael Lemonick, "Darwin Victorious," *Time*, 20 December 2005 [on-line], accessed 16 July 2009; available from http://www.time.com/time/health/article/0,8599,1142672,00.html; Internet.

[74]Ridley, "Judge Who Ruled for Darwin," 82.

production, and within supplemental material for educators provided by PBS on the website.[75]

Popular books. Numerous books analyze the trial and its ramifications. In *Monkey Girl: Evolution, Education, Religion, and the Battle for America's Soul*, Pulitzer winner Edward Humes places the Dover trial within the larger national context of the origins controversy.[76] The book, however, is unequivocally biased towards the plaintiffs and sympathetic to the situation in which Judge Jones was placed. In Humes's opinion, it was understandable that Jones would rule in favor of a necessary compartmentalizing that keeps science confined to one "world" of explanation and religion to another. As stated by Jones, "While ID arguments may be true, a proposition on which the Court takes no position, ID is not science."[77]

Also considering whether the Dover trial was a microcosm of national political tensions, while also being significantly biased in favor of the plaintiffs, is Lauri Lebo's book, *The Devil in Dover*. Lebo's account is a result of her work as a reporter covering the trial for the *York Daily Record*.

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[75]In "Judgment Day's" program description on the PBS/*Nova* website, PBS asserts, "During the trial, lawyers for the plaintiffs showed that evolution is one of the best-tested and most thoroughly confirmed theories in the history of science, and that its unresolved questions are normal research problems—the type that arise in any flourishing scientific field." "TV Program Description," PBS/*Nova* website for "Judgment Day: Intelligent Design on Trial," originally aired 13 November 2007 [on-line]; accessed 16 July 2009; available from http://www.pbs.org/wgbh/nova/id/about.html; Internet.

Additionally, *Nova*'s Senior Executive Producer, Paula Apsell, stated, "If the decision had gone the other way, it could have had dire consequences for science education in this country. We know that state boards of education in Kansas and Ohio were considering changing science standards and curriculums to accommodate intelligent design, and they since have decided against it in the wake of this verdict." "A Q&A with Paula S. Apsell, Senior Executive Producer of *Nova*," PBS/*Nova* website for "Judgment Day" [on-line]; accessed 16 July 2009; available from http://www.pbs.org/wgbh/nova/id/apsell.html; Internet.

[76] The unusual title of the book is from the epitaph placed upon the daughter of Tammy Kitzmiller, the Dover parent whose name represents the plaintiffs. Her daughter was called "Monkey Girl" by other students who teased her after she opted out of listening to the school policy disclaimer as it was being read aloud to students. Edward Humes, *Monkey Girl: Evolution, Education, Religion, and the Battle for America's Soul* (New York: HarperCollins, 2007), 222.

[77]Jones quoted by Humes in *Monkey Girl*, 340.

40 Days and 40 Nights was written by Matthew Chapman, great-great grandson of Charles Darwin. Chapman analyzes the trial and its participants as someone who considers religious skepticism of evolution to be irrational in an era that demands more sophistication; the evidence and reason must bring one to accept his ancestor's theory. Chapman concludes *40 Days and 40 Nights* by writing, "Eleven 'ordinary' citizens in Dover bravely rejected the intrusion of fundamentalism into their lives and won."[78] In hopes of a New Age of Reason, he states further, "Maybe something more beautiful than religion will evolve to lead us forward."[79]

Science writer Gordy Slack also writes about the trial as another eyewitness of the proceedings. *The Battle over the Meaning of Everything* contains facts about the trial and Slack's personal reflections about the two conflicting religio-scientific views of the world represented in the *Kitzmiller* arguments. He discusses how such divisions have also affected his own family.

Educational lobbyists and organizations. As mentioned, NCSE President, Kevin Padian, gave significant expert testimony for the plaintiffs. He said, "The judge had given us everything we asked for. It was clear that he had carefully read all the testimony, and that he had bowed to no political pressure in rendering his decision." Padian considered it, in his words, a "slam dunk" victory for his side.[80]

As previously indicated, certain members of the Discovery Institute gave important testimony for the trial, while the Institute itself remained officially uninvolved with the trial proceedings. However, Discovery did submit an amicus brief during deliberation, asking Jones to keep his ruling confined to the motivations of the DASB and

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[78]Matthew Chapman, *40 Days and 40 Nights* (New York: HarperCollins, 2007), 272.

[79]Ibid.

[80]Kevin Padian, "The Dover Victory," *Reports of the National Center for Science Education* 26 (2006): 49.

not to be concerned with the question of ID's scientific legitimacy. Jones declined such advice, rendering a decision extensively influenced by both DASD motivations *and* ID's overall viability. In response, John West of the Discovery Institute stated in a press release:

> Judge Jones found that the Dover board violated the Establishment Clause because it acted from religious motives. That should have been the end to the case. . . . Instead, Judge Jones got on his soapbox to offer his own views of science, religion, and evolution. He makes it clear that he wants his place in history as the judge who issued a definitive decision about intelligent design. This is an activist judge who has delusions of grandeur.[81]

Also, according to West, "Banning intelligent design in Dover will likely only fan interest in the theory."[82]

Furthermore, the Discovery Institute released a thorough analysis of the wording of Jones's written opinion; an analysis that has disconcerting implications for jurisprudence. Their well-documented research disclosed that "90.9% (or 5,458 words) of Judge Jones's 6,004-word section on intelligent design as science was taken virtually verbatim from the ACLU's proposed 'Findings of Fact and Conclusions of Law' submitted to Judge Jones nearly a month before his ruling."[83]

Discovery Institute Senior Fellow, William Dembski, remained confident of ID's future, especially mindful of its international appeal. Dembski responded, "It is naïve to think that this case spells the end of ID, which is rapidly going international and crossing metaphysical and theological boundaries." He continues himself to advance

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[81]Lauri Lebo, "Design Knocked Out," *York Daily Record*, 21 December 2009 [on-line]; accessed 16 July 2009; available from http://ydr.inyork.com/ci_3330082?IADID=Search-ydr.inyork.com; Internet.

[82]Ibid.

[83]"A Comparison of Judge Jones' Opinion in *Kitzmiller v. Dover* with Plaintiffs' Proposed 'Findings of Fact and Conclusions of Law,'" posted 12 December 2006 on the Discovery Institute website [on-line]; accessed 24 August 2009; available from http://www.discovery.org/a/3829; Internet, PDF document, 1.

ID's ideas further, stating, "I now correspond with ID proponents on every continent (save Antarctica)."[84]

Educational lobbyists observing from outside of the litigation responded. Executive Director, Gerry Wheeler, of the National Science Teachers Association, the world's largest organization of science educators, was supportive of the verdict. "Judge Jones's decision will echo far beyond Pennsylvania because not only does it maintain sound science for the students of Dover, but his comprehensive and detailed opinion also provides great clarity that ID is not science and has no place in science instruction. The judge's opinion is a 'must read' for school boards and communities that are addressing this issue."[85]

Alan Leshner, CEO of the American Association for the Advancement of Science and executive publisher of the journal *Science* commented, "We are heartened by Judge Jones's decision, which recognizes that Intelligent Design was injected into Dover's 9th grade biology classes for religious reasons rather than scientific reasons. And on behalf of the entire U.S. scientific community, we are grateful for the courage of science teachers and parents in Dover, who worked so hard and took such risks to preserve the integrity of science education in our public schools."[86]

Judicial influence of the trial. The Jones opinion affected school board decisions outside of Pennsylvania.[87] Soon after *Kitzmiller*, the Ohio Board of Education

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[84]Wm. A. Dembski, "Life after Dover," *Science & Theology News* 1 (2006): 2.

[85]"NSTA Hails Dover Court Decision Supporting Quality Science for Students of Dover, PA," news release, National Science Teachers Association, 20 December 2005 [on-line]; accessed 16 July 2009; available from http://www.nsta.org/about/pressroom.aspx?id=51419; Internet.

[86]Edward W. Lempinen, "Dover Decision is Good for Long-Term Economic and Scientific Strength," news release, American Association for the Advancement of Science, 20 December 2005 [on-line]; accessed 16 July 2009; available from http://www.aaas.org/news/releases/2005/1220dover.shtml; Internet.

[87]Jones later commented on the significant influence of his decision in the membership voting and ID policy decisions of other state boards after *Kitzmiller*, particularly in Kansas and Ohio. And he was

voted to remove the standardized "Critical Analysis of Evolution" model lesson plan, along with an indicator requiring students to be able to "describe how scientists continue to investigate and critically analyze aspects of evolutionary theory."[88] This standard lasted only as a temporary effort to "teach the controversy" about potential weaknesses in evolutionary models. Nonetheless, in immediate response to the Jones opinion, the Ohio board became concerned about potential litigation against the state for being out of compliance with the *Kitzmiller* precedent. "Critical Analysis" was then defeated by a vote of 11-4.

As for the Dover, Pennsylvania, community, voters in the school district took decisive measures between the completion of trial testimony and Jones's final opinion, defeating all eight pro-ID board members running for reelection and replacing them with pro-evolution members. Trial plaintiff Brian Rehm was among the newly elected.[89]

Criticisms of Dembski from Expert Witnesses

Barbara Forrest

Correlation between Intelligent Design and religious creationism had material bearing on Jones's decision, ruling that ID is inherently religious, pseudoscientific, and does not comply as with constitutional public school policies. As mentioned in the survey of *Kitzmiller*, Barbara Forrest's expert testimony was no small factor in Jones's judgment. Although her disclosure of the religious nature of the *Pandas* textbook was arguably the most consequential element of her testimony, her critique of Dembski was

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confident that his decision would be a contributing factor in future decisions in Texas and Louisiana. In his view, since ID had been discredited, "the likely tack [of creationists] going forward is something like teach the *controversy*, talk about the alleged flaws and gaps in the theory of evolution and go to that place first." Gitschier, "Taken to School, 5. Emphasis in the original.

[88]Glenn Branch, "Critical Analysis Defeated in Ohio," *Reports of the National Center for Science Education* 26 (2006): 7.

[89]"Intelligent Design Articles," *Kitzmiller v. Dover*, *Montana Law Review*, 5, citing Christina Kauffman, "Dover Dumps Designers," *York Dispatch,* 14 November 2005.

also a significant element of research for the court. More direct attention will now be given to her treatment of Dembski's thought, both inside and outside of the trial. Similar examination of Robert Pennock's critique of Dembski will then follow.

Background in Philosophy of Science. Forrest is Professor of Philosophy at Southeastern Louisiana University. She has extensively researched what she calls the "intelligent design creationist movement." Her most significant body of research is *Creationism's Trojan Horse: The Wedge of Intelligent Design* (2004, hereafter referenced as *Trojan Horse*). Co-authored with Paul R. Gross, the book examines the political and religious agenda of the movement, especially as described in the "wedge controversy." Forrest is a board member of both the NCSE and the National Advisory Council of Americans United for Separation of Church and State. Both organizations, as previously mentioned, were primary *Kitzmiller* consultants and filed the initial complaint on behalf of the plaintiffs.

In demonstrating the significance of her criticisms against William Dembski, proper order would be to inspect in more detail her written and oral opinions for the Jones court and then examine what she has written about Dembski outside of the trial. Several of her publications will be referenced, but *Trojan Horse* represents the majority of the rhetoric that pertains to the present thesis.

Criticisms of Dembski in written and direct testimony. Rather than a comprehensive listing of all of Forrest's oral and written citations of Dembski in her opinions for the trial, the present work is better served by more specific examination of her references to Dembski's scientific (or pseudoscientific, according to her charges), philosophical, and methodological ideas.

In her expert report for the court on the background of ID, Forrest devotes a brief but important section on Dembski.[90] She describes Dembski, Phillip Johnson, and other ID leaders as attempting to understand nature from within a firmly Christian worldview. Restating the Logos of the John's Gospel "in the idiom of information theory" is an approach that Dembski shares with Johnson.[91] Also in alliance with Johnson, "Dembski sees evolution as a threat to religious, and specifically Christian, faith."[92] In keeping with the wedge strategy, Dembski understands ID to be a "ground-clearing operation."[93] The goal behind it is to rid science of methodological materialism, allowing room for an explicitly Christian explanation of origins to thrive. Dembski believes ID can have better success in reaching this goal than previous attempts from more direct biblical approaches by young earth creationists such as Henry Morris.[94]

Finally, Forrest's section on Dembski notes what she implies to be his inconsistencies on whether or not the designing agent behind nature exists supernaturally. On the one hand, he has said to a mainstream audience, "Taken strictly as a scientific theory, intelligent design refuses to speculate about the nature of this designing intelligence."[95] One the other hand, in his own publications, he clearly identifies the designer as the supernatural God of religious theism.

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[90]Forrest's brief explains the explicitly Christian motivations of the modern ID movement's prominent initiators. One notable leader was Charles Thaxton, who influenced Dembski. Thaxton was a contributing author of one of the modern movement's most influential books, *The Mystery of Life's Origins: Reassessing Current Theories*, discussed in chapter 2 of the present research. Barbara Forrest, Expert Report, 1 April 2005, Kitzmiller v. Dover, 15.

[91]Ibid., 26-27, quoting Wm. A. Dembski, "Signs of Intelligence: A Primer on the Discernment of Intelligent Design," *Touchstone*, July/August 1999, 84.

[92]Barbara Forrest, Expert Witness Report, 1 April 2005, Kitzmiller v. Dover, 33.

[93]Ibid.

[94]Ibid.

[95]Ibid., 35, citing Wm. A Dembski, "Intelligent Design Is Not Optimal Design," *Metaviews*, February 2, 2000 [on-line]; accessed by Forrest 16 March 2005; available from http://www.leaderu.com/offices/dembski/docs/bd-optimal.html; Internet.

Forrest took the witness stand during day six of the trial proceedings and was asked about her knowledge of Dembski's work. Defense attorney Robert Muise contended that her lack of expertise in mathematics disqualified her in giving an opinion about Dembski's work on Complex Specified Information (CSI) in his book, *The Design Inference.* Forrest agreed, stating further that "Dr. Dembski has written that that book does not address the implications of design theory for biology, . . . but that book is a highly technical book."[96] Moreover, Muise argued that she should be disqualified as a witness because of her lack of expertise in mathematics and the other disciplines that Dembski employs in this, his most significant book. Judge Jones, however, ruled for Forrest's general credibility for some lines of questioning.

She was then questioned by plaintiffs' attorney Eric Rothschild, who used her testimony to substantiate the claim that Dembski, Phillip Johnson, Stephen C. Meyer, and Michael Behe[97] are known throughout ID circles as visibly "evangelical," Christian scholars who devised the "wedge strategy."[98]

Furthermore, Forrest's research and testimony were used to demonstrate clear affinities that Dembski and other Intelligent Design leaders have had with young earth, biblical creationists; both groups have made very similar statements against scientific naturalism. Rothschild told Forrest, "In 1998, you see Dr. Dembski in a book called *Mere Creation* rejecting naturalism, distinguishing it from creation, and it's clear here that he rejects it for religious reasons because he says that, 'As Christians we know naturalism is false. Nature is not sufficient,' and this is very common throughout

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[96]Day 6, morning session, Kitzmiller v. Dover, 28.

[97]"Evangelical" could be a misleading term for describing Behe personally. A Roman Catholic, he has not expressed publicly any desired evangelistic strategy behind his scholarship. However, he does examine the relationship between Catholic doctrine and evolutionary science in Michael J. Behe, "A Catholic Scientist Looks at Darwinism," in *Uncommon Dissent: Intellectuals Who Find Darwinism Unconvincing*, ed. Wm. A. Dembski (Wilmington, DE: ISI, 2004), 133-51.

[98]Day 6, morning session, Kitzmiller v. Dover, 137-39.

creationism."[99] Rothschild then prompted Forrest to remind the court that the only alternative to naturalism is supernaturalism.[100] The line of questioning also used several examples from Forrest's research to reveal how biblical creationism and ID are very similar in specific arguments they have made from fields such as paleontology and microbiology. ID leaders, therefore, use religiously motivated arguments grounded in supernaturalism, and such arguments have been long established. The specific religious label that ID leaders have continually used to denote the supernatural designer is "God." Dembski, as one of the leaders, has made this clear in his citations from the biblical book of John. Working within what Forrest asserts is a Christian enterprise, Dembski is among the ID leaders who have attempted to appeal to Christians as a natural support base by offering apologetics seminars that teach how to deal with hostile opposition.[101]

Using multiple sources during Forrest's testimony, plaintiffs' attorneys divulged ID leaders' own admission about the lagging behind of Intelligent Design's actual *science*, while they continue to make progress in *cultural confrontation* and *public*

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[99]Day 6, morning session, Kitzmiller v. Dover, 141.

[100]Forrest also testified about a 1993 meeting at Pajara Dunes, California, led by Phillip Johnson. The meeting was for planning a new strategy in arguing for creationism. This needed to be done in response to creation science being ruled unconstitutional in the *Edwards* trial. Part of this tactic, which was the genesis of the wedge strategy, would involve Dembski, Behe, and Jonathan Wells devising a way to redefine science that departed from the purely naturalistic definition from the National Academy of Sciences. Day 6, afternoon session, Kitzmiller v. Dover, 13. However, as Monton argues in the previously-stated critique of Jones's decision, it is questionable whether the NAS definition of science by the time of the *Kitzmiller* trial was purely naturalistic.

In post-trial publications, Forrest and co-author Paul Gross give further warnings against the ID wedge agenda of advancing a premodern view of science and education, along with a premodern political conscience. Among their many citations of Dembski, they write, "He . . . defends 'premodernity,' because, he asserts, 'modernity, with its commitment to rationality and science, is wonderfully adept at discerning the regularities of nature,' but 'woefully deficient at discerning the hand of God against the backdrop of those regularities.'" Barbara Forrest and Paul Gross, "The Wedge of Intelligent Design: Retrograde Science, Schooling and Society," in *Scientific Values and Civic Virtues*, ed. Norette Koertge (Oxford University Press, 2005), 191-92, citing Wm. A. Dembski, *Intelligent Design: The Bridge between Science and Theology* (Downers Grove, IL: InterVarsity, 1999), 44.

[101]Day 6, afternoon session, Kitzmiller v. Dover, 44.

awareness. Examples of such acknowledgment included Dembski's keynote address at a 2002 conference on Research and Progress in Intelligent Design (RAPID).

Dembski became the brief primary focus of Forrest's testimony at the end of day six. At the time of the *Kitzmiller* trial, Dembski was employed by the Southern Baptist Theological Seminary in Louisville, Kentucky. In addition to his seminary employment, she described how some of his publications, including *Unapologetic Apologetics*, written with fellow Discovery Institute member J. Wesley Richards, also give explicit evidence of his theological and Christian apologetic background and agendas. Legal counsel and Forrest exhibited Dembski's published dialogue with notable creationist, Henry Morris. Dembski said he was indebted to Morris for a growing desire to supplant materialism/naturalism with something that could advance Christianity. Dembski, as quoted by Forrest, claimed, "Dismantling materialism is a good thing. Not only does intelligent design rid us of this ideology which suffocates the human spirit, but in my personal experience, I found that it opens the path for people to come to Christ."[102] In other statements, Dembski had argued that "the chief obstacle for people to come to Christ was Darwinian naturalism."[103] Also, as a "big tent" strategy, Dembski has affirmed that there can be "tacit acceptance" of standard old earth and old universe theories among ID thinkers; that particular issue is peripheral to ID's main objectives. Yet according to Forrest, such ambiguity would not be acceptable in the mainstream of science. Reputable scientists unquestionably assert that the earth and universe are several billions of years old.[104]

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[102]Ibid., 50, citing Wm. A. Dembski, "Intelligent Design's Contribution to the Debate Over Evolution, A Reply to Henry Morris," February, 2005.

[103]Forrest's paraphrase of what Dembski said to a group of national religious broadcasters. Day 6, afternoon session, Kitzmiller v. Dover, 51.

[104]Ibid., 52-53.

Using other exhibits from various Dembski writings, Rothschild led Forrest to describe Dembski as one who believes that a worldview of Christian theism should be fundamental to science. Conversely, he sees naturalism—based on an understanding of nature as a series of blind, purposeless processes—as having no place at all for the concept of intelligent agency in nature.

As Rothschild concluded his questioning of Forrest, she repeated a recurring reference in both her oral and written testimonies: a prevalent Christological theme of Dembski's from John's Gospel. Forrest quoted Dembski: "Intelligent design . . . readily embraces the sacramental nature of physical reality. Indeed, intelligent design is just the Logos theology of John's Gospel restated in the idiom of information theory."[105]

In cross-examination, defense attorney Thompson then proceeded with a line of questioning that attempted to prove that Forrest—closely associated with the ACLU and the New Orleans Secular Humanist Association—has attacked the defendants' position because they are Christians. Then later, he made a lengthy effort to demonstrate a double standard in Forrest's acceptance of naturalism and rejection of ID. "[W]hat I'm trying to discover is the methodology you use for excusing Darwinists who use philosophical terms and make philosophical statements based upon their science and the methodology you use for not excusing intelligent design theorists when they make philosophical statements and religious comments?"[106] Examples used by Thompson included NCSE director Eugenie Scott and other self-described secular humanists such as Steven Wineberg.[107] Thompson referred to the third edition of the Humanist Manifesto.

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[105]Ibid., 55. Forrest citing Dembski in "Signs of Intelligence."

[106]Ibid., 108-09.

[107]Ibid. 91-94.

He said that it "makes broad philosophical claims such as, humans are the result of unguided evolutionary change, and that humanists recognize nature as self-existing."[108]

Forrest said that she herself agreed with such claims. However, she replied, there are major differences between the actions of these humanists and those by ID leaders such as Dembski. Scott, for instance, does not represent the NCSE in her comments about humanism, and she does not promote the teaching of philosophical humanism in public schools. Yet Dembski's is an overtly religious and therefore unscientific viewpoint, and he and other ID leaders act to promote that viewpoint in science classes.

In response to implications by defense council, Forrest also stated that, as a philosopher of science, it is not necessary that she be an expert in the particular scientific fields of ID thinkers in order to opine that ID is disqualified as science. Disqualification of ID should be evident when one examines the religious rhetoric plainly stated by these thinkers. Thompson alluded that it would be legitimate for Dembski, based on the type of audience he is addressing, to discuss ID in scientific/mathematical terms in one setting, while using theological ideas in another. Answering this claim, Forrest argued that the fact that Dembski would ever need to discuss ID in theological language would demonstrate that it is religious at the core and, de facto, pseudoscience. Such sentiment clearly extended beyond her opinion of Dembski; the explicit intention behind Forrest's written report and oral testimony was to prove that Intelligent Design in general is not only beset with religious implications, but is religious in its very essence.

Thompson then charged that her criticism of ID theorists is logically fallacious. It is unfair, suggested Thompson, to oppose ID thinkers who have theological alliances, while supporting certain Darwinists, such as Kenneth Miller, who are also theistic evolutionists. Miller is an ardent critic of ID and its methodology. Yet, since Miller also

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[108]Ibid., 93.

believes that God has created nature and physical laws, why should he not be called a creationist as well? Forrest replied that Dembski himself, representing the majority of ID leaders, has stated that "design theorists are no friends of theistic evolution."[109]

As her testimony extended into day seven, Forrest defended her choice of excluding *The Design Inference* from her written report. This is Dembski's book that most thoroughly articulates his own program. She stated that she did not have the technical expertise to examine the book accurately, and, as Dembski himself has mentioned, the book does not address the biological implications of ID. Instead, she considered herself better qualified to inform the court of the religious nature of Dembski's ideas by exposing his publications for lay audiences. This was also the approach as she reported on other ID leaders as well.

