Chapter One

ARGUMENTS

> People sometimes say that you must believe in feelings deep inside, otherwise you'd never be confident of things like 'My wife loves me'. But this is a bad argument. There can be plenty of evidence that somebody loves you. All through the day when you are with somebody who loves you, you see and hear lots of little tidbits of evidence, and they all add up. It isn't purely inside feeling, like the feeling that priests call revelation. There are outside things to back up the inside feeling: looks in the eye, tender notes in the voice, little favors and kindnesses; this is all real evidence.
>
> Richard Dawkins

WHAT THIS BOOK IS ABOUT

In the fall of 1975 I had a truly life changing experience. The previous spring I had been admitted to the graduate program in philosophy at the University of California, Riverside. That next fall I began work for Professor Larry Wright as a Teaching Assistant in his Critical Thinking course. It was there that I first learned about Inference to the Best Explanation as a tool for assessing evidential quality. This discovery has greatly influenced both my professional research and my teaching. The purpose of this book is to share with you this tool. One that I believe is valuable not just in academic contexts, but practical and professional ones as well.

The sentence to follow this one is the most important in the entire book. ***This book is about one, and only one thing – how to make evaluations about quality of evidence.*** I hope you will take me at my word here. If all goes well, you will learn lots of things in the course of the next several chapters – some history of science, debates about global warming and the death penalty, and even a little philosophy of religion. But that is all secondary. Each chapter builds on this one goal – assessing evidence. I will lay out a technique – what I will be calling a "recipe" for making qualitative judgments about evidence. I don't expect this technique to change your life the way it did mine, but I do think it is one you will find useful well beyond to confines of this course.

THE IMPORTANCE OF ARGUMENTS

I am in an unusual career where arguments dominate my professional life. I am paid to teach my students what philosophers have had to say on a great array of topics. Almost always these philosophers, whether they are the historical "biggies," or contemporary thinkers, support their theories with arguments. Obviously, if I am going to do my job, I need to help my students sort out the good arguments from the bad. As a professor, I also participate in what is called "shared governance," and as a consequence, I am required to vote and help decide policies, curricula, and other matters of university importance. Administrators and my colleagues consistently defend position of great significance to Eastern with impassioned arguments. Since I take this part of my profession very seriously, I find it essential to decide which of these arguments I find most persuasive.

Most of us are not simply consumers of arguments, we are producers as well. In my own professional work I present and defend theories about privacy, the Constitution,

the death penalty, the existence of God, and a number of other philosophically, politically, and legally controversial topics. As an active participant in shared governance, I take sides, advocate positions, and occasionally lead the charge for particular causes. All of this demands that I defend my views. In these cases it is my name on the argument, and there is a heightened sense, not just of ownership, but of personal and professional responsibility. I need my arguments to be as strong as they can be – not just convincing, but plausible, and hopefully pointing in the right direction.

Your life may not be as argument-intensive as mine, but if you stop to reflect a bit, I think you'll find arguments all around you. Advertisers make arguments for why you should buy their products, and politicians for why they deserve your vote. You may need the advice from accountants and economists, hopefully backed up with arguments, to plan for a major business investment, or your retirement. And you are a producer of arguments, as well. That memo you wrote to your boss for a change in the way things are done, or the case you just made to your partner about the need to buy a new car.

This book is about arguments and a suggested technique for distinguishing good arguments from bad ones. These general hints are intended to be of use both when you find yourself in the position of the consumer of an argument, and must make some decision about the quality of its evidence, as well as when you are the producer of the argument, and desire to present the strongest evidence you can. I don’t claim to have a magic bullet that will automatically show us the truth about complicated issues. But I think you will be pleasantly surprised at how often this technique proves useful for thinking through these issues, finding out where you stand, and even beginning the process of formulating your own arguments about them.

WHAT IS AN ARGUMENT?

One potentially misleading aspect in some of my examples above is that when it comes to controversial issues like abortion or the death penalty tempers can be high. And trust me, debates about curriculum or university policy can be just as emotionally explosive. There is a perfectly fine use of the word ***argument*** that basically means a verbal fight. Joe and Sally got into a terrible argument about his failure to do his share of the house cleaning. That is not what we will mean by the term, however. Sure, there will be times when arguments are very important, and disagreements about their strength or weakness will touch our emotions as much as our reason. There will be many other times, however, where arguments are simply there for our consideration, and we can assess them free of any passion or personal commitment. And, indeed as much as is possible, I would recommend adopting the more dispassionate approach, even when you feel strongly about what is at issue.

It is useful to see an argument as a complex arrangement of three quite different things. There will be what logicians call a ***conclusion*** – some theory, hypothesis, or position that the argument seeks to defend. There will be ***premises*** – facts, data, or evidence that the argument uses to support the conclusion. And there will be a relationship between the premises and conclusion whereby the conclusion ***follows from*** the premises. We can schematically represent an argument as follows.

e_1. Premise
e_2. Premise
e_3. Premise
...
e_n. Premise
==========
t_0. Conclusion

Let's begin at the bottom. Every argument will have a ***conclusion*** – that's part of the definition of an argument. When we put an argument in what we will be calling its ***schematic form*** it will always come at the end, under the double lines (sometimes just a single line). But in the real world of arguments we should treat the term conclusion as technical jargon. Conclusions don't always come at the conclusion of a person's argument. Sometimes they come at the beginning.