Upon redirect examination of Forrest by plaintiffs' attorney Rothschild on day seven, important mention was made regarding the scientific methodology of Dembski and Johnson:

> Q. As regards the theory of evolution, does the scientific community that studies it begin their research into it by looking at passages of Scripture and then looking for scientific evidence that's consistent with Scripture?
> A. No.
> Q. Is that what major figures in the intelligent design movement have described themselves as doing?
> A. Yes.
> Q. Mr. Johnson?
> A. Yes.
> Q. Mr. Dembski?

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[109]Ibid., 111. This was arguably one of the most interesting exchanges of the trial involving expert testimony. Thompson repeatedly pressed Forrest about why she would not call Miller a creationist, since "Dr. Miller testified in this case that, quote, God is the author of all things seen and unseen, and that would certainly include the laws of physics and chemistry, end quote. Is that a creationist talking?" Ibid., 110. One could argue that Forrest's response that "Dembski . . . has stated that 'design theorists are no friends of theistic evolution'" was irrelevant to the important question at hand and did not in any way address what Thompson implied to be a logical inconsistency. The plaintiffs interrupted Thompson's line of questioning, objecting because they did not have the proper documentation about Miller's "creation statement" at hand (even though the statement was taken from Miller's own testimony from earlier in the trial.). In the middle of the objection, the court and attorneys agreed to adjourn for the day. One would expect the defense to continue this effective offense with Forrest back on the stand the next day. But, surprisingly, that subject was discontinued; the defense left the dispute unresolved and proceeded to other lines of questioning.

A. Yes.[110]

Notably, Forrest did not quote any material within Dembski's corpus in which he has described his own scientific method in such terms, nor was she asked by Rothschild to do so.

Treatment of Dembski beyond *Kitzmiller*. Barbara Forrest's most significant publication before the *Kitmiller* trial was *Trojan Horse*, co-written with Paul Gross. The book is a thorough survey and criticism of the contemporary Intelligent Design movement and especially the Discovery Institute. Utilizing many of the same findings and analyses that Forrest submitted to the Jones court, *Trojan Horse* centers on the wedge strategy, its principal instigators, and a running critique of the prominent ID ideas that Forrest and Gross perceive as potential dangers for origins science and public education.

In their explanation of ID in general, Forrest and Gross claim that ID's leading thinkers attempt to appeal to an audience that is "uninformed about the way science works and about the current state of evolutionary science."[111] Also, as a general assessment, they say that ID is a negative program that exists primarily to promote skepticism of modern evolutionary science: "It is not theory but the denial of theory."[112] Contrary to ID's arguments, Forrest and Gross are convinced by what they consider to be the hard, empirical weight of facts espoused in mainstream science that prove a non-miraculous origin of life. *Trojan Horse* asserts that Dembski and all other ID thinkers continually resort to *abstraction*, instead of empirical evidence, as their only theoretical alternative. Nevertheless, Forrest and Gross do admit that William Dembski "creates the

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[110]Day 7, morning session, Kitzmiller v. Dover, 88-89.

[111]Barbara Forrest and Paul R. Gross, *Creationism's Trojan Horse: The Wedge of Intelligent Design* (New York: Oxford University Press, 2004), 114.

[112]Ibid., 115. During the *Kitzmiller* trial, Forrest stated that "Intelligent Design theory is based on the supernatural, and so it is not likely that you'll have scientific evidence that will support that." Day 7, morning session, Kitzmiller v. Dover, 75. Forrest gives a thorough defense of her philosophy of scientific methodology in "Methodological Naturalism and Philosophical Naturalism: Clarifying the Connection," *Philo* 3 (2000): 7-29.

steepest treadmill" for critics, as the ID leader with the most intellectual strength at present.[113]

It is relatively easy for the reader to find specific analyses and criticisms of Dembski's explanatory filter within *Trojan Horse*. However, these significant comments are heavily mixed with rhetoric—often ad hominem, superficial, and superfluous—that is unnecessary and distracting for research of the particular merits and problems within Dembski's theorems. The co-authors frequently refer to their own lack of expertise in the fields involved with the filter, and they occasionally suggest that the reader seek out their secondary sources for detailed expert critique of Dembski from such fields. These suggestions are understandable and expected, yet Forrest and Gross's argumentation would benefit from more succinct analysis of one or two prominent examples from Dembski's thought. Closer inspection could more plainly demonstrate whether the filter fails as a theoretical framework.

Before giving somewhat specific treatment of Dembski, *Trojan Horse* adequately describes his general, personal program: "to prove by formal reasoning that life is necessarily a product of active, purposive intelligence—of an agent."[114] The most substantive arguments against Dembski that are brought forth in *Trojan Horse* have been addressed by Dembski himself, and his responses are forthcoming in the present work.

Specific analysis criticizes the Basic Argument from Improbability (BAI), used by Dembski, Behe, and others.[115] Using the BAI, Dembski emphasizes events that have occurred within extremely small probabilities, claiming that they give evidence of design.

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[113]Forrest and Gross, *Trojan Horse*, 117.

[114]Ibid., 118.

[115]Mark Perakh explains the BAI and its weaknesses, criticizing its use by Michael Behe. "Behe seems to assume that an event whose probability is 1/N, where N is a very large number, would practically never happen. This is absurd. If the probability of an event is 1/N it usually means that there are N equally probable events, of which some event must necessarily happen." Forrest and Gross, *Trojan Horse*, 126, citing Perakh.

But Forrest and Gross say that "ridiculously improbable things happen all the time," and, "[v]ery low probability does *not* mean impossibility."[116] Placing the speciousness of the BAI in biological terms, they say that it misrepresents established biological science:

> Trotting out absurdly small probabilities, such as for the spontaneous . . . appearance of even a small protein of specific amino acid sequence, remains the commonest form of argument that something other than "chance" must be the explanation and that therefore Darwinism is a snare and a delusion. . . . But such an argument is specious: no protein ever assembled itself in one step from all its amino acids, and no reputable scientist has ever supposed that it could; that is not how proteins are synthesized. Nevertheless, by showing how wildly improbable that would be (it is!), one can imply for the mathematically and biologically unsophisticated that proteins can never have evolved at all.[117]

In examining further Dembski's understanding of "chance," Forrest and Gross note the difference between chance (random) mutations within genotypes, on the one hand, and natural selection, on the other. Natural selection's choice of which variant will survive to become the norm of succeeding generations "is the very opposite of chance."[118] Forrest and Gross criticize all of ID and scientific creationism for conflating these two realities and always equating Darwinism with mere "chance" processes. Dembski's explanatory filter is misleading in this regard, say Forrest and Gross. The filter stipulates "that anything which *cannot* be explained by frequent, regular operation of known natural laws, or simply as an accident, *must* be both very rare and designed."[119] This, however, is an oversimplification of the filter by Forrest and Gross, leaving out the substantial element of *specification*. They would be more accurate to say that if specification is detected in a complex, rare event, then design is inferred, according to Dembski's process.

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[116]Ibid. Emphasis theirs.

[117]Ibid.

[118]Ibid., 129.

[119]Ibid., 130. Emphasis theirs.

Also, in asserting "chance," absence of "will," and absence of "conscious purpose" behind natural events, *Trojan Horse* proposes that the appearance of "design" can be adequately explained in naturalistic terms, without inferring intent. For example, phenomena such as wave patterns on a beach, the configuration of atoms in a molecule of water, and the symmetry of snowflakes prove that natural processes without a designing intelligence behind them can sufficiently explain such patterns. A similar "design appearance" phenomenon mentioned by *Trojan Horse* and other ID critics is the Fibonacci number arrangement of leaves.[120] Gert Korthof, referenced in *Trojan Horse*, is among the most notable biologists who use this argument. The algorithm that produces a beautiful *appearance* of design in certain leaves is actually quite simple, therefore it is an example of how Dembski's filter can create a false positive for design detection. Forrest and Gross are aware of Dembski's response that this false positive comes from a misapplication of his filter, but they are not impressed: "He dismisses the [Korthof] argument on grounds that the ID is not in the design itself, but in some generative processes antecedent to the actual emergence of the CSI—in the present case, of the leaf positioning."[121]

Using another example advanced by Korthof, *Trojan Horse* argues that the explanatory filter does not account for the existence of essentially the same amount of information in the DNA of functional genes as that found in "junk DNA." Therefore, in order to demonstrate which pieces of DNA contain information used for design, Dembski needs an additional criterion. Korthof is aware of Dembski then introducing *specification* as this extra criterion, but according to Korthof (along with Forrest and Gross), Dembski has not explained the particulars of "specified DNA" in his literature. Forrest and Gross

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[120]In a Fibonacci algorithm, each number is the sum of the two previous numbers, as in 1, 1, 2, 3, 5, 8.

[121]Forrest and Gross, *Trojan Horse*, 132.

note further complications. Among them is "the fact that the 3-D structure of a protein *cannot* be calculated from its gene's DNA sequence; thus, the DNA information, however calculated, cannot in any case be the 'design' of the protein."[122]

Forrest and Gross also argue, "Nor is there any reason why an object cannot be due to chance *plus* regularity: genetic variation more or less by chance; selection by demonstrably 'regular'—lawful—processes."[123] Dembski's response to this claim of multi-modality in events will be discussed in detail ahead. Superficially, the assertion appears to beg the question; it is Dembski's goal to explain the plausibility of each reality separately. Therefore, given natural selection itself as a lawful process, what are the chances of just the right mutations occurring within a genotype in the first place so that natural selection can operate?

Trojan Horse rightly cites an analysis of Dembski's filter by University of Wisconsin philosophers Branden Fitelson, Christopher Stephens, and Elliot Sober. "How Not to Detect Design" is a substantive critique of Dembski's logic and statistical claims for design detection. Forrest and Gross, in a style common throughout *Trojan Horse*, list the critical findings of the experts (in this case, Fitelson et al.) but with insufficient detail to allow the critical, objective reader to determine the weight of such criticisms. Nevertheless, the following reservations of Fitelson et al. are the most notable:

> For example, [Fitelson et al.] find repeated internal contradictions to the stated foundational principles of the design filter. They cite sequential page numbers on which a necessary connection between *design* and *agency* is either affirmed and then denied, or denied and then affirmed. They find that the stipulated parsimonious ordering of "regularity, "chance," and "design" (high/moderate/low probability) is arbitrary and indefensible. They explore the idiosyncratic *specification* conditions (by which chance is eliminated, leaving only design as the explanation), and they find that those conditions do not, and cannot, identify the "specificity" that Dembski must have in order to eliminate regularity and chance.

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[122]Ibid., 131.

[123]Ibid., 130.

> They argue that the critical probability threshold (or "probability bound") on which Dembski's handling of chance depends is not justified.[124]

Instead of following any of the above criticisms systematically, analytically, or logically, proving the criticisms' intrinsic merits, Forrest and Gross immediately proceed to embellished rhetoric about Dembski's personal argumentative style and attitude when answering such charges.

However, they do acknowledge that one of Dembski's responses to Fitelson et al. is "diagnostically useful, . . . address[ing] the criticism that 'design,' if actually identified by Dembski's procedures, cannot demonstrably mean *only* design as the work of an intelligent agent."[125] They quote his reply:

> [I]t's not clear why this should be regarded as a defect of the concept. It might equally be regarded as a virtue for enabling us neatly to separate whether something is designed from how well it was produced. Once specified complexity tells us that something is designed, not only can we inquire into its production, but we can rule out certain ways it could not have been produced (i.e., it could not have been produced solely by chance and necessity). A design inference does not avoid the problem of how a designing intelligence might have produced an object. It simply makes it a separate question.[126]

Regardless of this response's lucidity, Forrest and Gross say that Dembski is avoiding the issue. They are far from impressed, and they speculate that the University of Wisconsin critics would have a similar opinion. "We suspect that Fitelson et al., concerned about the confusion of epistemic with deductive arguments in *The Design Inference*, were not satisfied by these responses to their analysis. Among professionally qualified reviewers, such dissatisfaction is common."[127]

An important section in *Trojan Horse* is devoted to how critics have responded to Dembski's use (or, according to the authors, *mis*use) of physics. Forrest and Gross say

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[124]Ibid., 133. Emphasis theirs.

[125]Ibid., 135.

[126]Forrest and Gross, *Trojan Horse*, 135, quoting Dembski from "Another Way to Detect Design."

[127]Ibid.

that "despite his enormous range of reference, example, and anecdote, physical scientists are no more impressed with the science of the design inference and ID than are the biologists, mathematicians, and philosophers."[128]

They begin with the negative review by physicist Mark Perakh. In sum, his criticism against the explanatory filter is that its first node—which forces one to make a yes/no distinction regarding an event—is a violation of physical logic. (If the answer to the physical law question is not "yes," the only alternative offered by the filter is "no," it must be chance.) In order to explain Perakh's argumentation adequately, Forrest and Gross cite two of his illustrations that demonstrate variable relationships between law and chance:

> Perakh offers examples that violate Dembski's stipulations. The first concerns the impacts, in one (selected) square meter of tennis court on one side of the net, of tennis balls flung by a tennis-practice machine on the other side. Assuming a large number of throws and depending on the total number of them, the probability of impact of some of the balls on the observed square will be determined to be low or, rather more likely, *very* low. Should a number of balls land in that spot, a naïve observer might then attribute the "event," in toto, to chance. The physical reality, however, is that chance determines only the exit speed of the ball from the pitching machine. But whatever the speed, all remaining essential phenomena and their quantities—the number and the timing of impacts on the chosen square meter—however low the calculated probability, are fully determined by the "regularity," that is, the law(s), of classical mechanics, which set(s) the trajectory of each ball."
>
> This case is therefore one of law and chance acting together and inseparably in an "event" whose cause is to be investigated. Perakh then describes the Galton board, a machine in which many balls fall under the influence of gravity through baffles and into bins placed at increasing distances from the point of egress. The drop of each ball is governed by chance, but the final distribution of balls in bins—the pattern—is eventually determined when a sufficient number of balls have already fallen into the bins. The distribution, which is a function of position to the left and right of center when a large number have fallen, is infallibly the familiar Gaussian (the "normal") distribution. The balls will always be distributed in the same way. Perakh is showing here that "the situation is in a sense opposite to the case of the tennis balls: while for the tennis balls chance operated through law, now the law (Gaussian distribution) operates through chance."[129]

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[128]Ibid., 136.

[129]Ibid., 137-38. In quotations is Forrest and Gross's quote of Mark Perakh from "A Consistent Inconsistency."

Perakh, along with Forrest and Gross, assert that these examples prove that Dembski creates a faulty dilemma of having to choose "chance" or "law" with the first node of the filter. But, they argue, there are innumerable events in the physical world in which "natural law and chance can act together, inseparably."[130]

Another physics-related critique by Forrest and Gross involves what Dembski calls the Law of Conservation of Information. According to their interpretation of his claim:

> This "law" is the formal equivalent of the second law of thermodynamics—which asserts that the entropy of a closed system (such as the universe) can only remain constant or increase. In his treatment of information, Dembski adopts a part of Claude Shannon's famous entropy theory of communication, one of the basic ideas of modern information theory, for estimating information content. Thus, Dembski's proposed new law is a law of thermodynamics.[131]

The law, according to Dembski, means that nature conserves (complex specified?) information but does not create novel information.[132] Therefore, when CSI is found, it indicates the certain presence of design that cannot be explained in naturalistic terms.

Forrest and Gross begin to challenge this idea by claiming that Dembski fails to "represent the true significance" of Shannon's entropy rule regarding communications.[133] When Dembski describes the working of nature using Shannon's formulation, he makes a misappropriation of it: "Dembski's measure of information is

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[130]Ibid., 138.

[131]Ibid.

[132]Unfortunately, Forrest and Gross are inconsistent and therefore confusing in their explanation of Dembski's version of the Law of Conservation of Information (LCI). At places in their critique, they correctly represent him as saying that nature cannot produce novel *complex specified* information, while at other places they misrepresent him as saying that nature cannot produce novel *information*. This disparity of definition is significant and reduces the credibility of this particular critique by Forrest and Gross. It will become evident (*infra*, chap. 5) that Dembski clearly defines his version of the LCI in numerous writings, especially in *The Design Revolution*, and that he recognizes the importance of this clarification.

[133]To support their claim that Dembski misappropriates Shannon's theory, Forrest and Gross cite a review of Dembski by physicists Victor Stenger and Matt Young. Forrest and Gross, *Trojan Horse*, 139.

really just a measure of entropy, not the information, of the event."[134] Such a mistake, therefore, cannot disprove the possibility of the increase of information due to *natural* processes.[135] Even though information cannot be added to a closed, isolated system, "biological organisms and their parts are not closed systems." Actually, they are constantly open to "negative entropy, . . . which is the same as information."[136] Therefore, according to Forrest and Gross, such physics is considered as fundamental for the study of self-organization phenomena.

It is noteworthy that Forrest and Gross—after explaining their vigorous skepticism about Dembski's unjustified claim of discovering the Law of Conservation of Information—then briefly mention how materialist physicists Victor Stenger and Matt Young propose the possibility of how such a law could exist. Their theorems supposedly avoid the mistakes of Dembski's flawed logic. Yet *Trojan Horse* provides no details of Stenger and Young's own thought-experiments supporting this law and how it could actually operate in purely naturalistic, non-designed processes. Similar ambiguity pertains to *Trojan Horse*'s passing mention of Richard Dawkins's arguments of how naturalistic theories can adequately explain the increase of information in DNA.

Robert Pennock

Pennock, as previously mentioned, was another instrumental *Kitzmiller* witness who significantly influenced Jones's final opinion. He contributed to the judge's determination that Intelligent Design is inherently religious, defective as science, and incongruous with legitimate scientific methodology. More will now be discussed

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[134]Ibid.

[135]A crucial result of Dembski's errors, say Forrest and Gross, is that they "fail to account for the empirical fact that the complexity and the information in living things *has clearly increased* over time." Ibid. Emphasis theirs.

[136]Ibid., 140.

regarding Pennock's treatment of Dembski within the trial and in his arguments against Dembski apart from the trial. First, some brief professional background on Pennock is in order.

Background in philosophy of science. Robert T. Pennock is a philosopher of science at Michigan State University. Among his numerous grants from the National Science Foundation (NSF), he has been a principle investigator for the NSF's interests in the Avida algorithm. Avida, which was discussed in his *Kitzmiller* testimony, is a significant element of technology for teaching evolution and the nature of science. The program makes use of what Pennock and others describe as "digital organisms."

Pennock is a leading apologist of Darwinism and critic of Intelligent Design Creationism (IDC), as he describes the field. He has written numerous academic articles supporting the explanatory strength of neo-Darwinian theory, while criticizing any and all theories within ID for their lack of substantive scientific credence. Pennock is associated with three important books that he has authored, edited, or co-edited that involve these subjects. *But Is It Science? The Philosophical Question in the Creation/Evolution Controversy*, a collection of essays that he co-edited with Michael Ruse, was updated in early 2009.[137] Pennock also edited *Intelligent Design Creationism and Its Critics* (2001), containing articles by himself, other anti-ID scholars, and some pro-ID scholars, including Dembski. Most of his argumentation relevant to the present research is represented in his only solely authored book, *Tower of Babel* (1999). Comparing

[137]The book was updated in 2009 in response to *Kitzmiller*. This new edition includes one article self-authored by Pennock. He argues that *Kitzmiller* confirmed his own position on the demarcation problem in defining real science. Demarcation should not require a set of precise definitions that narrowly separate science from anything else. He argues for "a more modest notion of demarcation" that he describes as a general, "ballpark" judgment based on methodological naturalism. Robert T. Pennock, "Can't Philosophers Tell the Difference between Science and Religion?: Demarcation Revisited," in *But Is It Science? The Philosophical Question in the Creation/Evolution Controversy*, ed. Robert T. Pennock and Michael Ruse, rev. ed. (Amherst, NY: Prometheus, 2009), 536-77.

contemporary ID thought with older, more explicitly biblical creationism, *Tower of Babel* is an effort to prove ID concepts as insubstantial pseudoscience.

After examining Pennock's research and opinions for the *Kitzmiller* trial, focus will be given to his extra-*Kitzmiller* material; although other publications will be referenced, *Tower of Babel* will require the majority of attention regarding his critique of Dembski.

Criticisms of Dembski in written and direct testimony. Similar to Forrest, Pennock begins his written expert report for the *Kitzmiller v. Dover* trial by arguing that the defining concepts of Intelligent Design are not only theological, but, more specifically, they are grounded in New Testament Christology. Pennock supports this argument with quotes from ID's main leader, Phillip Johnson, then from William Dembski. Like Forrest, he quotes Dembski's explicit statement from a *Touchstone* article: "Intelligent Design is the Logos of John's Gospel restated in the idiom of information theory."[138] Pennock returns to the theme of ID's explicitly Christian ties near the end of his report. He mentions Dembski's Law of Priority in Creation, which is the biblical concept of the creature never being able to surpass its creator. Pennock then notes that Dembski restates the law for a secular audience as "the 'Law of Conservation of Information,' claiming that it is a '4th Law' of Thermodynamics."[139]

According to Pennock, broadly accepted opinions within ID on certain bioevolutionary issues could lead to promotion of explicitly religious, creationist theories in schools. For example, he reveals Dembski's own stance on common descent (whether various species have descended through common points of origin in the "tree of life"). Pennock says, "William Dembski allows that organisms have undergone some change

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[138]Robert Pennock, Expert Witness Report, Kitzmiller v. Dover, 5.

[139]Ibid., 27.

through natural history, but like proponents of creation science says this occurred only within strict limits, and holds that human beings were specially created."[140] Furthermore, while ID leaders such as Dean Kenyon, Percival Davis, and Paul Nelson clearly reject common descent, Michael Behe is open to the possibility. This leads Dembski to support debate about common descent when teaching origins in public schools. This is unacceptable to Pennock; such debate is unwarranted and "at odds with the settled findings of science."[141]

Pennock then discloses Intelligent Design's rejection of methodological naturalism, citing Dembski and other ID proponents. He quotes Dembski as stating that "there are natural systems that are incapable of being explained in terms of natural causes."[142] This and other statements clearly prove that ID theorists "are fundamentally committed to supernatural creation *ex nihilo*."[143]

Pennock proceeds with similar citation of ID's methodological commitments in his comprehensive argument that ID is not science, and ID theorists (or "IDCs," Intelligent Design Creationists) have, in a sense, *admitted* that ID is not science. Specific statements by Dembski and other leaders acknowledge that ID's understanding of science is incompatible with the mainstream modern view. "The scientific picture of the world championed since the Enlightenment is not just wrong but massively wrong," writes Dembski.[144]

ID theorists define important terms unscientifically, according to Pennock, and Dembski's nomenclature within his explanatory filter is an example:

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[140]Ibid., 7. Pennock also mentioned this issue orally to the court during his testimony. See Day 3, morning session, Kitzmiller v. Dover, 46.

[141]Robert Pennock, Expert Witness Report, Kitzmiller v. Dover, 8.

[142]Ibid., 9.

[143]Ibid.

[144]Ibid., 12, citing Dembski, *Intelligent Design*, 224.

> According to Dembski, "Naturalistic explanations by definition exclude appeals to intelligent agency." Again, this would not be so if design is used in ordinary scientific sense, for example, as when archeologists identify something as an artifact—pottery, for instance—from an ancient people. Science understands people as being a part of the natural causal order. IDC [Intelligent Design Creationism] rules out any such natural notion. In Dembski's discussion of what he calls his "explanatory filter" he provides the technical definition upon which his "design inference" rests: Design is just "the set-theoretic compliment of necessity and/or chance." That is to say, design is defined by negation in ID theory, as whatever is not constrained by any natural law ("necessity") or chance process. As they sometimes put it, design just means "transcending natural causes." To be accurate, IDCs should just say non-natural or supernatural and leave it at that."[145]

Pennock uses Dembski's statements to explain how IDCs believe that God is not the only existing supernatural entity; so are humans and, theoretically, extra-terrestrial beings. Dembski believes that man and his intellect cannot be explained in purely scientific terms and therefore posits an anthropological dualism of body and spirit; a view that Dembski certainly derives from the Bible.

As further evidence of what he considers to be the unscientific nature of ID, and similar to Forrrest and Gross's criticisms of Dembski's Law of Conservation of Information, Pennock quotes Dembski's words about evolutionary processes never being able to increase complexity. Yet Dembski does assert that complexity can remain constant in evolution, or, more likely, devolution can cause the *loss* of information. He writes in *The Design Revolution*:

> If we see evolution as progressive in the sense that the capacities of organisms get honed and false starts get weeded out by natural selection over time, then it seems implausible that a wise and benevolent designer might want to guide such a process. But if we think of evolution as regressive, as reflecting a distorted moral structure that takes human rebellion against the designer as a starting point, then it's possible a flawless designer might use a very imperfect evolutionary process as a means of bringing a prodigal universe back to its senses.[146]

Pennock not only identifies this thinking as religious—which is obvious—but also as incompatible with legitimate scientific conjecture.

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[145]Pennock, Expert Witness Report, Kitzmiller v. Dover, 14.

[146]Ibid., quoting Dembski, *The Design Revolution*, 62.

Furthermore, Pennock accuses Dembski of being overconfident in his attempts to apply the unclear concept of CSI to biological information. Dembski's probability theorizing about CSI has little value within the framework of modern physics. An intriguing example by Pennock: "Dembski dismisses out of hand important hypotheses in physics that suggests [*sic*] the possibility of multiple universes that would completely undermine his set figure [that is, his universal probability bound]."[147]

Pennock argues that Dembski's application of specified complexity to particular biological phenomena is vacuous. A specific and oft-noted example among ID's critics is Behe's *irreducible complexity*. Pennock claims that he and his colleagues have sufficiently proven that complexities relevant to Behe's theory can be adequately explained within a completely Darwinian framework.[148]

Then, proceeding outside of Dembski's specific theoretical concepts, Pennock returns to the general theme with which he began his report; ID's religious affinities. He references Dembski and other ID leaders who admit the theological nature of ID within their religious circles, yet obscure the religiosity of it in other settings. Pennock has personally heard Dembski explain "how the designer doesn't create the world like a watchmaker and let it run on its own like a watch, but plays it like a violinist—'without using the G-word.'"[149] Yet Dembski has categorically rejected any compatibility of ID with theistic evolution, which he says typically has too many similarities with Darwinism and atheism. Also, Dembski is among IDCs who have stated that ID, while congruous with Christian theism, is incompatible with other religious frameworks such as Hinduism and Greek mythology.

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[147]Pennock, Expert Witness Report, Kitzmiller v Dover, 19.

[148]Ibid., referring to Richard E. Lenski et al., "The Evolutionary Origin of Complex Features," *Nature* 423 (2003): 139-44.

[149]Pennock, Expert Witness Report, Kitzmiller v. Dover, 25.

In addition to his substantive written report, Pennock gave important oral expert testimony during the trial. While he was on the witness stand, plaintiffs' attorney Rothschild presented the court with various quotes by Dembski supporting a revolution in which the current prevailing restrictions of science within methodological naturalism concede to consideration of intelligent causes. When asked to give his interpretation of Dembski's comments, Pennock stated that it is clear to him that ID theory has no chance of advancing without changing the ground rules of science. "Intelligent Design," according to Pennock, "needs to have for it to be a science a way of offering a specific hypothesis that one could then test in an ordinary way. They failed to do that, and so they really don't get off the ground with regard to science."[150] Thus, according to Pennock, they desire a theistic science that would set science backward to the pre-Enlightenment era. However, in post-*Kitzmiller* publication, Pennock claims that Darwinism leaves a place for teleology, despite contrary claims made by Dembski. Pennock says that Darwinism uses a legitimate scientific understanding of teleology; adaptations are explained by [the telos of] natural selection, instead of an explicitly supernatural God, as espoused by Intelligent Design.[151]

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[150]Day 3, morning session, Kitzmiller v. Dover, 38. Pennock has criticized the scientific legitimacy of ID with various lines of argument within numerous publications. For example, he claims that ID leaders are "self-deceived" about the importance of their ideas within the broader scientific community. Were it not for ID's disruptions in politics and education, asserts Pennock, science would rightly have continued to ignore it. Therefore, he says that Dembski makes a gross mischaracterization in stating that Intelligent Design "'is ultimately a scientific controversy within the scientific community. To be sure, there are educational, political, religious, and philosophical aspects to this controversy, but if there were no scientific controversy here, these other aspects would never have gotten off the ground.'" Robert T. Pennock, "The Pre-modern Sins of Intelligent Design," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson (New York: Oxford University Press, 2006), 737, citing Wm. A. Dembski, "In Defense of Intelligent Design" (2005). Pennock gives further critique of ID and creationist rhetoric about there being a legitimate controversy in science, along with how public schools should respond, in Robert T. Pennock, "How Not to Teach the Controversy about Creationism," in *Teaching about Scientific Origins While Taking Account of Creationism*, ed. Leslie S. Jones and Michael J. Reiss (New York: Peter Lang, 2007), 59-74.

[151]Pennock, "Pre-modern Sins of ID," 738. In the same article, Pennock answers Dembski's methodological assertion that Darwinism forces one to reject supernaturalism. Pennock replies, "Methodological naturalism does not define away any metaphysical possibilities or constrain the world; rather, it constrains science. Methodological naturalism is neutral with regard to supernatural possibilities."

Pennock explained to the court his understanding of Behe's *irreducible complexity* and Dembski's *specified complexity*. In his opinion, they are restated concepts of old creationist arguments motivated by skepticism of any Darwinian mechanism's ability to explain life's complexities. They also prove ID's dependence on negative arguments in the attempt to cast doubt on Darwinism, while offering no positive evidence that ID is actually true. Pennock sees this as a false dilemma by ID supporters; they imply that one must choose one and reject the other and that the debunking of one automatically validates the other.

Rothschild then gave Pennock the opportunity to explain that his computer models have been able to demonstrate that Darwinian evolutionary processes can produce irreducibly complex systems, contrary to Behe's theory that such systems can only be the product of a purposeful designer.[152] Thus, Pennock asserts that his computer demonstrations also debunk specified complexity by default, since specified complexity significantly hinges on irreducible complexity as its primary application.

Treatment of Dembski beyond *Kitzmiller*. In *Tower of Babel*, Pennock briefly describes Dembski's explanatory filter and then presents scrutiny similar to

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Ibid., 739. Pennock also sees *inconsistencies* and *contradictions* in Dembski's defense of his general methodological philosophy. Pennock is "astonished" at his "redefining the supernatural as part of nature." Ibid., 740-41. Dembski's defense of this "redefining" will be examined, *infra*, chap. 5. Pennock also addresses similar methodological issues in "God of the Gaps: The Argument from Ignorance and the Limits of Methodological Naturalism," in *Scientists Confront Creationism: Intelligent Design and Beyond*, ed. Andrew Petto and Laurie Godfrey (New York: W.W. Norton & Co., 2007), 309-38.

[152]These computer models involving digital organisms are detailed in an article in *Nature* to which Pennock contributes. The article states, "Populations of digital organisms often evolved the ability to perform complex logic functions requiring the coordinated execution of many genomic instructions. Complex functions evolved by building on simpler functions that had evolved earlier, provided that these were also selectively favoured. However, no particular intermediate stage was essential for evolving complex functions. The first genotypes able to perform complex functions differed from their non-performing parents by only one or two mutations, but differed from the ancestor by many mutations that were also crucial to the new functions. In some cases, mutations that were deleterious when they appeared served as stepping-stones in the evolution of complex features. These findings show how complex functions can originate by random mutation and natural selection." Lenski et al., "Evolutionary Origin of Complex Features," 139.

Perakh's (who is cited by Forrest and Gross, as mentioned above). Pennock challenges the implication within the filter that law, chance, and design are mutually exclusive. Specifically, in explaining how *natural law* and *design* are *not* mutually exclusive, Pennock refers to the hands of a clock. They move because of mechanical laws, yet they also operate in a scheme by which the clock's designer specifically intends to keep accurate time. Pennock also mentions how some theistic evolutionists have said that God carefully set the Newtonian clockwork *laws* of the universe in place as the means by which his *designed* creation would unfold. Additionally, "Some theistic evolutionists today hold a similar view, but they add the notion of randomness into the mix by also recognizing indeterministic laws. So neither are *chance* and *design* mutually exclusive."[153]

Also congruous with Forrest and Gross, Pennock criticizes the filter (and by default the overall Design Inference) because of its simplistic negative nature of "a two-step process of elimination."[154] Instead, ID must develop a basis of positive evidence that proves how natural processes cause a designer's intended results to come about. Pennock implies that this positive evidence should perhaps contain viable "knowledge of specific design intentions."[155] Nevertheless, as asserted throughout *Tower of Babel*, he is skeptical about such intentions ever being the subject of serious scientific discussion.

In addition to a direct critique against the explanatory filter, Pennock, in *Tower of Babel*, attacks the argument from information, espoused by Dembski and colleagues.[156]

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[153]Robert T. Pennock, *Tower of Babel: The Evidence against the New Creationism* (Cambridge, MA: MIT Press—Bradford, 1999), 95. Emphasis added.

[154]Ibid.

[155]Ibid., 95-96.

[156]As background for the critique of the argument from information, *Tower of Babel* surveys various illustrations that Dembski uses to explain CSI in nature. Pennock also attempts to connect Dembski's argument from information with classical theistic and non-theistic forms of the argument.

Pennock argues that Dembski fails to establish any viable scientific method to prove that CSI in nature is "real." At best, the concept of "function," determined by specification, is a useful way of describing what we simply find interesting in certain natural phenomena. Therefore, according to Pennock, Dembski's oft-quoted archery illustration is specious.

The archery illustration is thus.[157] If an archer were to shoot an arrow and hit a wall from a significant distance, each point on the wall would have an equally low probability of being hit. No claim of the archer's specified purpose could reasonably be made after hitting just any point; this would prove arbitrariness and would have to be attributed to chance. However, if the arrow were to hit a bull's eye—a target area determined and drawn on the wall beforehand—there would be a very low probability that the archer hit it by chance. There would also be a very high probability that he had used his skill to hit that particular point on the wall with purpose—that is, by design. This illustrates the Design Inference that Dembski attempts to disclose in nature. A natural phenomenon infers design when the phenomenon is proven to be the specified, "targeted" result that occurs despite extremely low probability. By default, such inference rules out that it happened by chance or by the regularities of natural processes.

Pennock criticizes fundamental assumptions behind Dembski's archery illustration. The main problem with the analogy is that one knows the rules of the game

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A recurring illustration in Dembski's literature is the one he uses to explain that there is CSI in DNA. A pulsar comes from outer space that transmits Morse code, indicating that it is the "mouthpiece of Yahweh." From the coded signal then come forecasts of the future, cures for diseases, and the answers to difficult math problems. The probabilities of such answers originating from mere humans or from chance are so low that one must concede that the signal is indeed from a super intelligence. This is analogous to the low probability of nature being able to produce the specific nucleotide sequences in a biological genome (that is, in DNA). As Pennock explains further, "Dembski also makes the connection to the SETI project [Search for Extraterrestrial Intelligence]. We are supposed to think that the information in DNA molecules is a sign from God in the same way as would a transmission of the Bible in Morse code beamed from a pulsar. The SETI project looks for intelligent life in the universe by searching for a signal with information, and [Intelligent Design Creationists] claim that we find such an information signal in the DNA of every cell, which therefore indicates the existence of an intelligent designer who put it there." Ibid., 232-33.

[157]*Supra*, chap. 3.

of archery, but one should *not* assume to know the "rules" behind biological information and resulting processes. Pennock says:

> Even Dembski's archery example works only because we know in advance the relevant features of the game and something about the physics of arrows and targets. It is by no means clear that biological information is analogous to the sort of information pattern that allows us to infer design. It is certainly not a function that is specified in advance in the same sense that . . . archers specify their goal in advance. . . . [T]he functionality of something is not seen on its face. Things are causally interacting constantly, but it is not possible to say that they are "functioning" in some way unless there is reasonable sense to be made of what it would be for them to malfunction, and both notions require some prior specification of purpose. Is a tree functioning or malfunctioning when it topples to the forest floor and becomes a source of nutrition for mushrooms and a shelter for foxes? Who can say?[158]

In a separate post-*Kitzmiller* writing, Pennock further examines the problem of ignorance of "game rules" and applies it to knowledge of divine intent. He thinks that Dembski's use of a "Zeus Hypothesis" to explain specified complexity conveys epistemological overconfidence. As Dembski illustrates:

> Individual lightning strikes are readily explained in terms of the laws of physics, with no need to invoke a designer. The only way lightning strikes might require an ID hypothesis is if jointly they exhibit some particularly salient pattern. Consider, for instance, the possibility that on a given day all, and only, those people in the United States who had uttered snide remarks about Zeus were hit by lightning and died. In that case, the joint pattern of lightning strikes would exhibit specified complexity, and the Zeus Hypothesis might no longer seem altogether absurd.[159]

Pennock's response: how could one have any substantive knowledge of divine intentions from which to determine purposeful actions of specified complexity? And, in this case, how does one obtain such confident knowledge of what the god interprets as snide? In this scenario, the divine character is Zeus, but the same question would apply to any god,

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[158]Pennock, *Tower of Babel*, 256. Similar responses to this and other analogies of CSI by Dembski are in Robert T. Pennock, "Mystery Science Theater: The Case of the Secret Agent," *Natural History*, April, 2002 [on-line]; accessed 16 July 2009; available from http://www.actionbioscience.org/evolution/nhmag.html; Internet.

[159]Robert T. Pennock, "The Premodern Sins of Intelligent Design," in *Oxford Handbook of Science and Religion*, ed. Phillip Clayton (New York: Oxford University Press, 2006), 742, quoting Wm. A. Dembski, "In Defense of Intelligent Design" internet posting. Dembski also uses this illustration in his rebuttal against Pennock for the *Kitzmiller* trial. *Infra*, chap. 5. A Zeus Hypothesis is first mentioned in an argument by Pennock as a passing comment, but later extended by Dembski.

even Dembski's Christian God. "Dembski's supposed inference relies upon presuming that we can know the mind of God."[160]

Pennock concurs with Forrest and Gross (who cite Perakh) in emphasizing the two-fold process of how complexity evolves in biology; first, chance mutations occur, then, secondly, natural selection allows favorable mutations to phase into the organism. Dembski, however, is skeptical of whether such a theoretical process can account for CSI.[161] He suggests that a person's assigned telephone number *can* be understood as the product of CSI. "[T]he complexity [in a personal telephone number] ensures that this number won't be dialed randomly (at least not often), and the specification ensures that this number is yours and yours only."[162]

Contrariwise, Pennock uses the dialing of personal phone numbers to illustrate how mutations operate within evolutionary processes. "The mechanisms of DNA replication and repair make it likely that the random mutations that occur will be in proximity to the original, similar to the way that a random mistake in dialing a phone

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[160]Pennock, "Premodern Sins of ID," 743.

[161]Pennock also gives critique of Dembski's argument from information in publications other than *Tower of Babel*. In *Intelligent Design and Its Critics*, he says that Dembski and other ID theorists fail to prove that microevolutionary changes cannot produce macroevolutionary variation. However, as an example of the explanatory power of descent with modification, Pennock discusses a significant protein—the beta-globin sequence. This molecule in gorillas is 99 percent identical to that of humans. He therefore concludes, "The simplest explanation of this pattern of information is that human beings and gorillas descended from a recent common ancestor . . . and that the original sequence was modified in one line by a single mutation. Processes of natural law together with chance variation produced the CSI of both." Robert T. Pennock, "The Wizards of ID," in *Intelligent Design Creationism and Its Critics: Philosophical, Theological & Scientific Perspectives*, ed. Robert T. Pennock (Cambridge, MA: MIT Press, 2001), 661.

In another article, Pennock briefly references several criticisms of Dembski's CSI theorems in *No Free Lunch*. In one critique, "Mathematician David Wolpert, an author of the original No Free Lunch (NFL) theorem to which Dembski appeals, concludes in his review that Dembski's treatment is 'fatally informal and imprecise' and points out that the NFL theorems do not apply to the evolution in nature because genomes do not search the same fixed fitness space, as NFL assumes, but coevolve." Robert T. Pennock, "Creationism and Intelligent Design," *Annual Review of Genomics and Human Genetics* 4 (2003): 154-55.

[162]Pennock, *Tower of Babel*, 257, citing Wm. A. Dembski, "Intelligent Design as a Theory of Information," *Perspectives on Science and Christian Faith* 49 (1997): 186.

number is more likely to reach someone still in the same calling area."[163] Pennock continues by giving a counterexample from phone number generation to illustrate how a Darwinian process can generate CSI:

> My office phone is part of the university system that requires one to press "9" to get an outside line, . . . If you start to dial an outside number without first pressing the "9" you are quickly cut off by a recording saying that the call cannot be completed as dialed. If you do press "9" first, but then get a few digits into a long-distant number, another recording interrupts to say that an authorization code must be entered first. Suppose that the entire phone system was set up so that it would cut one off in this manner if dialing hit illegitimate prefixes. We might imagine a phone system that did this at first as I described, but then also had cut-offs for domestic versus international prefixes, say, then respectively for either working area codes or country codes, then for local calling areas, and so on, until the only legitimate calls were those of five digits that were individuals' numbers. Suppose now that we start with simple mechanical phone dialers that begin by dialing just a single digit. Those that are cut off "die" and those that "survive" then replicate, with some chance of random variation. That is, in the next generation of dialers, most will dial the number that survived but a few will dial a randomly different digit, or perhaps add one or a few additional random digits. With this sort of replicating dialer and our hypothesized phone environment acting as a natural selector, we have a simple Darwinian system that could explore the space of phone numbers, and it would soon turn out that most of dialers of the population were reaching one or another working individual number, improbable though reaching any specific one of them might have been. This is a rough illustration of the searching power of naturally selected, randomly varying replicators. This process, as a kind of genetic algorithm, can generate complex information and, assuming that phone numbers are indeed "specified" in the relevant sense, also generate CSI.[164]

This phone example from Pennock is similar to illustrations by Richard Dawkins and Elliot Sober to prove the explanatory power of "cumulative selection." Dawkins describes how probability allows for a monkey eventually to be able to type the Shakespearean line "METHINKS IT IS LIKE A WEASEL" after a surprisingly small number of successive generations that *cumulatively* bring about the targeted sentence.[165]

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[163]Pennock, *Tower of Babel*, 257.

[164]Ibid., 258. Pennock says that, in this case, he is arguing against an error by Dembski and other ID theorists that is similar to that of 1980s astronomer Fred Hoyle. "Hoyle calculated the probability of getting the exact sequence of amino acids for a specified small protein at random and pronounced it so unlikely as to be not worth considering. There was thus simply not enough time for chance to have produced such proteins on earth." Ibid.

[165]Richard Dawkins, *The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe Without Design* (New York: Norton, 1996). *Infra*, chap. 5.

(Dembski's critique of this and other examples from algorithmic computation is discussed in the following chapter.) Sober makes a similar example of cumulative selection from a combination lock.[166]

In sum, Pennock's critique against Dembski's specification in nature is similar to that of Fitelson et al. (although much less technical), who are referenced by Forrest and Gross: Dembski's attempt to determine specification in nature is based on an arbitrary concept of "design" that can never be tested and proven scientifically.

Summary of Forrest and Pennock

Forrest's and Pennock's arguments against Dembski, both during the trial and within their respective publications, can be conflated and summarized thus (with no regard at this point for any claim's veracity):

1. They criticize Dembski and all of ID's rejection of methodological naturalism (also known as materialism) and their adherence to supernaturalism. Dembski's Logos statement is an example that Forrest and Pennock use repeatedly to imply this criticism succinctly.

2. Dembski, like other ID leaders, is closely associated with young earth, biblical creationism. ID proponents and creationists have made very similar statements against scientific naturalism. Both groups also espouse the idea of a supernatural, purposeful God as the source of nature, and within both groups are scholars who question the established doctrines of evolutionary biology, including common descent. ID proponents and creationists also advocate challenging Darwinism in public schools.

3. Dembski has publicly admitted ID's deficiencies as a scientific program, yet it continues to advance in cultural confrontation and public awareness.

The criticisms above pertain to Dembski within the general scope of Intelligent Design. Criticisms that are more directly related to his specific program can be grouped thus:

4. Using a form of the Basic Argument from Improbability, Dembski fails to prove how events that have occurred within extremely low probabilities entail design.

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[166]Mentioned in Pennock, *Tower of Babel*, 259.

5. Dembski's explanatory filter violates physical logic. He creates a faulty dilemma of having to choose either "chance" or "law" in the filter's first node. He therefore does not recognize the multi-modality of nature in which "chance," "law," and (in the case of human activity) sometimes "design" can operate simultaneously to cause an event.

6. Dembski's interpretation of the Law of Conservation of Information as a fourth law of thermodynamics is specious. Also, he has no valuable criterion to prove that nature cannot create novel information.

7. The appearance of design in biology can be explained adequately by purely natural processes. Dawkins's description of "cumulative selection" is one example. Also, apparent design within nature is anything but optimal or efficient, ruling out its creation by an intelligent, purposeful mind.

8. The Design Inference (DI) has been sufficiently refuted by "The Wisconsin Philosophers," Fitelson et al. Generally, they have proven that Dembski's precise conditions for *specification* utterly fail to eliminate regularity and chance. The DI is yet another negative "creationist" attempt to challenge Darwinism. It also has no conceivable use for positive predictions, nor can it be tested and compared to competing hypotheses.

9. In accordance with 8., Dembski's filter, with its "two-step process of elimination," is further proof that ID can only argue by negation. He lacks a basis of positive evidence that proves how a designer uses natural processes to create intended results.

10. In accordance with 8. and 9., the DI is yet another Intelligent Design hypothesis that is not testable within an ordinary process. Therefore, it is not science.

11. Concepts to which Dembski applies the DI, most notably Behe's *irreducible complexity*, can be adequately explained within a completely Darwinian framework. Pennock and colleagues claim that this is proven by digital organisms in Avida.

Dembski has given substantive responses to the arguments categorized above, directed to Forrest and/or Pennock and to his critics in general. These responses are the subject of the next chapter.

CHAPTER 5

DEMBSKI'S RESPONSES TO FORREST AND PENNOCK

William Dembski rarely expresses systematic, point-by-point responses to his critics. Instead, he often incorporates their criticisms into each subsequent article or book, using them as aids for clarifying and advancing his own program. *The Design Revolution* is a typical example of this rhetorical method. However, the trial situation did require that he use a more systematic, precise approach in rebutting Forrest, Pennock, and other critics of his in a written rebuttal for *Kitzmiller*, subsequent to his original report. The present thesis will benefit from a survey of how Dembski has responded to their scrutiny. This will include responses directed to precise claims by Forrest and/or Pennock, along with replies to more general critiques of Intelligent Design (ID) and his work. The survey will be taken from various writings within his corpus, including the significant expert witness rebuttal for *Kitzmiller*.

The chapter will begin with Dembski's more general defenses of ID in response to Forrest's and Pennock's commentaries, both inside and outside of the *Kitzmiller* proceedings.[1] The chapter will then advance toward his defenses that relate more specifically to elements of his Design Inference. Such rhetorical inspection will then assist the final chapter's more definitive conclusion of the Design Inference's scientific viability.

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[1]Dembski claims that his scholarship was misrepresented by Pennock in *Intelligent Design Creationism and Its Critics*. In this book edited by Pennock, he used two popular essays by Dembski without permission and followed them with critical analysis from various authors, including Pennock himself. Dembski says that these dated essays ("Who's Got the Magic?" and "Intelligent Design as a Theory of Information") were not what he would have chosen for posting ID's strongest arguments to date. Dembski's latest and best argumentation is not adequately represented in the book. Wm. A. Dembski, Expert Written Rebuttal, Kitzmiller et al v. Dover Area School District et al, 17-18 No. 04cv2688 (M. D. Pa. 2005).

ID, Evolution, and Religious Bias

In his written rebuttal for the *Kitzmiller* trial, Dembski first acknowledges the quote of his that is constantly repeated by his critics. This is his statement that "intelligent design is the Logos of John's Gospel restated in the idiom of information theory." In response to comments by Forrest, he says that she is misguided in her assumption that there must be a direct association between ID and its religious and moral implications, while evolutionists remain religiously neutral. To the contrary, there are significant examples of evolutionists publicly stating their own ideas of a theological basis for evolution.[2]

Rather than assuming that evolutionists err by default because they might not believe in God, Dembski makes definitive effort in his argumentation to say that they err because they practice bad science. To do otherwise, he implies, would make him guilty of the same genetic fallacy made by Forrest. The genetic fallacy, according to Dembski, is "a type of argument in which an attempt is made to prove a conclusion false by condemning its source or genesis. Such arguments are fallacious because how an idea originated is irrelevant to its viability."[3]

Dembski says that this fallacious reasoning is another method by which Forrest makes ID guilty by association; it is automatically discredited simply because it has religio-ethical implications. Regardless, Dembski turns this kind of reasoning against evolutionists by considering some publicly stated implications of evolutionary development. He begins with an example from Darwin himself. Dembski quotes how Darwin connects human evolution with racism and genocide in *Descent of Man*:

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[2]One example from Dembski: "[C]onsider Barry Lynn, who heads Americans United for Separation of Church and State. In a 1997 PBS Firing Line debate on intelligent design, he too invoked the opening chapter of John's Gospel, but this time to support evolution: "'In the beginning was the word. . . .' Indeed that word just might turn out literally to have been a command: 'Evolve!'." Ibid., 2.

[3]Ibid., 3, citing S. Morris Engel, *With Good Reason: An Introduction to Informal Fallacies*, 5th ed. (New York: St. Martin's Press, 1994), 198.

> At some future period, not very distant as measured by centuries, the civilised races of man will almost certainly exterminate, and replace, the savage races throughout the world. . . . The break between man and his nearest allies will then be wider, for it will intervene between man in a more civilised state, as we may hope, even than the Caucasian, and some ape as low as a baboon, instead of as now between the negro or Australian and the gorilla."[4]

Dembski continues with other quotations demonstrating direct connections between evolutionary thought and bestiality, rape, a basis for morality, the origin of religion, justification for atheism, the goal of science to rid society of religion, and the strict maintaining of materialism (despite its multiple absurdities and failed promises).

Dembski also questions whether Forrest herself, a philosopher of science, can be considered religiously neutral as a member of the New Orleans Secular Humanist Association's board of directors. The organization declares publicly to be skeptical of any supernatural claims. "Moreover," says Dembski, "evolution is a necessary feature of secular humanism. Given her secular humanist presuppositions, her opposition to intelligent design follows as a matter of course."[5]

Thus, in a related argument, he says that maintaining complete religious neutrality in high school biology curricula is an impossible task. He adds:

> [The pertinent question should be] whether some religious believers see evolution in its conventional, materialistic form as fundamentally incompatible with their religious beliefs. So long as there are people like this (and Gallup polls consistently indicate that about half the U.S. population falls in this category), the teaching of evolution in high school biology curricula will not be religiously neutral. The only way, then, to effect religious neutrality is either to remove evolution from the biology curriculum (which clearly is not an option) or to offset it by also teaching intelligent design (which is an option).[6]

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[4]Ibid., 3-4, citing Charles Darwin, *The Descent of Man*, 1871, chap. 6.

[5]Ibid., 6.

[6]Ibid.

ID and Creationism

As indicated by their repeated reference to ID as "Intelligent Design Creationism," Forrest and Pennock see little difference between ID and biblical creationism. Relating to Dembski, Forrest quotes him from one of his early publications, *Mere Creation*, in which he has rejected naturalism, differentiating it from creation and what Christians know to be true. His writings for a Christian audience clearly identify the designer as the supernatural God of religious theism.

In responding to this claim, Dembski differentiates between the categorical questions asked by religious creationism and those asked within ID research.[7] "Creation asks for an ultimate resting place of explanation: the source of being of the world. Intelligent design, by contrast, inquires not into the ultimate source of matter and energy but into the cause of their present arrangements, particularly those entities, large and small, that exhibit specified complexity."[8] There is nothing within specified complexity that directly associates it with the Christian God or any particular deity. That consideration is important, but outside the concerns of ID research. While on the one hand ID researchers detect something that is "really there" in nature (specified complexity), on the other hand, others may debate about *by whom* and *how* it came about and its various metaphysical and theological implications. Rather than making inferences based on empirical data, Dembski asserts that "the religious believer sees design in the world only through the eyes of faith."[9] Furthermore, ID does not "prescribe in advance the sequence of events by which this intelligent cause had to act."[10] ID research advances wherever the data leads, without the strictures of any religious propositions imposed on

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[7]Dembski gives a succinct list of contrasting propositions made by creationists and ID theorists. Wm. A. Dembski, *The Design Revolution* (Downers Grove, IL: InterVarsity), 42.

[8]Ibid., 38-39.

[9]Ibid., 39.

[10]Ibid., 41.

the inquiry. Dembski says, "Intelligent design begins with data that scientists observe in the laboratory and nature, identifies in them patterns known to signal intelligent causes and thereby ascertains whether a phenomenon was designed. For design theorists, the conclusion of design constitutes an inference from data, not a deduction from religious authority."[11]

Dembski underscores the inferential modesty in which ID operates. Intelligent Design, as a scientific discipline, is not equipped to do the work of theology and philosophy—that is, to theorize about the essence, moral qualities, and intentions of the intelligent designer. Creationism presupposes that a creator brought the world—with its fundamental matter—into existence *ex nihilo*, while ID is concerned with explaining the ordering of matter, *given* that there is a material world.[12]

Intelligent Design theorists are not isolated from other fields of science, in the sense that other fields potentially raise deeper theological questions. Yet these questions are for others to address. "The big bang has theological implications, but that does not make it a theological enterprise. Likewise, intelligent design has theological implications, but that does no make it a theological enterprise."[13]

There is often ambiguity about what one exactly means by the term "creation." (The same is true for "evolution.") In his written expert rebuttal for *Kitzmiller*, Dembski asserts that the use of "creation" in the early drafts of *Pandas* is not for religious connotations about God bringing the world into existence. Instead, the word in those drafts refers to "a generic intelligence capable of bringing about biological complexity."[14] Since those drafts were made, a more precise distinction has developed in the

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[11]Ibid., 41-42.

[12]Ibid., 42-43.

[13]Ibid., 45.

[14]Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 8.

nomenclature in which "intelligent design" rather than "creationism" is preferred to describe intelligence in biological sciences.[15]

Dembski also addresses the accusations that Forrest makes against Phillip Johnson. Dembski recognizes that Johnson, a foremost ID leader who also holds to theistic creation as a personal belief, is clearly religious in his cultural agenda. But Johnson's religious motivations have little to do with whether ID operates within acceptable science.

Also in relation to Johnson's theological convictions, Forrest assumes that his belief in theistic realism—the idea that God has left observable marks in the natural world—necessarily applies to all ID thinkers. Dembski refutes this claim with an example referring to David Berlinski (who is briefly mentioned in chapter 2 of the present work). Berlinski is openly agnostic about God's existence and has no personal religious convictions or identities. Yet he is a notable member of the ID movement and an intellectual associate of Johnson's because of their mutual interests in criticizing the explanatory weaknesses of Darwinism. Notwithstanding, Dembski says:

> In her expert witness report, Forrest gives the impression that what is now known as intelligent design was set in stone decades ago and that the only thing to have changed since is the vocabulary to describe it. But that is not the case. As with most intellectual movements, intelligent design has gone through a continual process of development and refinement, clarifying its scientific critique of conventional evolutionary theory, building a positive scientific alternative, and separating off interpretations of ID's cultural and religious significance.[16]

According to Dembski, Pennock resorts to "fear-mongering" when he claims in his own expert report that young earth creationists identify themselves as part of the ID movement.[17] Pennock then warns that, as a result, "allowing ID into the schools thus

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[15]Dembski also briefly mentions how "creation" and "creativity" are common terms in engineering sciences as well. Ibid.

[16]Ibid., 9.

[17]Ibid., 20.

allows these views perforce."[18] But Dembski anticipates that "ID's acceptance into the high school biology curriculum will proceed conservatively, preserving as much of 'the settled findings of science' as possible and coming into conflict with evolution mainly on the question of evolutionary mechanisms."[19] The U.S. Supreme Court has barred young earth creationism from high school science curricula, so there is little reason to fear its entry in public schools under the guise of ID. Dembski does not predict that ID will open the way for biblical creation to challenge evolution; Intelligent Design proper, however, will bring warranted skepticism of the status quo evolutionary paradigm.

Methodological Materialism

Forrest and Pennock ardently oppose any program that allows for supernatural causation in the natural world; any inference to a cause beyond nature is, ipso facto, unscientific. But according to Forrest's testimony for *Kitzmiller*, Dembski believes that supernaturalism—specifically Christian theism—should be essential to scientific inquiry. Pennock sees a strong correlation between Dembski's description of "design" and that of "supernaturalism;" by describing design as the set-theoretic compliment of necessity and/or chance, design is not constrained by natural law or necessity, making it synonymous with causation that transcends the natural order. To Pennock, inference to anything beyond nature—anything outside of empirical observation—is the same as inference to the supernatural.

Furthermore, Forrest (under oath on the witness stand) explicitly associated Dembski with ID leaders who "begin their research into [evolution] by looking at passages of Scripture and then looking for scientific evidence that's consistent with

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[18]Robert T. Pennock, Expert Written Report, Kitzmiller v. Dover, 8.

[19]Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 20. "The settled findings of science" is within quotation marks as a phrase that Dembski borrows from Pennock.

Scripture."[20] It is important to question whether this implication by Forrest accurately represents Dembski's scientific philosophy and method.

In his expert rebuttal for *Kitzmiller*, Dembski begins a response to these accusations by asking, "[W]hat are 'natural explanations'?"[21] The definitive essence of "nature" continues to be an unsettled issue in science. Furthermore, "the very term 'supernatural' concedes to materialists like Barbara Forrest precisely the point at issue, namely, what is nature like and what are the causal powers by which nature operates."[22] To reject "supernatural" causation by default is begging a fundamental question in philosophy of science.

Dembski cites another evolution advocate involved in *Kitzmiller* whom he claims also avoids the issue. "By natural explanations, [Eugenie] Scott means explanations that resort only to material causes—as she puts it, to 'matter, energy, and their interaction.' But that is precisely the point at issue, namely, whether nature operates exclusively by such causes."[23] Materialism is deficient in explaining the processes that bring about irreducibly complex systems, but ID hypotheses enable the scientist to advance past important empirical challenges that otherwise obstruct the materialist. Dembski says:

> [I]ntelligent design purports to show that there exist configurations of material entities (e.g., bacterial flagella, protein synthesis mechanisms, and complex organ systems) that cannot be adequately explained in terms of antecedent material conditions together with processes characterized by fixed laws that act on them. . . . Whenever you have a theory about process—how one state is supposed to progress

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[20]Day 7, morning session, Kitzmiller v. Dover, 88-89.

[21]Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 9.

[22]Ibid.

[23]Ibid., 10. Dembski also mentions that another reason Scott defends methodological materialism is because "it works." In addition to Scott begging the question at hand, Dembski also responds that if materialism is accepted because "it works," then "scientists are free to discard it when it no longer works." Ibid.

> into another—it is perfectly legitimate to ask whether the process in question is capable of accounting for the final state in terms of the initial state.[24]

In *The Design Revolution*, Dembski writes, "Darwinism rules out design from biology. The design inference, by contrast, neither rules it out nor requires it. Rather, it allows the evidence of biology to decide it."[25]

Relating to the issue of supernaturalism is whether ID requires miracles and, if so, whether that makes it unscientific. Dembski makes two main points about the topic, with both points questioning modern definitions of miracles. (1) The Latin definition of "miracle" "refers to something that inspires wonder or amazement."[26] So this classical understanding of the concept requires no metaphysical assumptions. "[I]t doesn't prejudge whether nature is ruled by inviolable laws or whether God or some supernatural agent would be violating those laws to perform a miracle."[27] (2) Dembski allows for the sake of argument that miracles be defined within the conceptions of modern science, which refers to miracles as *counterfactual substitution*: "[A] natural cause was all set to make one thing happen but instead something else happened."[28] But human experience informs us that design has little if anything to do with miracles in this counterfactual sense. Dembski explains:

> To see this, consider that when humans act as intelligent agents, there is no reason to think that any natural law is broken. Likewise, should an unembodied designer act to bring about a bacterial flagellum, there is no reason on its face to suppose that this designer did not act consistently with natural laws. It is, for instance, a logical possibility that the design in the bacterial flagellum was front-loaded into the universe at the big bang and subsequently expressed itself in the course of natural history as a miniature motor-driven propeller on the back of the *E. Coli* bacterium.

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[24]Ibid., 12.

[25]Dembski, *Design Revolution*, 80.

[26]Ibid., 183.

[27]Ibid.

[28]Dembski, *Design Revolution*, 183, borrowed from Schleiermacher.

> Whether this is what actually happened is another question, but involves no contradiction of natural laws and gets around the usual charge of miracles.[29]

Therefore, according to Dembski, it is misleading to divide causes between "natural" and "supernatural." A better conception is *undirected natural causes* contrasted with *intelligent causes*. Intelligent causes can utilize natural causes to bring about events that undirected natural causes are incapable of doing on their own. "Undirected natural causes can explain how ink gets applied to paper to form a random inkblot but cannot explain an arrangement of ink on paper that spells a meaningful message."[30]

In sum, Dembski rejects the false dilemma imposed by Forrest and other materialists: either "natural explanations" or "supernatural explanations" (that according to Dembski's interpretation of Forrest mean "magic."[31]) ID theorists instead maintain a third option: that a mindful, designing intelligence's interaction with matter is fundamental in our understanding of nature proper. Dembski's arguments about the explanatory weaknesses of methodological materialism—coupled with the probabilistic-analytic method used to explain the Design Inference—demonstrate that his scientific approach has nothing to do with looking for evidence to support Scripture. Therefore, Forrest's implication of Dembski regarding that issue (while under oath) was unfounded.

ID and Scientific Advancement

The controversial Logos statement is not the only comment by Dembski that has been used against him. Forrest, in her expert report, writes, "Dembski has admitted [in an article that he wrote] that the ID movement has produced no science on its own."[32] Impugning ID by using its leaders' own quotes against them is a rhetorical method of

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[29]Ibid., 184.

[30]Ibid., 189.

[31]According to Dembski's interpretation of Forrest's rhetoric, she equates supernaturalism with magic. Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 9.

[32]Barbara Forrest, Expert Witness Report, 1 April 2005, Kitzmiller v. Dover, 26, quoting Wm. A. Dembski, "Becoming a Disciplined Science: Prospects, Pitfalls, and Reality Check for ID."

both Forrest and Pennock. They do this with at least two objectives: first, to denote ID as much more of a cultural and political program instead of a scientific one. As a second objective, Pennock has used Dembski's own comments to place ID squarely in opposition to the modern scientific method. Pennock quotes from an early work by Dembski: "The scientific picture of the world championed since the Enlightenment is not just wrong but massively wrong."[33]

Dembski responds by insisting that Forrest took his comment that ID "has produced no science on its own" out of context. According to Dembski, he was discussing Intelligent Design as *both* a cultural and a scientific movement. He was merely commenting that its scientific aspect at that particular time was being surpassed by the speed of its cultural progressions. But since the writing of that article in 2002, he considers ID's scientific development to have accelerated.

He admits that Intelligent Design is like many other scientific fields in its need to advance its particular hypotheses with improved explanatory power. For example, Dembski admits with colleague Paul Nelson that ID has a need of a "general theory of biological form."[34] Leading evolutionary theorists also admit this need. Dembski quotes Stuart Kauffman, among others: "The strange thing about the theory of evolution is that everyone thinks he understands it. But we do not."[35]

The claim that ID contributes nothing to science also comes as a result of Forrest's own research and analysis presented to the *Kitzmiller* court. She is resolved that no scientist has adequately supported ID with originally produced data. Dembski challenges the assumption that new data must be presented for a scientific contribution to be made. He posits Albert Einstein as a foremost example. Einstein's seminal work on

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[33]Pennock, Expert Witness Report, Kitzmiller v. Dover, 12, citing Wm. A. Dembski, *Intelligent Design: The Bridge between Science & Theology* (Downers Grove, IL: InterVarsity, 1999), 224.

[34]Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 14.

[35]Ibid. Dembski quotes Stuart Kauffman, "The Emergence of Autonomous Agents," in *From Complexity to Life*, ed. Niels Henrik Gregersen (Oxford: Oxford University Press, 2003), 68.

relativity theory was produced with neither laboratory access, tools for experimentation, nor any means by which to generate new data. In fact, argues Dembski, presenting novel data was irrelevant. Instead, "Einstein's genius was to look at those data differently and see new patterns and possibilities that had eluded other scientists."[36]

According to Dembski, another matter that Forrest overlooks in not recognizing ID's contribution to science is her flawed method of seeking out ID material in scholarly publications. Dembski says that she should do more than just search "intelligent design" in academic journals. He claims that there is actually a growing interest in ID concepts in the scientific literature. If Forrest were to search materials in greater depth, she would find examples within academia that even cite his own Design Inference.[37]

Finally, Dembski has responded to Pennock's concern about his skepticism of the scientific method dating back to the Enlightenment; further evidence to impugn ID's general scientific legitimacy. ID does not succumb to the arbitrary definition of science based on methodological materialism. There is no testable basis for asserting *materialism's* legitimacy, so ID proponents are "changing the ground rules of science," which Dembski says has been done at various times throughout the history of science.[38] "ID proponents most emphatically claim to be doing science," while claiming to be justified in avoiding the strictures of materialist ideology.[39]

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[36]Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 17.

[37]Dembski further claims that "Intelligent Design" is often not an adequate database search criterion because researchers supporting ID science frequently avoid explicit use of the "ID" label. "New scientific theories tend to face considerable opposition when they are first proposed (Forrest's own opposition is a case in point)." Therefore, Dembski argues that one must examine closely what articles are actually *saying* and the ideas with which they are engaging; one would then find many more positive ID-related arguments circulating in academe. Ibid., 15.

[38]Ibid., 21.

[39]Ibid.

Lack of Positive Evidence and Testability

ID as Negative Rhetoric

Pennock makes repeated reference in his expert report of Intelligent Design as a negative critique of material explanations of nature, but ID contributes no positive evidence for design. This is a false dilemma from ID supporters, argues Pennock; they imply that one must choose between materialism and design and that the disproving of one automatically confirms the veracity the other.

Dembski argues that this is actually a fallacy based on semantics of the words "positive" and "negative," which can be misleading when criticizing areas of research. As examples, Dembski says that the first law of thermodynamics *precludes* energy in an isolated system from changing; the second law of thermodynamics *precludes* entropy from decreasing. According to Pennock's reasoning, scientists who assert these important laws—proscriptive as they are—are merely making negative comments about energy and entropy. Pennock's reasoning would be a distraction from what is scientifically beneficial from these laws. Therefore, Pennock should not be so concerned with the "negative" aspect of ID's efforts "to gauge the unevolvability [*sic*] of biological systems."[40] To be more specific, Dembski boldly states, "[F]or ID to gauge the unevolvability of biological systems and to establish the need for intelligence to bring about such systems may well turn out to be a catalyst of scientific research whose significance might even end up being comparable to that of the laws of thermodynamics."[41]

Relating directly to Dembski's explanatory filter, Pennock criticizes its negative nature of "a two-step process of elimination" as overly simplistic. Instead of always devising theorems to rule out Darwinian benchmarks of chance and necessity, ID

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[40]Ibid.

[41]Ibid.

must develop a basis of positive evidence that proves how natural processes bring a designer's intended results to reality. Pennock suggests that this positive evidence contain, among other things, viable "knowledge of specific design intentions."[42] This would give empirical, useful insight about "the rules of the game" being "played out" by nature's designer. However, this suggestion by Pennock is completely rhetorical, as he has absolutely no confidence in true science's ability to confirm these metaphysical inferences.

Dembski works with an understanding that obtaining "knowledge of specific design intentions" is an unfair weight placed upon ID. The ID field can work successfully at determining that a creative innovator is "there" in natural phenomena, but is de facto incapable of (and not necessarily interested in) determining a designer's intentions and ensuing causal factors. Dembski explains:

> Darwinism is a theory about *process*. . . . Intelligent design, in contrast to Darwinism, is not a theory about process but about *creative innovation*. Now creative innovation is not a process. Creative innovation can occur in a process, but even then it is a process where each step constitutes an individual creative act (a micro-innovation, as it were). In our experience with intelligences, creative innovation is a unifying conceptual act that ties together disparate elements into a purposeful whole. The act can occur over time in a process, or it can occur in one fell swoop. But in either case, creative innovation is not reducible to a causal chain where one step "causes" the next. . . . The primary issue is to determine whether there is design (i.e., creative innovation by an intelligence) in the first place."[43]

Dembski's argument from creative innovation also applies to the testability criticism as raised by Fitelson et al, to be discussed below.

Testability

Pennock says that "Intelligent Design needs to have for it to be a science a way of offering a specific hypothesis that one could then test in a ordinary way. They failed

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[42]Robert T. Pennock, *Tower of Babel: The Evidence against the New Creationism* (Cambridge, MA: MIT Press—Bradford, 1999), 95-96.

[43]Dembski, *Design Revolution*, 250-52.

to do that, and so they really don't get off the ground with regard to science."[44] A significant reason for their testability problem, according to Pennock, is their appeal to causation by a supernatural God whose design intentions are, theoretically, beyond empirical knowledge. As a result, Dembski and ID resort to deficient effect to cause reasoning; a process that is historically characteristic of believers in the supernatural, especially when they attempt to make inferences from nature.

In terms of testability, Dembski actually believes in principle that Darwinian evolution is logically testable as a general concept. However, "[i]n the real world, testability assumes a pragmatic rather than an in-principle or logical form. At the heart of testability is the idea that our scientific theories must make contact with and be sensitive to what's happening in nature."[45] In this regard, Darwinism fails the test. In answering the demand for a specific mechanism that accounts for specified complexity or irreducible complexity, "[n]o Darwinist . . . has offered a hypothetical Darwinian production of a tightly integrated multipart system with enough detail to make the hypothesis testable even in principle."[46]

Dembski says that ID surpasses Darwinism in meeting four primary criteria of testability. Refutability, confirmation, predictability, and explanatory power are the four main aspects by which scientific theories prove to "make contact with" nature and explain it with useful accuracy.[47]

Refutability is Dembski's variant of Karl Popper's falsifiability.[48] It does not necessarily pertain to the truth or falsehood of a theory. "Refutability comes in degrees.

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[44]Day 3, morning session, Kitzmiller v. Dover, 38.

[45]Dembski, *Design Revolution*, 280.

[46]Ibid., 249.

[47]Ibid., 280.

[48]Dembski says that, ultimately, no theory is falisifiable in the Popperian sense, unless it entails a logical contradiction, which is a non-empirical consideration. "In practice one can always shore up

Theories become more refutable to the degree that new evidence could render them unacceptable."[49] Dembski says that ID is refutable, but Darwinism is not. ID's refutability is obvious: complex integrated systems like the bacterial flagellum could conceivably be proven to have developed from gradual, undirected, non-intelligent Darwinian processes. "By contrast, Darwinism seems effectively irrefutable. The problem is that Darwinists raise the standard for refutability too high. . . . Darwinism is wonderfully adept at rationalizing its failures and therefore just keeps chugging along."[50]

There is an aspect of *confirmability* in Darwinism, but it is not impressive to Dembski. Darwinism relies heavily on evidence for small-scale evolutionary changes, such as the ways that some insects evolve resistance to insecticide. Confirming Darwinism's "grand extrapolation," however, is another matter. Darwinism has continually failed to present any mechanism that can confirm its large-scale theory as a whole with any coherency; for example, "insects developing insecticide resistance via the Darwinian mechanism to their emergence by that same mechanism in the first place."[51]

Contrariwise, Dembski says that positive confirmation abounds in biology for design's conspicuous marker, specified complexity. He claims to understand a fundamental reason why Darwinists remain apathetic to confirmed design inferences: "The only reason to insist on looking for nontelic explanations to explain the complex specified structures of biology is a prior commitment to naturalism that perforce excludes unevolved designers."[52]

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a failing scientific theory by adding suitably chosen auxiliary hypotheses that harmonize recalcitrant data with the theory." Ibid., 281.

[49]Ibid.

[50]Ibid., 282.

[51]Ibid., 282-83.

[52]Ibid., 285.

Corresponding to ID's confirmability is its power for *prediction*. Dembski asserts that nature contains a plethora of examples of specified complexity that point to design. Thus, these multiplying examples continue to confirm what design theorists have predicted.[53] Darwinian science, on the other hand, has no proven method of predicting where evolutionary processes will lead—what kinds of adaptations will actually occur. Dembski says, "'Adapt or go extinct' is not a prediction of Darwin's theory, but a logical truth that can be reasoned out independently of the theory. Indeed, it was reasoned out before Darwin and reasoned out by design advocates no less."[54]

When considering the struggles between ID and status quo Darwinism, one needs to understand why ID claims to answer the question of predictability affirmatively, yet also claims that predictability can be an unfair imposition. Therefore, the question of *predictability* is a subset of the question of *testability*, previously mentioned. That is to say, the concept of a designer in nature must logically entail that the designer is also an innovator, and innovation is beyond the bounds of scientific testability, therefore also prediction. Dembski explains innovation even further:

> Even so, there is a sense in which to require prediction of intelligent design fundamentally misconstrues intelligent agency and design. . . . To be sure, designers, like natural laws, can have predictability. (Designers often obey policies and conventions and follow routines in problem solving.) Yet unlike natural laws,

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[53]Ibid., 286. Among many ID sources discussing particular biological confirmations of specified complexity (Dembski) and irreducible complexity (Behe), see Michael J. Behe, *The Edge of Evolution: the Search for the Limits of Darwinism* (New York: Free Press, 2007) and Michael J. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution* (New York: Simon & Schuster, 1996). In addition to biology, Dembski also mentions confirmation of design in the study of technological evolution. He cites the work of Russian engineer Genrich Altshuller in the "theory of inventive problem solving" (TIPS, or sometimes referred to as TRIZ). Dembski, *Design Revolution*, 286-87.

[54]Dembski, *Design Revolution*, 286. Dembski also argues the fact that the Cambrian Explosion is such a mystery to Darwinists demonstrates how the theory does not accommodate detailed retrodiction (explanation of historical patterns from current evidence) and detailed prediction of evolutionary development. The most detail they can predict is "organisms placed under selection pressures either adapt or go extinct." He also adds, "Darwin's theory has virtually no predictive power, especially concerning the broad sweep of natural history. . . . Indeed, why else did Stephen Jay Gould and Niles Eldredge need to introduce their theory of punctuated equilibrium if the fossil record was such an overwhelming vindication of Darwinism?" Ibid.

> which are universal and uniform, designers are innovators. Specific innovations can't be predicted."[55]

Notwithstanding, ID predicts and discloses specified complexity, which draws notice to innovations within nature that should make chance and/or necessity theories dubious.

In addition, Dembski is convinced that ID answers better the question of "which theory can in principle accommodate the greater range of biological possibilities."[56] There are biological phenomena for which a "design-theoretic tool chest" could provide better *explanatory power*. "[A]s a tool chest for scientific inquiry, intelligent design is more robust and sensitive to the possibilities that nature might actually throw our way than Darwinism, which must view everything through the lens of chance and necessity and take a reductive approach to all signs of teleology in nature."[57] While Darwinism unjustifiably reduces all non-materialistic explanations to pseudoscience, ID opens up freedom for scientists to investigate more hypotheses that are workable and testable. Darwinism habitually ignores nature's telic possibilities. ID allows more objectivity about where the evidence might lead, and when chance and necessity prove insufficient, ID has a built-in, coherent plan of action.

Effect to Cause Reasoning

The claim that ID is effect to cause reasoning is part of Pennock's broader criticism of ID's commitment to untestable supernaturalism. To illustrate effect to cause reasoning from supernaturalism, he says, "Lightning bolts never form unless Zeus throws them."[58] But "experimentation requires observation and *control* of the variables."[59] This is the cause to effect reasoning by which science must operate, according to Pennock.

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[55]Ibid., 287.

[56]Ibid., 288.

[57]Ibid., 290.

[58]Pennock, Expert Witness Report, Kitzmiller v. Dover, 23.

[59]Ibid., 21. Emphasis his.

Dembski again refuses to allow his opponent to define the rules of scientific research, thereby limiting, or, more likely, nullifying ID's necessary empirical approaches. Dembski replies:

> [Pennock] is talking about cause to effect reasoning: the experimenter sets up certain causal processes in an experiment and then determines the outcome of those processes (the effect). But, in many cases, we don't have control of the relevant causal processes. Rather, we are confronted with an effect and must reconstruct its cause. Thus, an alien visiting Earth and confronted with Mt. Rushmore would need to figure out whether wind and erosion could produce it or whether some additional factors might be required. ID involves such effect to cause reasoning.[60]

Dembski then responds to Pennock's Zeus analogy that implies that ID's effect to cause reasoning is similar to the ad hoc explanations of ancient superstitions. Dembski says effect to cause reasoning is legitimate when it (1) carefully compares alternative explanations or (2) recognizes conspicuous patterns in the effects:

> Now, granted, Pennock's supposed counterexample of Zeus throwing lightning bolts falls under effect to cause reasoning. But effect to cause reasoning is always comparative: before attributing lightning bolts to Zeus, one needs to compare the "Zeus hypothesis" with other hypotheses that are on the table. Even in ancient times, there were competing hypotheses (even naturalistic ones) to the Zeus hypothesis (cf. the pre-Socratic natural philosophers). The reason no one accepts the Zeus hypothesis for lightning bolts any longer is not because it is inherently silly but because we have explanations that are so much better. In this case, they are explanations in terms of physical laws and thus without reference to design. But that's not a problem. ID does not purport to explain everything. Incidentally, lightning strikes might require an ID hypothesis if they exhibit some particularly salient pattern. Consider, for instance, the possibility that on a given day all, and only, those people in the United States who had written snide remarks about Zeus were hit by lightening and died (suppose these people were all scattered around the U.S.). In that case, a Zeus hypothesis for the pattern of lightning strikes might not seem entirely incredible. At the same time, our understanding of the physical mechanisms for how to produce individual lightning bolts would in this case remain unchanged.[61]

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[60]Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 22.

[61]Ibid.

As mentioned in chapter 4, Pennock would rebut this extension of his Zeus analogy by arguing that no mortal can prove to know the mind of Zeus or any other hypothetical god and confidently understand what the god considers as "snide." By comparison, he says that it is equally baseless to assume understanding of a supernatural, intelligent designer's salient intentions by observing natural phenomena.

ID's Theological Favoritism

The final claim by Pennock that Dembski rebuts in his *Kitzmiller* report is that ID is biased toward certain theological views, but it rejects theistic evolution. Pennock asserts that science can and should remain "neutral and non-dogmatic with regard to metaphysical possibilities."[62] According to Dembski's interpretation of Pennock's charges, "ID is biased whereas evolution (theistic or otherwise) is not."[63]

However, Dembski believes that theistic evolution is untenable, not because of theological concerns, but because it is bad science that does not adequately repair the explanatory failures of evolution in general. Dembski says:

> ID views evolution, insofar as it is committed to explaining the evolutionary process in terms of material mechanisms (like natural selection), as a failed research program. A guided form of evolution is fine for ID provided such guidance is empirically detectable, thereby facilitating a design inference. But theistic evolution is committed to methodological materialism and therefore rejects the very possibility of design being inferred scientifically for biological systems.[64]

Moreover, Dembski says that theistic (or "guided") evolution contradicts a prodigious claim made by Darwinists—especially by those who are logically consistent and understand Darwin's most profound supposition. This supposition is that his theory rids science of any need for a creator external of nature itself. Therefore, because of its

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[62]Pennock, Expert Witness Report, Kitzmiller v. Dover, 29.

[63]Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 23.

[64]Ibid.

logical and functional incompatibility with both ID and typical non-theistic evolutionary frameworks, theistic evolution should be rejected.

CSI and Improbability

Pennock asserted in his written report for the court that "there is no way to assess the probability in any real biological case."[65] Therefore, he claims, Dembski's Complex Specified Information (CSI) cannot be defined or applied. To the contrary, Dembski insists that probabilities can be assigned to various phenomena, and his method of detecting design can accommodate many approaches.

Dembski asserts that Pennock's doubts border on irrelevance when judging the accuracy of the Design Inference's probability claims. Precise probabilities are often irrelevant to the primary effort behind the Design Inference. "It is enough to establish upper bounds. That's because design detection depends on probabilities being *small enough* and not on them taking on any particular values."[66] Although Dembski does not mention it specifically in this part of his rebuttal, it is reasonable to assume that his allowance of probability imprecision would apply to his *universal probability bound*, which Pennock correctly describes as "essential" to Dembski's overall inference program.[67]

Dembski's Design Inference is a version of the Basic Argument from Improbability, which is scrutinized by Barbara Forrest and Paul Gross in *Creationism's Trojan Horse*. Dembski's method focuses on events that have occurred within extremely small probabilities, proving that they are designed. But Forrest and Gross say that

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[65]Pennock, Expert Witness Report, Kitzmiller v. Dover, 19.

[66]Dembksi, Expert Written Rebuttal, 22. Emphasis his.

[67]Pennock, Expert Witness Report, Kitzmiller v. Dover, 19.

"ridiculously improbable things happen all the time," and, "[v]ery low probability does *not* mean impossibility."[68]

This is another criticism that ignores the critical factor of *specification*, which can set highly improbable, *designed* events apart from all other things that are highly improbable. So to answer Forrest and Gross, there are indeed events of such low probability that a chance hypothesis must be ruled out, and that is Dembski's main objective. He states:

> [G]iven an independently given pattern, or specification, what level of improbability must be attained before chance can be legitimately precluded? A wall so large that it cannot be missed and a target so large that covers half the wall, for instance, are hardly sufficient to preclude chance (or "beginner's luck") as the reason for an archer's success hitting the target. The target needs to be small to preclude hitting it by chance.[69]

But determining a low enough probability to preclude chance may seem arbitrary, or, at best, difficult to justify. To address this issue, Dembski introduces two types of probabilistic resources; they are *replicational resources* and *specificational resources*.[70] He explains them with another archer analogy. An archer shoots an arrow at a wall so large that anyone could easily hit it. But we then realize that the archer hit a target fixed on the wall, and we want to determine whether we should attribute his hitting the target to chance. This requires us to learn of any other conceivable targets at which the archer might be aiming—specificational resources. We also need to know the number of arrows in the archer's quiver that might have been shot at the wall—replicational resources. Dembski further explains:

> Probabilistic resources comprise the relevant number of ways an event can occur (replicational resources) and be specified (specificational resources). The important question therefore is not, What is the probability of the event in question? but rather,

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[68]Barbara Forrest and Paul R. Gross, *Creationism's Trojan Horse: The Wedge of Intelligent Design* (New York: Oxford University Press, 2004), 126.

[69]Dembski, *Design Revolution*, 116-17.

[70]*Supra,* chap. 3.

> What does its probability become after all the relevant probabilistic resources have been factored in? Probabilities can never be considered in isolation but must always be referred to a relevant reference class of possible replications and specifications.[71]

Dembski then addresses Forrest and Gross's skepticism mentioned above. He asserts:

> A seemingly improbable event can become quite probable when placed within the appropriate reference class of probabilistic resources. On the other hand, it may remain improbable even after all the relevant probabilistic resources have been factored in. If it remains improbable and if the event is also specified, then it exhibits specified complexity.[72]

Dembski uses the concept of probabilistic resources to give credence to his *universal probability bound* (UPB), explained in chapter 3. The UPB is the part of the Design Inference that denotes the probabilistic limitations of our finite universe. "In the observable universe, probabilistic resources come in limited supplies. In fact, it can be shown that any specified event of probability less than 1 in 10^{150} will remain improbable even after all conceivable probabilistic resources from the observable universe have been factored in."[73] Nevertheless, designed events of specified complexity exhaust the immense but still limited possibilities within the UPB. This means that Forrest and Gross's comment, "Ridiculously improbable things happen all the time," is overly simplistic.

Explanatory Modes and Physical Logic

Citing Mark Perakh, Forrest and Gross accuse Dembski of violating physical logic. Although they claim there are other examples, *Trojan Horse* mainly makes this argument by attacking the first node of the explanatory filter. Dembski forces one to make an illogical yes/no distinction regarding an event. If the answer to the physical law (necessity) question is not "yes," the only alternative offered by the filter is "no," it must be from chance. Forrest and Gross, with support from Perakh, argue that this is an

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[71]Dembski, *Design Revolution*, 117.

[72]Ibid.

[73]Ibid. *Supra*, chap. 3.

unwarranted dilemma. Dembski does not take into account that "natural law and chance can act together, inseparably."[74]

Pennock makes a similar argument from physical logic within his *Kitzmiller* report. He says that design, understood from a proper materialist perspective, is *not* the "set theoretic compliment" of chance and necessity. Instead, design should be understood as working completely *within* chance-necessity processes. This is true even when examining anthropological artifacts, since man is another product of nature.[75]

Dembski, on the other hand, says that the responses mentioned above misinterpret the explanatory filter. The filter does *not* operate with denial of the harmonious workings of design, chance, and necessity in a particular phenomenon. It does, however, demand that distinctions be maintained during empirical determinations of these causal modes.

He addresses the Perakh/Forrest/Gross argument in a rebuttal of the same criticism by Michael Ruse. Dembski's rusty automobile analogy is useful in this rebuttal:

> Ruse is wrong that the Explanatory Filter separates necessity, chance, and design into mutually exclusive and exhaustive categories. The filter models our ordinary practice of ascribing these modes of explanation. Of course all three can be run together. But typically one of these modes of explanation predominates. Is the rusted automobile in your driveway designed? The rust and the automobile's beaten appearance are due to chance and necessity (weathering, gravity and a host of other unguided natural forces). But your automobile also exhibits design, *which typically is the point of interest*. What's more, by focusing on suitable aspects of the automobile, the filter detects that design. Ultimately, what enables the filter to detect design is specified complexity. For that reason, the only way to refute the Explanatory Filter is to show that specified complexity is an inadequate criterion for detecting design.[76]

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[74]Forrest and Gross, *Trojan Horse*, 138. As mentioned in chapter 4 of the present thesis, Forrest and Gross notably misrepresent the filter, saying it stipulates "that anything which *cannot* be explained by frequent, regular operation of known natural laws, or simply as an accident, *must* be both very rare and designed." This statement's omission of *specified complexity* as the deciding factor for design is critical. Ibid., 130. Emphasis theirs.

[75]Pennock, Expert Witness Report, Kitzmiller v. Dover, 14.

[76]Dembski, *Design Revolution*, 93. Emphasis added. *Supra*, chap. 2.

Therefore, the argument from physical logic as made by Perakh, Forrest/Gross, and Ruse, which emphasizes the harmonious relationship between chance and necessity, begs the question. Given chance and necessity's simultaneity, empirical investigation is made with *points of interest* in mind. If a scientist's interests were to be directed toward a design hypothesis to explain a particular phenomenon, he has a workable method of testing the theory through the explanatory filter.

In the previously mentioned, more general assessment of the filter, Pennock does not concede that the filter proves design (i.e., specified complexity) to be the set-theoretic compliment of chance and necessity. The following argument from Dembski addresses this type of criticism by again insisting on a *conceptual* separation between causation and specified complexity, as understood through the Law of Conservation of Information:

> A mixture of intelligent and natural causes is clearly not being denied when the Law of Conservation of Information states that specified complexity cannot be generated by natural causes. The Law of Conservation of Information is not saying that natural causes in tandem with intelligent causes cannot generate specified complexity but rather that natural causes apart from intelligent causes cannot generate specified complexity. Thus, to attribute *X* to natural causes is a call for an explanation in terms of some antecedent circumstance *Y* upon which natural causes—and only natural causes—operate and suffice to produce *X*. The Law of Conservation of Information says that if *X* exhibits specified complexity, then so does *Y*. It follows that natural causes do not, and indeed cannot, generate specified complexity but merely shuffle it around.[77]

Law of Conservation of Information

Dembski has defined "information," as it pertains to physical science, as "what gives shape to matter, fixing one shape to the exclusion of others."[78] Noted physicist and information theorist Leon Brillouin has explained the Law of Conservation of Information (LCI) by saying, "The computing machine does not create any new

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[77]Ibid.,162.

[78]Ibid., 130.

information, but it performs a very valuable transformation of known information."[79] Dembski is criticized for applying the LCI to Intelligent Design. He argues that nature conserves and manipulates preexisting CSI but the LCI means that it is always a mistake to assert that natural processes were ever the *source* of CSI.[80]

In *Trojan Horse*, Forrest and Gross claim that Dembski misapplies Claude Shannon's entropy theory of communication: "Dembski's measure of information is really just a measure of entropy, not the information, of the event." Therefore, with Dembski's misappropriation of Shannon's well-established law, he has not disproved that the increase of information can come from *natural* processes. Additionally, *Trojan Horse* argues that even though information cannot be added to a closed, isolated system, "biological organisms and their parts are not closed systems." Actually, they are constantly open to "negative entropy, . . . which is the same as information."[81]

In this section of *Trojan Horse*, Forrest and Gross either overlook a serious inconsistency on their part or they commit a fallacy of equivocation by not clearly defining a significant term within their argument. In some statements, they accuse Dembski's interpretation of the LCI as saying that nature cannot increase *information*. But in other statements they accuse him of asserting that nature cannot increase *CSI*. This discrepancy cannot be overlooked. Dembski's literature was unambiguous about this issue before Forrest and Gross's writing of *Trojan Horse*.[82]

The issue is further clarified in subsequent Dembski literature. He writes in *The Design Revolution*, "The problem is that chance can generate plenty of novel

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[79]Leon Brillouin, *Science and Information Theory* (New York: Courier Dover, 2004), 269.

[80]In his *Kitzmiller* expert report, Pennock stated that Dembski's LCI definition is the same as the "Law of Priority in Creation" that he discusses before Christian audiences." Pennock, Expert Witness Report, Kitzmiller v. Dover, 27. *Supra*, chap. 4.

[81]Forrest and Gross, *Trojan Horse*, 140.

[82]In *Trojan Horse*, 138-39, Forrest and Gross even use an endnote referencing Dembski's own books *Intelligent Design* and *No Free Lunch*, where his comments on LCI assert that nature cannot increase *Complex Specified Information*. Ibid., 339 n.83.

information. (Just get out your coin and start tossing it. After a few dozen tosses, the sequence of heads and tails that you witness will be unique in the history of coin tossing and constitute novel information.)"[83] Dembski comments on chance (as opposed to necessity) being able to generate new information in his critique of Peter Medawar's LCI. Medawar posits that *deterministic* processes alone cannot generate information. However, Medawar overlooks the fact that chance, or chance combined with necessity (deterministic law or laws), actually *can* generate novel information. Yet in order to demonstrate the uniqueness of *Complex Specified* Information in the LCI, Dembski states an improved version of the LCI: "Neither chance, nor necessity nor their combination is able to generate specified complexity or, equivalently, complex specified information. . . . The key word in the definition of the [LCI] is *generate*. Natural processes are quite adept at shuffling preexisting specified complexity. But what they can't do is generate it from scratch."[84]

It therefore follows that Forrest, Gross, Pennock, and an other evolutionists who argue that CSI can be explained in terms of natural causes are begging the question. "With specified complexity, the information problem never goes away, short of locating the intelligence that originated it."[85]

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[83]Dembski, *Design Revolution*, 159.

[84]Ibid., 160. Emphasis his.

[85]Ibid., 163. As mentioned in chapter 4, Pennock has another criticism involving information. He says that the explanatory filter does not account for the existence of essentially the same amount of information in the DNA of functional genes as that found in "junk DNA." Therefore, in order to demonstrate which pieces of DNA contain information used for design, Dembski needs an additional criterion.

In *Design of Life*, Dembski questions the common concept of "junk DNA." It refers to genetic information for which no biological function has yet been determined. But the term is becoming outdated in response to an increasing number of explanations for the functionality of supposed "junk DNA." Preferring the term "pseudogene," Dembski and co-author J. Wells assert, "Because genetic material can do more than simply code for protein, it is questionable whether pseudogenes in fact serve no biological function." Wm. A. Dembski and Jonathan Wells, *The Design of Life: Discovering Signs of Intelligence in Biological Systems*, ed. Wm. A. Dembski (Dallas: Foundation for Thought and Ethics, 2008), 315, 318.

Cumulative Selection Explaining Appearance of Design

Forrest and Pennock agree with Darwinian philosophers such as Richard Dawkins and Elliot Sober in arguing that the appearance of "design" in nature can be adequately explained in materialist terms without the need of an intelligent, purposeful mind behind the cause. As mentioned in the previous chapter, Forrest refers to examples such as wave patterns on a beach, the configuration of atoms in a molecule of water, the symmetry of snowflakes, and "design" patterns caused by Fibonacci sequences in some leaves.

Pennock is convinced that his example of a random number, replicating dialer proves that non-intelligent, evolutionary processes can operate within cumulative chance probabilities to generate CSI, thereby debunking the need for ID to explain CSI. This is similar to the concept behind Dawkins's evolutionary algorithm that produces the complex-specified, meaningful phrase "METHINKS IT IS LIKE A WEASEL" within a relatively small number of approximately forty generations. This experiment in Dawkins's book, *The Blind Watchmaker*, is used to support his statement, "Biology is the study of complicated things that give the appearance of having been designed for a purpose."[86]

Pennock also claims that he and his colleagues have sufficiently proven that complexities relevant to theory's like Behe's *irreducible complexity* can be explained within a completely Darwinian framework. This refers to Pennock's contribution to the research using the Avida computer algorithm. The program, featured in a *Nature* article, is used to create digital organisms that demonstrate evolutionary mechanisms for growth in complexity.[87]

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[86]Richard Dawkins, *The Blind Watchmaker: Why the Evidence of Evolution Reveals a Universe without Design* (New York: Norton, 1996), 1. Part of Dawkins's skepticism of ID being able to explain the universe is his observation of nature's gross inefficiencies. Dembski discusses how the issue of optimal design is not detrimental to ID in *Design Revolution*, 57-63.

[87]See Richard E. Lenski et al., "The Evolutionary Origin of Complex Features," *Nature* 423 (2003): 139-44.

However, Dembski is skeptical of experiments in algorithms, especially because of the methodology behind their programming. Programmers can "stack the deck" in favor of their desired results. According to Dembski, the *Nature* article on Avida even contains an admission that "the computer programmers built into the simulation what they thought evolution needed to make it work," severely challenging the dependability of their research.[88] Additionally, Dembski claims that most working biologists are not convinced that computer simulations like Avida adequately represent what actually happens in biological evolution.[89] "[T]here's no evidence that real-life irreducibly complex biochemical machines . . . can be decomposed [according to the assumptions programmed into these simulations]."[90] Dembski argues further that there is no evidence, including that within the *Nature* article, that sufficiently proves that "evolutionary mechanisms can generate biological information. . . . [T]here is a big difference between evolutionary mechanisms shuffling around preexisting biological information and evolutionary mechanisms actually generating it from scratch. I show [in *No Free Lunch*] that evolutionary mechanisms can do the former but not the latter."[91]

Dembski attempts to refute the integrity of these algorithms in general in *The Design Revolution*, in detail in *No Free Lunch*, and with more precise statistical reasoning in his recent work with Robert Marks. Producing the targeted effect of such an experiment uses evolutionary processes that "never output more specified complexity than was programmed into them through . . . constraining of the underlying information

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[88]Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 19.

[89]Ibid., 18.

[90]Ibid., 19. Dembski referring to his own book, *Uncommon Dissent: Intellectuals Who Find Darwinism Unconvincing* (Wilmington, DE: ISI, 2004), xxix.

[91]Ibid., 20. Cf. Wm. A. Dembski, *No Free Lunch: Why Specified Complexity Cannot Be Purchased without Intelligence* (Lanham, MD: Rowman & Littlefield, 2002), chap. 4. Dembski gives mathematical precision to the argument in "Searching Large Spaces: Displacement and the No Free Lunch Regress," version 2.1 [on-line]; accessed 7 August 2009; available from http://www.designinference.com/documents/2005.03.Searching_Large_Spaces.pdf; Internet.

space."[92] With close inspection, such algorithms are proven to be teleological, manipulated by the programmers' intentions.

Dawkins's Weasel is a prominent example. Dawkins is not interested in showing the operation of "pure chance," but rather the power of cumulative selection. He begins with a random sequence of twenty-eight Roman letters and spaces (call the letters and spaces "symbols") that are complete gibberish. The sequence then undergoes one perturbation after another. As each alteration causes a symbol or symbols to match a corresponding symbol or symbols in the target sequence, "METHINKS IT IS LIKE A WEASEL," those are left in place, and only the others continue to be randomly altered. This is repeated sequentially. The process will produce the entire target sentence in a relatively short order of an average of forty-three steps.

Dembski concludes that the process behind Dawkins's example is "deeply teleological."[93] Dawkins is setting up a prespecified target sequence before running the algorithm. "This is a problem because evolutionary algorithms are supposed to be capable of solving complex problems without invoking teleology (indeed, most evolutionary algorithms in the literature are programmed to search a space of possible solutions to a problem until they find an answer—not, as Dawkins does here, by explicitly programming the answer into them in advance.)"[94]

Dembski's Progression to Evolutionary Informatics

This argument by Dawkins was part of the genesis of what are now profoundly more advanced evolutionary algorithms that are intended to prove Darwinism's strength. It is now Dembski's central focus to demonstrate the flaws in such computations. Improving upon his applications of the *No Free Lunch* principles within his 2002 book,

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[92]Dembski, *Design Revolution*, 255.

[93]Dembski, *No Free Lunch*, 182.

[94]Ibid.

he now collaborates with Baylor University engineering professor Robert Marks to describe the "active information" that programmers must impose on evolutionary algorithms for them to prove that CSI requires no intelligent designer.[95] Dembski and Marks's theorems demonstrate how the creators of these programs acquire a "free lunch" of information that is unaccounted for in their outputs, thereby defeating the creators' own hypotheses.[96]

Dembski and Marks argue that most of these programs operate with knowledge of a target sequence (i.e., "METHINKS IT IS LIKE A WEASEL") to reject some sequences and preserve others.[97] In this process, the program is imparting "active information" that is required by the Law of Conservation of Information.

For further clarification of what Dembski and Marks are arguing and why "active information" is significant, the difference between "endogenous information" and "exogenous information" must first be explained. Endogenous information is what is present in the target, providing the measure of probability for a pure chance, null search to hit the target. In the cases of the evolutionary algorithms discussed here, the amount of endogenous information involved in a null search reaching the target would be extremely large because the probability of hitting the target would be extremely low. This is to say,

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[95]In addition to the algorithms discussed here, Dembski and Marks also analyze other programs. A highly recognized one is Ev, created by Thomas Schneider, a research biologist at the National Institutes of Health. The programming of Ev is mentioned in various articles on Dembski and Marks's *Evolutionary Informatics* website [on-line]; accessed 7 August 2009; available from http://evoinfo.org; Internet.

[96]No Free Lunch (NFL) theorems were first developed by NASA scientists to describe a restriction encountered by evolutionary algorithms as they search for information-rich targets. "The NFL theorem states that an evolutionary algorithm will, on average, perform no better than a blind search in finding a target within a large space of possibilities unless external sources of information are provided to the algorithm to point it toward the target." Stephen C. Meyer, *Signature in the Cell: DNA and the Evidence for Intelligent Design* (New York: HarperCollins, 2009), 291.

[97]Avida, as an exception, is *not* given a target sequence. As a unique program, it does not select sequences of characters because of their proximity to possible future function. In other words, Avida does not "look ahead" to a target to be met. Nevertheless, Meyer's critique of Avida is similar to Dembski's in saying, "Avida lacks realism as a simulation of biological evolution because the program selects functionally significant logic functions possessing too little complexity to represent the actual information content of functional proteins and genes." Ibid., 289.

"the amount of information present in a sequence or system is inversely proportional to the probability of the sequence or system arising by chance. If the probability of finding the target is small the information required to find the target is correspondingly large."[98] This means that a "blind" null search will simply be of no use for the programmers of these algorithms. They must devise the searches as "alternative" searches, thereby improving on the null search by increasing the probability of hitting a target successfully. "Alternative" searches are explained thus: "[b]y calculating the size of the space of alternative possibilities in which the target resides, the computer scientist can determine both the probability of finding the target in a random search and the information content of the target in question."[99]

This "alternative" search, entailing "exogenous information," greatly increases the probability of reaching the target, while inversely reducing the amount of needed information (possibly to zero) to reduce the difficulty of the search.[100] The difference between the endogenous and the exogenous information is the measure of information that must be added to a null search to make it workable. This consequential difference is called "active information." Active information must be incorporated into the search by the programmer to make searching through the immensely rich information of the target manageable within the principles of No Free Lunch and Conservation of Information. Dembski and Marks's primary efforts are to prove the measurability of this active information, while asserting that programmers of evolutionary algorithms are giving no account of it, thereby not admitting the teleological nature of their enterprises.[101]

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[98]Taken from Stephen C. Meyer's analysis of Marks's informational accounting. Ibid., 285.

[99]Ibid.

[100]Wm. A. Dembski and Robert J. Marks, "Life's Conservation Law: Why Darwinian Evolution Cannot Create Biological Information," forthcoming from *Evolutionary Informatics Lab* [on-line]; accessed 7 August 2009; available from http://evoinfo.org/Publications/Life.html; Internet, 14.

[101]They formally state this measurability as $I_+ = I_\Omega - I_S = \log(q/p)$. Active information I_+ measures the information that is added to a null search I_Ω to increase the probability of an alternative search I_S being successful by a factor of q/p. The probability of success for the initial blind (null) search is p, while

Furthermore, Dembksi and Marks extend their research to explain how their own interpretation of the Law of Conservation of Information applies to these telic alternative searches.[102] More specifically, the LCI is a significant factor in understanding the "search for searches" that occur within these algorithms:

> In characterizing the information cost that alternative searches incur, LCI treats searches as residing in higher-order search spaces (i.e., spaces each of whose elements is a search). Notably, the information imparted to improve a search picks out one class of searches (those that with probability q or better locate [the target] T) to the exclusion of others (those that with probability less than q locate T). LCI says that searching the original search space Ω for a target T with probability q of success is never more difficult, and possibly much easier, than searching a higher-order search space for a search that, when applied to the lower-order search space Ω, finds T with that same probability.
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> To see what's at stake in such a "search for a search," imagine that you are on an island with buried treasure. The island is so large that a blind (null) search is highly unlikely to succeed in finding the treasure. Fortunately, you have a treasure map that will guide you to it. But where did you find the treasure map? Treasure maps reside in a library of possible treasure maps. The vast majority of these will not lead to the treasure. How, then, did you happen to find the right map among all these possible treasure maps? What special information did you need to find it? Conservation of information says that the information required to pick out the right map is never less than the information required to locate the treasure directly.[103]

Returning to Robert Pennock's phone dialer (see chapter 4), it is a much simpler, hypothetical attempt to illustrate cumulative selection's explanatory power for CSI. However, it is also another example of how ID's critics use alternative searches, placing unaccounted for, active information into algorithms. Using a telic framework, Pennock therefore contradicts his own assumptions about "blind" evolutionary processes. His replicating dialer system begins to make contact outside of his office, then finds the

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the probability of success for the alternative search is q (logarithm to the base 2). Ibid., 13-14. Dembski and Marks say that the probability of the initial blind search being successful p in Dawkins's Weasel experiment is 1 in 10^{40}. The alternative search q that he then inputs for his evolutionary algorithm has a probability of success of near 1. Ibid., 12.

[102]Dembski and Marks's specific definition of the Law of Conservation of Information is as follows: "[a]ny search that proportionately raises the probability of locating a target by q/p with respect to blind search requires in its formation an amount of information not less than the active information $I_+ = \log(q/p)$." Ibid., 22.

[103]Ibid., 24-25.

right country code, then works towards operable multi-digit phone numbers, all with digits that are "selected" as they "survive" the process. Active information is imputed, since we are to "suppose that the entire phone system was set up so that it would cut one off . . . if dialing hit illegitimate prefixes."[104] This allows the algorithm to make gradual adjustments for reaching a target, which would be one or another working individual number. This target was conceived in advance of the process and favored by use of an alternative search. The scenario would have much different results if it were to use an actual blind search for getting a whole working phone number correct at one time, which is highly improbable.[105]

Dembski's Response to Fitelson, Stephens, and Sober

Chapter 4 of this research mentions Forrest and Gross's long list of problems posited by the Wisconsin philosophers, Fitelson et al, in their review that came shortly after the publication of *The Design Inference*. However, the general, concluding criticism most worthy of attention within "How Not to Detect Design" is Dembski's failure to connect *design* and *agency*. In other words, the Design Inference does not demonstrate any connection between the detection of an intelligent designer and *how* the designer might have produced some observable phenomenon. Furthermore, Fitelson et al assert that Dembski's design hypothesis gives no consideration as to whether competing hypotheses can better explain the phenomenon. A sample of Dembski's initial response to this critique by Fitelson et al, also cited by Forrest and Gross, is worth repeating from chapter 4:

> [I]t's not clear why this should be regarded as a defect of the concept. It might equally be regarded as a virtue for enabling us neatly to separate whether something is designed from how well it was produced. Once specified complexity tells us that something is designed, not only can we inquire into its production, but we can rule

[104]Pennock, *Tower of Babel*, 258.

[105]Although Dembski's literature to date contains no substantive, direct critique of Pennock's dialer, he has confirmed the conclusion of this critique in personal correspondence with the present writer.

> out certain ways it could not have been produced (i.e., it could not have been produced solely by chance and necessity). A design inference does not avoid the problem of how a designing intelligence might have produced an object. It simply makes it a separate question.[106]

The Fitelson et al criticism that detecting design is disjointed from an event's causal history is directly related to their complaint against creationists in general.[107] They argue that Dembski's inference is further proof that arguments supported by creationists never facilitate needed testable predictions that can be compared to competing theories of causation. It is another example of untenable, negative complaint against successful, positively tested Darwinian theory.

In a later publication, his book *The Design Revolution*, Dembski correctly refers to this kind of critique as "the most influential criticism of specified complexity," even though he does not directly mention "How Not to Detect Design."[108] He recognizes the fundamental differences between the Wisconsin philosophers' philosophical framework and his own: they oppose the eliminative, Fisherian approach to reasoning that uses specified complexity to infer design, whereas they think any approach to inferring design must come from a comparative, Bayesian framework.

The difference can be summarized as follows: the approach associated with Ronald Fisher rejects a chance hypothesis when the sample data appear within a preprescribed rejection region. The approach associated with Thomas Bayes rejects a chance hypothesis when an alternative hypothesis presents a bigger probability on the data in question than the original hypothesis.[109]

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[106]Wm. A. Dembski, "Another Way to Detect Design?" Metanexus Institute website [on-line]; accessed 8 August 2009; available from http://www.metanexus.net/magazine/tabid/68/id/3097/Default.aspx; Internet. Also quoted in Forrest and Gross, *Trojan Horse*, 135.

[107]Fitelson et al. carefully acknowledge that Dembski does not assume that his theory advances creationism against evolution. However, creationists highly support the Design Inference. Branden Fitelson, Christopher Stephens and Elliot Sober, "How Not to Detect Design—Critical Notice: William A. Dembski, *The Design Inference*," *Philosophy of Science* 66 (1999): 487.

[108]Dembski, *Design Revolution*, 232.

[109]Ibid.

In *The Design Revolution*, Dembski's method of rebuttal against this type of critique is to (1) defend his preferred Fisherian approach as logically coherent and (2) explain convincingly why the Bayesian approach, when it does rarely work, must presuppose (or be "parasitic upon") the Fisherian approach.

However, Dembski must first address some concerns. A primary concern involves ensuring that the "significance level" being used is not arbitrary. A significance level attributes the degree of improbability below which a rejection region eliminates a chance hypothesis once the sample falls within it.[110] A significance level is considered less arbitrary and more legitimate as more samples are taken—these are *replicational resources*.[111] A significance level must also limit rejection regions to those that are identified by "low-complexity patterns"—these are *specificational resources*.[112] These low-complexity patterns convey what Dembski refers to as *specificational complexity*. (This is not to be confused with *specified* complexity.) "Typically this form of complexity corresponds to Kolmogorov compressibility measure or minimum description strength. (The shorter the description, the lower the specificational complexity.)"[113]

Once the Fisherian approach is proven logically coherent and demonstrated as capable of eliminating chance hypotheses individually by checking whether samples fall within suitable rejection regions, the rest is rudimentary. "[I]t is a simple matter to

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[110]Ibid., 236.

[111]Ibid. Dembski's probabilistic resources are also described in chap. 3.

[112]Ibid., 236-37.

[113]Ibid., 237. Dembski illustrates specificational (Kolmogorov) complexity with two sequences of ten coin tosses. One sequence is HHHHHHHHHH, the other HHTHTTTHTH. Both sequences have the same approximate probability of 1 in 1,000, but the second sequence, at first observation, appears to come from chance. On the one hand, the pattern of the first sequence can be specified by simply describing it as "ten heads in a row." On the other hand, the second sequence requires a much longer specificational description, "two heads, then a tail, then a head, then three tails, then heads followed by tails and heads." Again, *specificational* complexity pertains to "minimum description length." For *specified* complexity to be attributed to something, it must have low *specificational* complexity but also "high probabilistic complexity (i.e., its probability must be small)," according to Dembski's process. Ibid., 83-84. Specificational (Kolmogorov) complexity is described similarly under the term "descriptive complexity" in Dembski and Wells, *Design of Life*, 168-69.

extend this reasoning to entire families of chance hypotheses, perform an eliminative induction, and thereby eliminate all relevant chance hypotheses that might explain a sample. And from there it is but a small step to infer design."[114]

Thus, with these concerns addressed, the first step in Dembski's defense proper of Fisher's method is to explain how it can be used to justify inferring design. He explains:

> Here's the rationale: if we can spot an independently given pattern (i.e., specification) in some observed outcome and if possible outcomes matching the pattern are, taken jointly, highly improbable (in other words, if the observed outcome exhibits specified complexity), then it's more plausible that some end-directed agent or process produced the outcome by purposefully conforming it to the pattern than that it simply by chance ended up conforming to the pattern. Accordingly, even though specified complexity establishes design by means of an eliminative argument, it is not fair to say that it establishes design by means of a *purely* eliminative argument. The independently given pattern, or specification, contributes positively to our understanding of the design inherent in things that exhibit specified complexity.[115]

Nevertheless, the Bayesian method demands elimination of competing theories by *comparison*. Bayesian theorists say that "samples falling within rejection regions (or, more generally, outcomes matching specifications) cannot serve as evidence against hypotheses. Rather, the only way for there to be evidence against a chance hypothesis is for there to be better evidence in favor of some other hypothesis."[116] As specifically stated by Fitelson, Stephens, and Sober, "When prediction is probabilistic, a theory cannot be accepted or rejected by seeing what it predicts. The best you can do is compare

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[114]Ibid., 238. Relating to the topic of eliminative induction, Dembski rebuts Darwinsts such as Kenneth Miller who accuse ID of being full of negative arguments and arguments from ignorance (not allowing for what Darwinian science will eventually discover). Dembski says, "Eliminative inductions, like all inductions and indeed all scientific claims, are fallible, but they need a place in science. To refuse them, as evolutionary biology tacitly does by rejecting specified complexity as a criterion for detecting design, does not keep science safe from disreputable influences but instead undermines scientific inquiry itself." Ibid., 221.

[115]Ibid., 238.

[116]Ibid., 238-39.

theories with each other. To test evolutionary theory against the hypothesis of intelligent design, you must know what *both* hypotheses predict about observables."[117]

Dembski challenges their line of thinking—the necessity of comparing hypotheses' empirical strengths—by explaining the relationship between evidence and our cognitive faculties, quoting Michael Rea, *World Without Design*:

> [I]n order to inquire into anything, we must already be disposed to take some things as evidence. In order even to begin inquiry, we must already have various dispositions to trust at least some of our cognitive faculties as sources of evidence and to take certain kinds of experiences and arguments to be evidence. Such dispositions (let's call them *methodological dispositions*) may be reflectively and deliberatedly acquired.[118]

There is therefore an intuitive aspect to scientific evidence that Bayesians neglect. Dembski says that "the debate [between Bayesians and Fisherians] is not merely over how to weigh certain evidence but over what counts as evidence in the first place."[119]

The Bayesians force Dembski, ID, and their Fisherian method into an unjustified logical problem of testability. "Can there even be such a thing as evidence for an unevolved intelligence that designs biological complexity?"[120] Or at least could there ever be evidence that would sufficiently satisfy the Bayesians? For the Bayesian approach to work, there must be clear definitions for both P(E | D) and P(E | H). (What can we know about the probability P of a natural event E [say, an event that causes a gene

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[117]Fitelson, Stephens, and Sober, "How Not to Detect Design," 487.

[118]Dembski, *Design Revolution,* 239, citing Michael Rea, *A World without Design.* Cf. Dembski and his "common sense" Reidian argument against Humaen empiricism, practiced by Pennock, Sober, and others. Ibid., 223-31. *Supra*, chap. 2. As part of his overall critique against Hume, Dembski challenges Pennock's own skepticism of what Dembski calls "inductive generalizations" that infer design. Pennock says that design inferences must be "based upon known types of causal processes." Dembski, *Design Revolution*, 225, citing Pennock, "The Wizards of ID," in *Intelligent Design Creationism and Its Critics* (Cambridge, MA: MIT Press, 2001). Dembski replies that "we recognize intelligence by its effects, not by directly perceiving it. . . . [Humean induction] is entirely the wrong analytic framework for how we infer design." Dembski, *Design Revolution*, 230.

[119]Ibid., 239.

[120]Ibid.

to code for a particular enzyme[121]], given that a designer designed it D? And what can we know about the probability P of that event, given that the chance hypothesis H cannot be ruled out?) For design theorists to satisfy the Baysian, there must be *sufficient evidence* to prove that P(E | D) >> P(E | H)—that there is a significantly greater probability of the event happening, given design, than given chance.

But as mentioned in the above section on testability, there is notable difficulty in assigning a probability to a designer designing something, when design, in many if not most cases, involves *creative innovation.*[122] On the other hand, chance probabilities can be easily defined, since researchers are familiar with the various natural processes that can affect things like genes. Dembski argues:

> When the issue is creative innovation, the very act of expressing the likelihood P(E | D) becomes highly problematic and prejudicial. It puts creative innovation by a designer in the same boat as natural laws, requiring of design a predictability that's circumscribable in terms of probabilities. *But designers are inventors of unprecedented novelty, and such creative innovation transcends all probabilities.*[123]

Dembski's second step in arguing for Fisherian preference is to demonstrate how the Bayesian method is "parasitic" on the Fisherian. He asserts that Bayesians cannot explain how they identify the events to which they ascribe probabilities. Moreover, Bayesian rationalizing can properly decide only among hypotheses that the Fisherian has thus far failed to exclude:

> In particular, the Bayesian approach offers no account of how it arrives at events on which it performs a Bayesian analysis. The selection of those events is highly intentional, and in the case of Bayesian design inferences it needs to presuppose an account of specification. Specified complexity, far from being refuted from the Bayesian approach, is therefore implicit throughout Bayesian design inferences.[124]

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[121]The example used by Dembski, *Design Revolution*, 241.

[122]Dembski gives some examples of creative innovation. "[W]hat's the probability of me writing this book? What's the probability of Rachmaninoff composing his variations on a theme by Paginini? What's the probability of Shakespeare writing his sonnets?" Ibid.

[123]Ibid. Emphasis added.

[124]Ibid., 247-48.

In sum, Dembski's first reply to Fitelson et al is that questions about an event's causal history are independent of the statistical considerations of the Design Inference, posing no real challenge to his program. Secondly, Darwinists are not only deficient in providing an efficacious mechanism for natural selection's design-like phenomena, but in their use of Bayesian rationality, they are also deficient in explaining why they might conceive of "design" attributes in the first place.

Chapter Summary

This chapter concludes with a summary of Dembski's response to these various categories of criticisms by Forrest, Pennock, and other thinkers who support their claims.

Dembski has argued that Forrest promotes a "myth of religious neutrality" when she impugns ID for having religious bias, while ignoring the religious bias inherent in evolution and its associated worldview of materialism.[125]

He has articulated the prevalent distinctions between Intelligent Design and biblical creationism; the two fields ask categorically different questions about reality, and Dembski's predominant research theme, specified complexity, can be advanced with absolutely no assumptions about the God of the Bible or any particular deity. Theoretically, specified complexity does not even require belief that any deity exists. Associations between ID and any religio-scientific fields are completely circumstantial.

Dembski has challenged the assumptions inherent in methodological materialism. He asserts that a rigid dichotomy between what is "natural" and "supernatural" is unjustified.

While admitting that ID researchers, like scientists in all fields, have much more to accomplish in advancing their theories, Dembski insists that ID is indeed a practicable, advancing field of science. Moreover, Forrest's flawed research methods

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[125]Dembski, Expert Written Rebuttal, Kitzmiller v. Dover, 2.

have led to her obscured understanding of the amount of ID-related concepts being discussed in respected academic literature.

When opponents delineate ID as "negative" argument, they are merely twisting the meanings of "positive" and "negative" in their favor. Any so-called "negative" aspect of ID is congruous with many well-established theories that could equally be described as "negative."

Dembski argues that ID theories surpass Darwinism in meeting the testability criterion. This is despite the logical, theoretical strictures inherent in ID concepts such as specified complexity; the existence of intelligent design in nature implies creative innovation, which therefore implies logical limitations for predictability and testability. Dembski also defends ID's common "effect to cause" reasoning as a warranted method of investigation.

Dembski has explained that ID is incompatible with theistic evolution, not because of theological favoritism, but because the latter is scientifically unjustified.

In addressing criticisms by Forrest and Pennock that are directly related to his Design Inference, Dembski has defended his probability arguments as practicable; they sufficiently demonstrate that CSI cannot be explained from a chance hypothesis.

Dembski has maintained that his logic pertaining to physical laws is defensible. His theory accounts for the fact that chance, necessity, and design can all work simultaneously in causing a particular phenomenon. However, for purposes of scientific inspection, it is justifiable to single out one of these modes at the exclusion of the others (i.e., design for detecting specified complexity).

Despite Forrest's and Pennock's criticisms of Dembski's application of the Law of Conservation of Information, he continues to assert its relevance in arguing that nature cannot create novel CSI. Furthermore, his latest work uses principles of the LCI and No Free Lunch (among other concepts) to disclose inherent problems with numerous artificial algorithms that produce "evidence" of evolution's cumulative selection.

Finally, examination has been made of Dembski's response to the influential review by Fitelson et al. He has argued that it is not necessary to establish how a design hypothesis explains an event's causal history. It is also unnecessary to insist that a design hypothesis be compared to competing chance hypotheses, particularly in terms of predictability and testability. Dembski argues how these explanatory demands by Fitelson et al are based on a flawed adherence to Bayesian reasoning.

The following, concluding chapter will assess the strength of these categorical challenges by Forrest, Pennock, and their secondary support. Consideration will also be given to the strength of Dembski's responses to these types of criticisms. Thus, final conclusions can then be made about whether the Design Inference holds as a viable scientific program.

CHAPTER 6

CONCLUDING ANALYSIS

Closing analysis will begin with a discussion of the "demarcation problem" of what generally constitutes good science. This will lead into how Intelligent Design (ID) itself corresponds to respectable methodology. Discussion will then move to how William Dembski and his Design Inference are a significant part of ID's overall scientific legitimacy. These factors will abet an informed determination of whether Dembski's scientific credibility still maintains after the collective criticisms of Forrest and Pennock.

"The" Scientific Method

Atheist philosopher and ID defender, Bradley Monton, argues that any attempt to constrain science with a fixed definition is not only superfluous, it is also "a dangerous practice to try to impose rigid boundaries on what counts as science."[1] Scientists should therefore be free to pursue whatever they consider to be workable hypotheses. In the case of ID, "the focus should be on the empirical arguments for and against intelligent design."[2]

Larry Laudan contributed a straightforward answer to Michael Ruse's popular book and question, *But Is It Science?*: "If we would stand up and be counted on the side of reason, we ought to drop terms like 'pseudo-science' and 'unscientific' from our vocabulary; they are just hollow phrases which do only emotive work for us."[3] ID leader

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[1]Bradley Monton, *Seeking God in Science: An Atheist Defends Intelligent Design* (Buffalo, NY: Broadview, 2009), 48.

[2]Ibid., 53.

[3]Larry Laudan, "The Demise of the Demarcation Problem," in *But Is It Science? The Philosophical Question in the Creation/Evolution Controversy*, ed. Robert T. Pennock and Michael Ruse, rev. ed. (Amherst, NY: Prometheus, 2009), 328.

Stephen C. Meyer is less emphatic, while equally ambivalent about a precise definition. He writes, "A definition of science does not, by itself, tell us anything about the truth of competing statements, but only how to classify them (whether as scientific or something else, such as philosophical, historical, or religious statements)."[4]

Little has been settled from philosophy's continual debate about what constitutes "true science" and what methods should be used to advance it. Christian philosophers J. P. Moreland and William Lane Craig write that "there is no such thing as *the* scientific method, but rather there is a cluster of practices and issues that are used in a variety of contexts and can be loosely called scientific methodologies."[5] According to William Dembski, "Methodologies are tools for assisting inquiry but cannot define (or confine) inquiry."[6]

Scientific Materialism (Naturalism)

There is at least one matter within the debate, however, that ID's most vocal opponents insist *must* be settled: all theorists who would consider themselves engaged in legitimate science must operate within the strictures of methodological materialism, giving no consideration as to whether any causation could be related to the choices of a purposeful, unembodied designer.

Chapter 2 briefly mentioned how Dembski uses a Reidian common sense argument to refute a criticism from Humean induction that discounts design inferences. "[A]s Reid showed, though signs of intelligence can be learned and confirmed by experience, our ability to recognize them cannot originate in experience. That ability is

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[4]Stephen C. Meyer, *Signature in the Cell: DNA and the Evidence for Intelligent Design* (New York: HarperCollins, 2009), 399.

[5]J. P. Moreland and William Lane Craig, *Philosophical Foundations for a Christian Worldview* (Downers Grove, IL: InterVarsity, 2003), 310. Emphasis theirs.

[6]Monton, *Seeking God in Science*, 59, citing Dembski's own weblog posting.

hardwired into us as part of basic human rationality."[7] Contrariwise, Harvard biologist and ID opponent Richard Lewontin exemplifies how a materialist might actually *oppose* common sense in defending his methodology:

> Our willingness to accept scientific claims that are against common sense is the key to an understanding of the real struggle between science and the supernatural. We take the side of science . . . because we have a prior commitment, a commitment to materialism. It is not that the methods and institutions of science somehow compel us to accept a material explanation of the phenomenal world, but, on the contrary, that we are forced by our *a priori* adherence to material causes to create an apparatus of investigation and a set of concepts that produce material explanations, no matter how counter-intuitive, no matter how mystifying to the uninitiated. Moreover, that materialism is absolute, for we cannot allow a Divine Foot in the door.[8]

Eugenie Scott, a major figure in the formation of the *Kitzmiller* plaintiffs' legal personnel and strategy, has been a leading proponent of a rigid philosophy of materialism. She asserts a position that, from the outset, places theorists at a significant disadvantage, should their theories have possible metaphysical or theological implications: "Science has made a little deal with itself; because you can't put God in a test tube (or keep it out of one) science acts as if the supernatural did not exist. This methodological materialism is the cornerstone of modern science."[9] UCLA biochemist Richard Dickerson agrees. "Science [has] one overriding rule: Rule No. 1: Let us see how far and to what extent we can explain the behavior of the physical and material universe in terms of purely physical and material causes, without invoking the supernatural."[10]

Michael Ruse affirms such statements, further specifying that the materialist (naturalist) does not necessarily deny God's existence, because that issue should not even

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[7]Wm. A. Dembski, *The Design Revolution: Answering the Toughest Questions about Intelligent Design* (Downers Grove, IL: InverVarsity, 2004), 230; cf. *Supra*, chap. 2.

[8]Richard Lewontin, "Billions and Billions of Demons," *New York Review of Books* 44 (1997): 31.

[9]Eugenie Scott, "Darwin Prosecuted," *Creation/Evolution* 13 (1993): 43.

[10]Richard Dickerson, "The Game of Science: Reflections after Arguing with Some Rather Overwrought People," *Perspectives on Science and Christian Faith* 44 (1992): 137.

matter. "[I]n no sense is the methodological naturalist . . . committed to the denial of God's existence. It is simply that the methodological naturalist insists that, inasmuch as one is doing science, one avoid all theological or other religious references. In particular, one denies God a role in the creation."[11]

The late Harvard paleontologist Stephen Jay Gould was a vocal critic of creationism and any claim that mixes science and theology.[12] It is disputable whether ID is an actual violation of his "NOMA" principle. Non-Overlapping Magisteria emphasizes a strict separation between facts and values. Gould "demands separation between nature's factuality and man's morality."[13] Therefore, "Thou shalt not mix the magisteria by claiming that God directly ordains important events in the history of nature by special interference knowable only through revelation and not accessible to science."[14] However, legitimate ID science, distinct from creationism, makes no claims from special revelation and asserts that its arguments are accessible from historical scientific disciplines that Gould himself followed.[15]

Intelligent Design and Scientific Method

Gould's concerns are understandable if they pertain to explanations of nature that do not come from empirical investigation of nature itself but rather are directed by

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[11]Michael Ruse, "Methodological Naturalism Under Attack," in *Intelligent Design Creationism and its Critics: Philosophical, Theological, and Scientific Perspectives*, ed. Robert T. Pennock (Cambridge, MA: MIT Press, 2001), 365.

[12]A critique of the first edition of Phillip Johnson's *Darwin on Trial* is Stephen Jay Gould, "Impeaching a Self-Appointed Judge," *Scientific American* 267 (1992): 118-21.

[13]Stephen Jay Gould, *Rock of Ages: Science and Religion in the Fullness of Life* (New York: Ballantine, 1999), 189; cf. 210-11. Gould's "NOMA" is similar to Pennock's dichotomy of "merely naturalistic scientific truth" and "ontological (metaphysical) absolute truth." Monton explains his "discomfort" with Pennock's truth terminologies in Monton, *Seeking God in Science*, 64-65.

[14]Gould, *Rock of Ages*, 85; cf. 93-94.

[15]Meyer explains Gould's direct influence on his own methodology in Meyer, *Signature in the Cell*, 402. Also, whether or not Dembski's Fisherian method of statistical reasoning is logically defensible, it likewise does not violate Gould's NOMA principle nor the historical scientific disciplines.

dogmatic metaphysical and/or religious assumptions. Barbara Forrest's concerns would be equally understandable if it were true that ID implies that some events happen by "magic," as Dembski has interpreted her comments to mean. However, ID has proven to hypothesize from direct observations of natural phenomena. ID has also proven the ability to make predictions, tests, and adjustments to hypotheses based on problems inferred from those observations. Furthermore, Dembski makes a worthy argument when he says that the supposed dichotomy between what is "natural" and "supernatural" is exaggerated. When assuming to understand fully "what nature is like [as distinct from "the supernatural"] and what are the causal powers by which nature operates," materialists such as Forrest and Pennock can only beg the question.[16] Dembski also adequately refutes their common materialist criticism that ID explains design as "miraculous," with the definition of "miracle" as *counterfactual substitution*: "[A] natural cause was all set to make one thing happen but instead something else happened."[17] But ID makes no such claims, understanding that *human* design (as an analogue) can be inferred without assuming that some natural law has been broken, suspended, or interfered with. Likewise, ID can logically assert that an *unembodied* designer can design complex-specified phenomena without violating natural laws.[18]

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[16]Wm. A. Dembski, Expert Written Rebuttal, Kitzmiller et al v. Dover Area School District et al, 9 No. 04cv2688 (M. D. Pa. 2005). *Supra*, chap. 5.

[17]Dembski, *The Design Revolution*, 183.

[18]Monton makes coherent arguments against Pennock's critique of supernaturalism. Pennock asserts, "[A]llowing appeal to supernatural powers in science would make the scientist's task too easy, because one would always be able to call upon the gods for quick theoretical assistance. . . . Indeed, all empirical investigation beyond the purely descriptive could cease, for scientists would have a ready-made answer for everything." Furthermore, Pennock says that "supernatural hypotheses remain immune from disconfirmation."

Monton calls this argument "unfair." The same criticism could be applied to the materialist. Instead of simply appealing to empirical problems by saying "God did it," the materialist could simply say "chance did it," which would be equally unimpressive science. "[J]ust because the option of appealing to indeterminism is there, it doesn't follow that the option should always be used." Monton, *Seeking God in Science*, 62-63. Cf. Pennock, *Tower of Babel*, 195-96.

Pertaining to the assertion that supernaturalism cannot be disconfirmed (that it is not testable), Monton adds, "It does *not* follow that *any* supernatural hypothesis is immune from disconfirmation. A supernatural hypothesis can be specific about the nature of the supernatural being; a supernatural

Therefore, assuming that a scientist's method involves the extrapolation of hypotheses from observation of nature, and that predictions and tests are involved to confirm, refute, or modify hypotheses, attention to the scientist's religious motivations would be an unnecessary distraction in assessing his or her arguments. What matters instead is the content of the *evidence* related to hypotheses.[19] Therefore, Dembski's personal belief in the God of John's gospel (and the associated "Logos") is inference grounded on something other than the ground for his scientific claims. The "preferred candidate" of who or what designed any phenomena with signs of intelligence can be a topic bracketed outside of scientific evidence.[20] Moreover, even if a scientist's motive for pursuing science comes from his religion, that should not be a factor in considering the content of his scientific evidence. "Motive does not constitute content."[21] Motive should not skew how a researcher's scientific work—with relevant evidence—is weighed by colleagues, critics, or the public.[22]

Examples from history that prove this argument include the consequential accomplishments of Kepler, Galileo, and Newton. Their scientific work was undoubtedly grounded in their religious beliefs that universal laws, the orderliness and

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hypothesis need not be simply a general one that states that a supernatural agent exists. For example, the supernatural hypothesis could specify that God exists, and that God wants a universe with simple laws of nature. This supernatural hypothesis is subject to disconfirmation—we could discover that the laws are not simple." Monton, *Seeking God in Science*, 68.

[19]Dembski therefore posits that theistic evolution should be rejected, not because ID theorists practice theological favoritism, but because theistic evolution is bad science, based on materialism's inherent, unjustified limitation of evidence. Dembski, Expert Witness Rebuttal, Kitzmiller v. Dover, 23. *Supra*, chap. 2.

[20]Del Ratzsch, "How Not to Critique Intelligent Design Theory," *Ars Disputandi* 5 (2005): 12 [on-line]; accessed 16 August 2009; available from http://www.ArsDisputandi.org; Internet, PDF document, 14.

[21]Ibid.

[22]Del Ratzsch illustrates, "Someone might infer the existence of an alien designer from some artifact found on Mars, and that person might for independent reasons believe in Alpha Centaurians, and might be utterly convinced that the designer of the alien artifact was in fact Alpha Centaurian. That would not in the slightest mean that *Alpha Centaurian* was part of the content of either the initial inference or any of its premises or its conclusion." Ibid.

comprehensibility of these laws, and the ability of humans to make rational inferences from these laws were all part of the handiwork of a purposeful creator.[23] It is arguable that their scientific data supported their fundamental religious beliefs, but it is certain that their respective practices *were* and still *are* methodologically acceptable. Their theories were confirmed (or, in the case of Newton, at least made useful) by scientific evidence that was in no way dependent on their respective religious worldviews.

Intelligent Design science is likewise independent of any of its proponents' "creationist" worldviews, whether real or perceived. The euphemism of "Intelligent Design Creationism," commonly used by ID critics Barbara Forrest and Robert Pennock, is specious, irresponsible name-calling and can potentially deceive people with a novice understanding of the evolution-design controversy. Dembski has adequately explained that creationism asks deeper questions about nature and meaning. Creationism is grounded in certain metaphysical dogmas and theological beliefs from an authority outside of science, i.e., revelation from Scripture. On the other hand, ID engages in specific problems discovered by observing how natural phenomena are arranged—in Dembski's case, the particular problem of how to explain phenomena exhibiting Complex Specified Information (CSI). Explaining CSI as the product of design requires no prior or subsequent allegiance to any religious dogma—Christian or otherwise.

The scientific merit of Intelligent Design has also been proven to influential thinkers from completely *non*-religious worldviews, giving further evidence that religious worldviews of scientists are perfunctory to their respective theories' validity. A prominent example is how the evidence from Intelligent Design persuaded philosopher Anthony Flew, formerly an atheist, to affirm the existence of an intelligent mind behind

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[23]Contra Pennock's representation of Newton in *Tower of Babel*, Newton did not adhere to scientific materialism; he believed that God intervenes in the motions of our solar system. See Robert T. Pennock, *Tower of Babel: The Evidence against the New Creationism* (Cambridge, MA: MIT Press—Bradford, 1999), 205; cf. Isaac Newton, *Opticks*, Great Minds Series (Amherst, NY: Prometheus, 2003), 400. For this argument contra Pennock, also see Monton, *Seeking God in Science*, 63-64.

the universe.[24] Flew made profound conclusions after considering Intelligent Design as robust scientific theory, not religious rhetoric. This makes accusations about ID as disguised religion even more trivial.

Dembski's claim about Forrest's genetic fallacy is a convincing, logical rebuttal. There is no defensible reason why any idea, including ID, must be automatically rejected because of its origination—religious origination or otherwise. Dembski properly focuses his critique of Darwinism on its scientific logic, although, as he argues, Darwinism is historically connected to significant a priori assumptions in ethics, theology (or a-theology), and metaphysics. Moreover, statements and associations of some contemporary Darwinists prove that they themselves are anything but theologically neutral. An example that cannot be ignored is Forrest's association with the New Orleans Secular Humanist Association, as Dembski aptly notes.

Although there is no conclusive method of science, there are notable commonalties between various schemata.[25] ID uses many of these common steps in

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[24]Gene Edward Veith, "Flew the Coop: How a Prominent Atheist Philosopher Made the Revolutionary Decision to Become a Theist," *World*, 25 December 2004, 22.

[25]Campbell and Reece's biology textbook states, "Science seeks natural causes for natural phenomena. This limits the scope of science to the study of structures and processes that we can observe and measure, either directly or indirectly with the help of tools such as microscopes that extend our senses. This dependence on observations that other people can confirm demystifies nature and distinguishes science from supernatural explanations. Science can neither prove nor disprove that angels, ghosts, deities, or spirits, both benevolent and evil, cause storms, rainbows, illnesses, and cures, for such explanations are outside the bounds of science." The authors propose a method that begins with an observation that leads to a question, which leads to a hypothesis. Prediction is made from the hypothesis that can then be tested by experiment or additional observation. This test will then either support the hypothesis, leading to additional predictions and tests, or the test will not support the original hypothesis, requiring its revision or replacement. Neil A. Campbell and Jane B. Reece, *Biology* (San Francisco: Benjamin Cummings, 2002), 16-17.

Another textbook also separates scientific questions from ones that are pseudoscientific—often religious. "The external world, not internal conviction, must be the testing ground for scientific beliefs. Systematic observations, hypotheses, predictions, tests—in all these ways, science differs from systems of belief that are based on faith, force, or simple consensus." This book, however, contains an ungrounded assumption about metaphysical knowledge: "Why do we exist, for what purpose? Why does any one of us have to die at a particular moment? Answers to such questions are subjective—they come from within us, as an outcome of all the experiences and mental connections shaping our consciousness. Because people differ vastly in this regard, subjective answers do not readily lend themselves to scientific analysis." Cecie Starr, *Biology: Concepts and Applications*, 3rd ed. (Belmont, CA: Wadsworth, 1997), 13.

As mentioned in chapter 2 of the present thesis, the National Academy of Sciences has defined science in contradistinction from a perceived "creationist" view. This definition also posits an adherence to

confirming design inferences. Meyer argues that ID is justified since it advances from "a rigorous application of the logical and methodological guidelines" of the "historical sciences."[26] He gives six main reasons for demarcating ID as legitimate science: ID is based on empirical evidence, its advocates use established scientific methods, it is testable, it exemplifies historic scientific reasoning, it addresses a specific question in evolutionary biology (How did the appearance of design in living systems arise?), and ID is supported by peer-reviewed scientific literature.[27]

Meyer uses this model of reasoning to explain signs of design in the DNA molecule. Dembski, on the other hand, employs a Fisherian approach to statistical reasoning (discussed in chapter 5) to eliminate chance and confirm that designing intelligence is behind complex-specified phenomena.

With these historically proven, empirical processes, ID's leaders are committed to following the evidence where it leads, even if it leads to inference of a designing mind as the ultimate cause of complex-specified sequences, which in turn has obvious theological implications. They agree that it is unjustifiable to preclude or ignore the results of their methods simply because of any incidental religious correlation. To do so is to stop defensible methodology that advances true science.

ID theorists have proven that Intelligent Design science has the historical methodological qualities of predictability and testability. They have predicted what kinds

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falsifiability: "In science, explanations must be based on naturally occurring phenomena. Natural causes are, in principle, reproducible and therefore can be checked independently by others. If explanations are based on purported forces that are outside of nature, scientists have no way of either confirming or disproving those explanations. Any scientific explanation has to be *testable*—there must be possible observational consequences that could support the idea *but also ones that could refute it*. Unless a proposed explanation is framed in a way that some observational evidence could potentially count against it, that explanation cannot be subjected to scientific testing." National Academy of Sciences (NAS)(U.S.) and Institute of Medicine (U.S.), *Science, Evolution ,and Creationism: A View from the National Academy of Sciences and the Institute of Medicine* (Washington: National Academies, 2008), 10. Emphasis in the original

[26]Meyer, *Signature in the Cell*, 402. Cf. Stephen Jay Gould, "Evolution and the Triumph of Homology: Or, Why History Matters," *American Scientist* 74 (1986): 60-69.

[27]Meyer, *Signature in the Cell*, 403-15.

of informational residues would be discovered, should a designing agent be at work in nature. They have also predicted that nature is full of examples of specified complexity that signify intelligence. Experiments are then conducted to test these predictions and determine empirically that design hypotheses are justified in explaining certain phenomena.

A tested example that has confirmed the existence of specified complexity in nature is the irreducibly complex bacterial flagellum. Microbiologists Michael Behe and Scott Minnich have used legitimate scientific methodology to prove that such systems are the products of design, inexplicable by Darwinian chance models.[28] Behe and Minnich have used genetic reverse-engineering ("knock out") techniques to determine if these supposed irreducibly complex organisms indeed require all their parts to be in place, working in concert, so that the organisms of which they are a part can function and survive.[29]

Inference to the Best Explanation

In determining that phenomena with CSI must come from a designing intelligence, ID theorists are making inference to the best explanation. Ironically, this is

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[28]The gradual process of Darwinian evolution provides no explainable pathway for any irreducibly complex system to function and survive; the system would not be able to remain functional as each part within the system gradually evolved, leaving the system little if any chance to be naturally selected. Moreover, recent opposition to the theory of irreducible complexity has been indefensible, especially the argument related to the bacterial Type III secretory system (TTSS), which contains a protein pump that resembles the flagellum. It has been argued that the flagellum evolved from the TTSS. However, no researcher has proposed a tenable Darwinian pathway for this to happen. To the contrary, evidence better supports the hypothesis that the opposite occurred—the TTSS was derived from the flagellum—through *de*volution. See Michael J. Behe, *The Edge of Evolution: The Search for the Limits of Darwinism* (New York: Free Press, 2007), 267-68. Also see Wm. A. Dembski and Jonathan Wells, *The Design of Life: Discovering Signs of Intelligence in Biological Systems*, ed. Wm. A. Dembski (Dallas: Foundation for Thought and Ethics), 154-55.

Therefore, since design is the only viable alternative in explaining survivability of irreducibly complex systems, Behe and Minnich have answered a challenge posed by Darwin himself: "If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down." Charles Darwin, *The Origin of Species by Means of Natural Selection* (Buffalo, NY: Prometheus, 1991), 139.

[29]Minnich mentioned his genetic knockout experiments performed on the bacterial flagellum during his *Kitzmiller* testimony. Day 20, afternoon session, Kitzmiller v. Dover, 99-108.

similar to the methodology of Charles Lyell, who significantly influenced the method of Charles Darwin. Darwin sought the *vera causa*, or "true, known, or actual cause" of a past event.[30] This involved consideration of "causes now in operation" in order to infer how causes operated in the past. "The present is the key to the past."[31] Likewise, leading ID theorists have used similar logic and determined that the only known cause of specified information in nature is intelligent, purposeful agency. After an arduous search through historical scientific explanations, Meyer has determined:

> Undirected materialistic causes have not demonstrated the capacity to generate significant amounts of specified information. At the same time, conscious intelligence has repeatedly shown itself capable of producing such information. It follows that mind—conscious, rational intelligent agency—what philosophers call "agent causation," now stands as the only cause known to be capable of generating large amounts of specified information starting from a nonliving state.[32]

Meyer and ID colleague Scott Minnich agree that "in all irreducibly complex systems in which the cause of the system is known by experience or observation, intelligent design or engineering played a role [in] the origin of the system."[33]

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[30]Meyer, *Signature in the Cell*, 160.

[31]Ibid. This is the principle of uniformitarianism. Meyer writes, "[B]y invoking design to explain the origin of new biological information, contemporary design theorists are not positing an arbitrary explanatory element unmotivated by a consideration of the evidence. Instead, they are positing an entity possessing precisely the attributes and causal powers that the phenomenon in question requires as a condition of its production and explanation." Stephen C. Meyer, "The Origin of Biological Information and the Higher Taxonomic Categories," in *Darwin's Nemesis: Phillip Johnson and the Intelligent Design Movement*, ed. Wm. A. Dembski and Jed C. Macosko (Downers Grove, IL: InverVarsity, 2006), 203. This is a reprint of the article in *Proceedings of the Biological Society of Washington* 117 (2004): 213-39.

[32]Meyer, *Signature in the Cell*, 341. Meyer posits how much specified information or complexity that the minimally complex cell would have to have before it inferred design. "[A]ssuming a nonbiological starting point . . . , the de novo emergence of 500 or more bits of specified information will reliably indicate design." Meyer's 500 bits of information is derived from Dembski's universal probability bound of 1 chance in 10^{150} of the universe's probabilistic resources for originating "any specified sequence or system." Ibid., 541 n. 27. In other literature explaining purposeful agency as the "best explanation" for complex-specified sequences, Meyer writes that "[a]gents can arrange matter with distant goals in mind. In their use of language, they routinely 'find' highly isolated and improbable functional sequences amid vast spaces of combinatorial possibilities." Stephen C. Meyer, "The Cambrian Information Explosion," in *Debating Design: From Darwin to DNA*, ed. Wm. A. Dembski and Michael W. Ruse (New York: Cambridge University Press, 2004), 388.

[33]Scott A. Minnich and Stephen C. Meyer, "Genetic Analysis of Coordinate Flagellar and Type III Regulatory Circuits in Pathogenic Bacteria," in Dembski and Macosko, *Darwin's Nemesis*, 222. This is from a reprint of *Proceedings of the Second International Conference on Design & Nature, Rhodes Greece* (Billerica, MA: WIT Press, 2004), 8.

Dembski's Legitimate Method

Dembski's Design Inference (DI) also operates under the principle of "inference to the best explanation."[34] The DI is based on the ability of the scientist to observe a phenomenon and infer whether it is the product of a designing agent; the scientist's understanding of human and animal intelligence and the residues this intelligence produces allows for the most immediate, tenable explanation. According to Dembski, "[t]he principal characteristic of intelligent agency is *directed contingency*, or what we call *choice*. Whenever an intelligent agent acts, it chooses from a range of competing possibilities."[35] The contingency is referred to as "directed" because it must conform to an independently given pattern. The contingency (or "choice") thereby leaves a discernible residue of design, namely, complex-specified information. "[T]he defining feature of intelligent causes is their ability to create novel information and, in particular, specified complexity."[36] Thus, Dembski's DI demonstrates how Intelligent Design is a theory of information that seeks various information-rich signs of intelligence in nature. "[I]nformation becomes a reliable indicator of design as well as a proper object for scientific investigation."[37] Dembski's program is therefore another example of ID's scientific legitimacy because of its use of a noted historical discipline. Inference to the best explanation allows signatures of human and animal intelligences to serve as useful analogues in discovering signatures of design from an unembodied intelligence. Dembski's general work of inferring design is then applied by his ID colleagues in their

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[34]While on the witness standing during *Kitzmiller*, Minnich also stated that the design hypothesis is the "best explanation" for the origin of irreducibly complex living organisms. Day 21, morning session, Kitzmiller v. Dover, 11.

[35]Wm. A. Dembski, *The Design Inference: Eliminating Chance through Small Probabilities* (New York: Cambridge University Press, 1998), 62. Emphasis in the original.

[36]Wm. A. Dembski, *No Free Lunch: Why Specified Complexity Cannot Be Purchased without Intelligence* (Lanham, MD: Rowman & Littlefield, 2002), xiv.

[37]Wm. A. Dembski, "Intelligent Design as a Theory of Information," in *Intelligent Design Creationism and Its Critics: Philosophical, Theological, and Scientific Perspectives*, ed. Robert T. Pennock (Cambridge, MA: MIT Press, 2001), 553.

respective inductive research pertaining to particular complex-specified systems, including the code in DNA (Meyer's specific expertise), and irreducible complexity in microbiology (Behe and Minnich's expertise).

The DI vs. Forrest and Pennock

The above description of the Design Inference and the DI's application to other Intelligent Design programs is sufficient ground for Dembski and other ID researchers to assert that they are indeed engaged in real *scientific* study. Forrest certainly takes Dembski's own words out of context when she implies that he had confessed ID's lack of scientific production.

She also misleads in her claim that ID lacks respectable academic publication.[38] This assertion is refuted by (1) the publication of Dembski's most important work, *The Design Inference*, peer-reviewed as part of the Cambridge Studies in Probability, Induction, and Decision Theory; (2) the publication of Stephen C. Meyer's peer-reviewed paper in *The Proceedings of the Biological Society of Washington* (which resulted in much criticism against the journal's editor);[39] (3) the publication by the Free Press of New York of the peer-reviewed book *Darwin's Black Box* by Michael Behe; (4) presentation of Minnich and Meyer's peer-reviewed paper, "Genetic Analysis of Coordinate Flagellar and Type III Regulatory Circuits in Pathogenic Bacteria," in *Proceedings of the Second International Conference on Design & Nature, Rhodes Greece* in 2004; and several other examples.[40] All of these examples were published before Forrest's participation as a witness for the *Kitzmiller* trial in 2005.

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[38]In addition to making this claim during the *Kitzmiller* trial, she told a national newspaper before the trial that ID researchers "aren't published because they don't have any scientific data." Dan Vergano and Greg Toppo, "'Call to Arms' on Evolution," *USA Today*, posted 23 March 2005 [on-line]; accessed 15 August 2009; available from http://bit.ly/sLas0; Internet.

[39]*Supra*, chap. 2 n. 25. The controversy behind the publication of the article, "The Origin of Biological Information and the Higher Taxonomic Categories," is explained by Thomas Woodward, *Darwin Strikes Back: Defending the Science of Intelligent Design* (Grand Rapids: Baker, 2006), 26-27.

[40]See other examples referenced in Meyer, *Signature in the Cell*, 412.

Pennock inaccurately describes ID as a negative program devoted to disproving Darwinism, while offering no positive evidence to advance its hypotheses. Although Dembski's work involves developing statistical evidence to rule out chance hypotheses for explaining CSI, to characterize this evidence as "negative" is an abuse of semantics. Dembski also adequately responds to Pennock's claim that, for ID to become legitimized, it should obtain knowledge of specific design intentions, thereby allowing us to know the "rules of the game" behind intelligent agency from an unembodied designer. Dembski correctly answers that this is logically impossible, since the aspect of *creative innovation* inherent in acts of design makes the intentions of the designer unobservable, unpredictable, untestable, and therefore unobtainable. Notwithstanding, the residue of design (that is to say, CSI) *can* be discovered and analyzed within legitimate scientific methodology.

Contra Pennock's assertions, ID is in no way dependent on beliefs about a supernatural God and is therefore adequately capable of testing its hypotheses. Dembski is correct in asserting that ID surpasses Darwinism in ability to advance from testable outcomes. Theoretically, ID falls within the scientific demarcation criterion of *refutability*, while failures of Darwinism continue to be rationalized extraneously. ID also meets the criterion of *confirmability*, with nature's massive resource of systems that can potentially be proven to contain CSI. Darwinists, on the other hand, have not proven how the principal theory of *macro*evolution is confirmed by *micro*evolution. Although Dembski correctly argues that a designer's *creative innovation* implies that there is an obstacle for ID's ability to make *predictions*, predictions are still made and confirmed. A leading example is Behe's and Minnich's research in irreducibly complex bacterial systems confirming the existence of CSI that Dembski and others have predicted. But Darwinism is incapable of predicting where evolutionary processes will lead and what kinds of adaptations will occur in the future. And finally, ID's "design theoretic tool chest" allows it to have more *explanatory power* than Darwinism, which by default is

limited to non-designed forces of chance and necessity.[41] It is forced to circumvent the fascinating opportunities of discovery that teleological explanations could otherwise disclose with legitimacy.

Dembski also gives adequate response to Pennock's criticism of ID as effect to cause reasoning. This is a proper form of induction when the scientist needs to compare alternative explanations. It also enables the scientist to recognize conspicuous patterns in effects that can prompt relevant questions. Finding problems that incite relevant questions and curiosities are a fundamental step in any proven scientific method. Pertaining to Pennock's Zeus analogy of effect to cause reasoning, the fact that ancient people might have inferred that lightening bolts came from Zeus fails to illustrate ID science and the salient patterns within nature that it investigates.

Dembski has reasonably defended his general philosophy of probabilistic reasoning and his specific assignments of probability to various phenomena—all of which Forrest and Pennock are skeptical. His explanation of probabilistic resources (both replicational and specificational), give credence to his theorems. Should he lack defensible precision in explaining some probabilities in his argument, such as with the *universal probability bound*, such imprecision would not defeat the validity of his broad argument. His conservative probability estimates (based on reputable secondary support) are still useful in arguing for the universe's limited probabilistic resources for generating CSI from chance.

Although Dembski's defense of his general Fisherian approach to statistical reasoning does not completely defeat the Bayesian approach, he proves the Fisherian approach to be practicable for eliminating chance hypotheses and confirming design hypotheses with defensible probabilistic arguments. Any exhaustively comparative approach (i.e., Fitelson et al's Bayesian reasoning) is unnecessary to confirm design hypotheses. It is both unnecessary and logically impossible to rule out all chance

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[41]Dembski, *Design Revolution*, 290. *Supra*, chap. 5, 165.

hypotheses before accepting design. This is partly because probabilities cannot be applied to design in the same way that they can be applied to natural laws; a designer's *creative innovation*, with its unprecedented novelty, is far beyond the probabilistic demands imposed by the excessively comparative induction of the Bayesian. The Fisherian approach, on the other hand, is capable of inferring design (of a system with CSI) after reasonably ruling out enough "families" of chance hypotheses. Furthermore, Dembski convincingly argues that it is not necessary for a design hypothesis to explain an event's causal history in order for the hypothesis to have merit.

Forrest (with co-author Gross) and Pennock's respective critiques of the explanatory filter's logic from physical laws are specious because they misinterpret the filter. They attempt to prove that Dembski, with his claim of design being the "set theoretic compliment" of chance and necessity, overlooks the harmonious workings of chance and necessity as they produce the appearance of design. However, Dembski argues that the filter's process does not contradict any plausible interrelated processes of chance, necessity, and design. Instead, it is justified that the filter be used to examine some particular mode of causation over the others. His illustration of a rusty automobile proves that chance (i.e., where rust will appear on the car), necessity (i.e., laws of weathering, oxidation, gravity, etc.), and design (i.e., the fact that the car was designed) are all justified and harmonious modes of causation that explain the automobile's appearance, but the observer is warranted in having specific *points of interest* that will direct his observations. The explanatory filter facilitates these variable points of interest in determining whether a phenomenon exhibits specified complexity.

Dembski's application of the Law of Conservation of Information is useful in explaining how the problem of information in CSI cannot be completely solved theoretically without locating its intelligent source. With his recent work in Evolutionary Informatics, he is developing robust arguments that debunk Darwinists' use of evolutionary algorithms to demonstrate cumulative selection in nature. Arguments from

these computational models should be discounted because there is no proven correlation between the "behavior" of digital organisms and that of real biological organisms in nature. More significantly, Dembski's work with Robert Marks is demonstrating the teleological nature of these algorithms. The algorithms operate with unaccounted for, active information imputed on null searches by alternative searches that enable the search's target to be attained within workable probability. Furthermore, Pennock's own example of cumulative selection from a basic theoretical algorithm, a replicating generational telephone dialer, proves to have the same problem of inherent teleology, making the example insufficient in demonstrating cumulative selection as design-free.

Conclusion

As with any promising scientific program, Dembski's DI requires clarifications, improvements, and advancements. First, Dembski should submit a more systematic response to the influential critique of the DI by Fitelson et al. Dembski's initial reply in the year 2000 to the 1999 critique is generally lucid, but is difficult to follow in terms of how it addresses specific issues raised by Fitelson et al.[42] In his brief response to Fitelson et al, "Another Way to Detect Design," Dembski states that the DI "is not *purely* eliminative." He later explains what that means in terms of Fisherian methodology in *No Free Lunch* and *The Design Revolution*. However, a point-by-point response to Fitelson et al could posit a more conclusive defense of his Fisherian approach (as basically eliminative) against the *comparative* approach followed by Fitelson et al and many of his other critics.

Secondly, regarding Dembski's new area of work that analyzes evolutionary algorithms, he must give convincing answers to biologist Kenneth Miller (and perhaps others) who claims to explain the active information that results from these computer simulations, particularly Thomas Schneider's Ev simulation. Can this active information

[42]Wm. A. Dembski, "Another Way to Detect Design?" Metanexus Institute website [on-line]; accessed 8 August 2009; available from http://bit.ly/33wnTo; Internet.

be adequately explained by the simple, natural concepts of "selection, replication, and mutation?"[43] For his program to advance impressively, Dembski's future argumentation must answer such challenges with clarity. Darwinism's explanatory power could be further weakened, should Dembski robustly explain how evolutionary processes "merely shuffle around preexisting information" instead of "generating it from scratch."[44]

Space does not allow adequate treatment of all of the informal fallacies used by both Forrest and Pennock in their respective critiques of Dembski; those committed by Forrest (and co-author Gross) are especially numerous.[45] Nevertheless, from the survey of Forrest and Pennock's collective arguments against Dembski and subsequent analysis, the present research proves that they have failed to defeat the Design Inference. More specifically, the focal concept in Dembski's program, *specification*, maintains its appeal.

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[43]Kenneth R. Miller, *Only a Theory: Evolution and the Battle for America's Soul* (New York: Viking, 2008), 77-78.

[44]Wm. A. Dembski and Robert J. Marks, "Life's Conservation Law: Why Darwinian Evolution Cannot Create Biological Information," with publication forthcoming from *Evolutionary Informatics Lab* [on-line]; accessed 7 August 2009; available from http://evoinfo.org/Publications/Life.html; Internet, 12.

[45]Dembski has explained a genetic fallacy by Forrest regarding the origination of some ID ideas from their proponents' religious beliefs. *Supra*, this chap. and chap. 5.

Trojan Horse contains much rhetoric against the attitudes and styles of Dembski and other ID leaders. Forrest and Gross's critique of Dembski is full of broad conclusions without adequately examining his specific arguments in detail. For example, in supporting Hume's argument against miracles, they write that "there has not been a successful creationist counter to Hume's basic argument; nor has there as yet been a convincing counter-argument from Dembski, who, among all the CRSC troops, has had to try hardest and most often to counter it." However, Forrest and Gross do not disclose any details of Dembski's (persistent?) contra-Hume argumentation. They are confident that concerned readers need not waste concern over particular facts of the matter. With a fallacious appeal to the majority, the book says, "Had there been a convincing counter-argument, every philosophy department in the world would be emphasizing it in the introductory course!" Barbara Forrest and Paul R. Gross, *Creationism's Trojan Horse: The Wedge of Intelligent Design* (New York: Oxford University Press, 2004), 121.

In another appeal to the majority from a different Forrest publication, she writes with Glenn Branch, "Dembski also gratuitously invokes the laurels, boasting of his correspondence with a Nobel laureate, bragging that one of his books was published in a series whose editors include a Nobel laureate, and exulting that the publisher of the intelligent design book *The Mystery of Life's Origin* also published books by eight Nobel laureates. In contrast, during the [*Edwards v. Aguilard*] case, seventy-two Nobel laureates endorsed an amicus brief that noted that the 'evolutionary history of organisms has been as extensively tested and as thoroughly corroborated as any biological concept.'" Barbara Forrest and Glenn Branch, "Wedging Creationism into the Academy: Proponents of a Controversial Theory Struggle to Gain Purchase within Academia. A Case Study of the Quest for Academic Legitimacy," *Academe* (January-February, 2005) [on-line]; accessed 22 June 2009; available from http://www.aaup.org/AAUP/pubsres/academe/2005/JF/Feat/forr.htm; Internet.

Articulating *specification* as a defensible concept in nature and proving how it can be observed in numerous complex, information-rich systems is what makes Dembski's thought distinct from most other theorists—ID theorists or otherwise. Nevertheless, Forrest's definition of the argument from design—*written in* Trojan Horse's *main section about Dembski*—fails to include this central concept. She writes (with Gross):

> For our purposes, the argument from design, ancient or modern, is just this: human life, all its component organisms, and their component parts, are too complex and too clearly the products of an antecedent *idea* (their complexity, in other words, is not random). They manifest a purpose. They are too much like things that we *know* to have been designed to have risen without external guidance of the process. Therefore, they cannot have arisen in nature spontaneously, that is, "by chance."[46]

Contrary to this definition, Dembski is not restating old arguments from design. Forrest and Gross are practicing weak scholarship in not adequately conveying *specification* early in their definition of ID as it relates to Dembski. Mentioning design's relationship to "an antecedent *idea*" implies specification in a sense that is far too vague. Therefore, typical readers would likely not understand a definitive distinction between historic arguments from design and ID's advanced concepts.

As the present research has demonstrated, it is inaccurate to characterize contemporary ID—including Dembski's Design Inference in particular—as disguised religious rhetoric. When he constructs his theorems, Dembski does not presume the existence of God or some kind of supernatural realm that exists independent of nature. He does however claim that his theorems confirm the existence of *intelligence* behind certain observable phenomena. Any subsequent consideration of a mind or minds existing independent of observable cause-effect events would be perfunctory; how Dembski opines of the plausible properties of such a mind or minds is irrelevant to his theorems proper.

It is logically possible that future scrutiny could defeat the Design Inference. Its present power to explain nature's abundance of specified complexity could

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[46]Forrest and Gross, *Trojan Horse*, 119. Emphasis in the original.

conceivably be overridden by a competing hypothesis. However, the collective rhetoric of Forrest and Pennock, both inside and outside the *Kitzmiller* trial, fails to debunk the Design Inference. Notwithstanding, their significant influence on Judge Jones's opinion that impugned Dembski's program and ID in general as pseudoscience is unfortunate.

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ABSTRACT

THE SCIENTIFIC VIABILITY OF W. A. DEMBSKI'S DESIGN INFERENCE: RESPONSE TO B. FORREST AND R. PENNOCK OF THE *KITZMILLER* TRIAL

Franklin Todd Belcher, Ph.D.
The Southern Baptist Theological Seminary, 2009
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This dissertation argues that philosophers Barbara Forrest and Robert T. Pennock fail to discredit William A. Dembski's Design Inference as a legitimate scientific program.

Chapter 1 is the introduction, explaining the problem and the research methodology used in the dissertation to ascertain a conclusion.

Chapter 2 is a background survey and analysis of contemporary Intelligent Design (ID) theory and Dembski's part within the overall schemata of the Intelligent Design enterprise.

Particular aspects of Dembski's Design Inference framework and its corresponding "explanatory filter" are explained in Chapter 3.

Both Forrest and Pennock had significant influence on the judge's final opinion in the *Kitzmiller v. Dover* trial, which brought serious scrutiny against ID's scientific merit. Criticism against Dembski was an important part of Forrest and Pennock's respective expert testimony against ID. Based on this trial testimony and their respective academic writings, Chapter 4 therefore argues for the legitimacy of Forrest and Pennock as influential critics when considering Dembski's scientific relevance. The chapter also surveys their substantive arguments against Dembski.

Dembski's own response to the categorical criticisms by Forrest and Pennock are addressed in Chapter 5.

The concluding analysis is in Chapter 6, arguing that Dembski's Design Inference maintains as viable science, despite the critiques by Forrest and Pennock.

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