> ***Dick's cheating on Jane***. He told her he had to work late, but Sally saw his car at Joe's Bar. Not only that, he leers at other women, and the last three times she called him he didn't answer.

Sometimes they come in the middle.

> Charlie's take-home exam was word-for-word identical to Sarah's. Clearly, ***Charlie copied it from Sarah***. The guy's a loser, never comes to class, and doesn't know how to write very well.

And, of course, some of the time they are at the end.

> The light from virtually every galaxy is "red-shifted." This shows that every galaxy is moving away from every other galaxy.

Therefore, ***the physical universe is expanding***.

I have used the lower-case letter, t, in my schematic representation to stand for ***theory***. The subscript, "0," is used to do two jobs. Although there is only one theory defended in the argument's conclusion (though, that single conclusion can be complicated and composed of many parts – "therefore, Jake did it, or helped plan it, or someone read his diary"), we will need to keep track of other possible theories besides the one defended in the argument. So "0" can be understood as the number zero and starting a sequence of numbered theories. But, the "0" can also be read as the letter, "o," and standing for ***original*** – the original theory or conclusion in the argument.

To standardize things, we will use the lower-case letter, "e", to stand for an individual bit of ***evidence***. There are no set numbers of premises, or parts of the evidence, in an argument. Sometimes there will be just a single datum, and sometimes there will be quite a bit of supporting data. The examples above illustrate not just that conclusions can come in many places in the statement of an argument, but that the same holds true the statements of the evidence.

Let's recast our schematized argument in terms of evidence for a theory.

e_1. Evidence (datum)
e_2. Evidence (another datum)
e_3. Evidence (another datum)
...
e_n. Evidence (another datum)
==========
t_0. Theory

LOGICAL CONNECTION

We've said a bit about the top and the bottom in our schematic representation of an argument. What about those conspicuous double lines? In good arguments the conclusion ***follows from*** the premises; the evidence ***supports*** the theory. What exactly is this relationship of support or following from? That turns out to be a very controversial issue in both philosophy and mathematical logic.

In some cases the relationship is ***semantic***. If we just understood enough about the meanings of all the words in the premises, we would see that the conclusion has to be true. Often the examples are pretty trivial.

e_1. The number is even.
e_2. The number is greater than seventeen.

---

t_0. The number is not prime.

Other times, however, there's quite a bit of information hiding in the premises, and the conclusions are a little surprising and quite significant.

e_1. The figure is a plane triangle.

---

t_0. The interior angles of the figure equal exactly 180^0.

Arguments of the above type have a technical name. They are called ***deductive arguments***. In a successful deductive argument, the relationship between the premises and conclusion (it's artificial here to call them evidence and theory) is a very special one. Logicians call it ***validity***. Valid arguments are ones where, ***if*** the premises are true,

the conclusion ***has to be true***. We will use a single line between premises and conclusions to indicate a proposed deductively valid argument. Many colleges and universities have whole courses on deductive (or symbolic) logic. Very sophisticated techniques are developed for determining validity. We will not spend time reviewing this material because as interesting (and just plain fun) as it is, one almost never finds deductive arguments being put forward outside of academic philosophy and mathematics.

A second way of connecting premises to conclusions relies on the technical fields of mathematics and statistics. We cannot as conveniently ignore these arguments, since they play huge roles in contemporary science. Our approach to them, however, will be a little indirect. Rather than going through the basics of ***probability theory***, and then developing statistical tests for making sense of numerical data, we will treat these arguments as special cases of ***inductive arguments***. This jargon simply means that the argument claims that the conclusion ***follows from*** the premises, but ***not*** deductively. That is, it is possible for the premises to be true, yet the conclusion can turn out to be false. Now, of course, it should be relatively rare that in good inductive arguments, the premises would be true, and the conclusion false, otherwise these arguments will not be very useful. It is a matter of great controversy in logic, philosophy, and even the sciences, as to how we describe this relationship between evidence and theories. The rest of this book is devoted to showing you one way of characterizing this relationship.

INFERENCE TO THE BEST EXPLANATION

Consider the three short examples above. We had purported evidence that Dick was unfaithful – the excuse about being sick, the car outside the bar, and missed phone calls. We had purported evidence about the copied take-

home exam – the word-for-word identical submissions, Charlie's chronic absences, and his failures as a writer. Finally, we had the evidence about the expanding universe – the red-shifted light from distant galaxies. In each of these cases, the suggested theory ***explains*** significant parts of our evidence. Charlie being a cheater doesn't explain his bad writing, but it sure helps us understand how the two exams ended up being the same. Dick's cheating (in a very different way) would explain why he was at the bar when he said he was sick. And an expanding universe explains the "Doppler shift" we observe in the light from galaxies.

This suggests a generalization. Suppose we treat the theory being defended in an inductive argument as an explanation of the data (at least some of the data) contained in the evidence. We get the following very symmetrical picture of an argument.

Evidence	e_1. Premise	**Data**
⇩	e_2. Premise	
	e_3. Premise	
	...	
	e_n. Premise	⇧
	=========	
Theory	t_0. Conclusion	**Explanation**

Inference to the Best Explanation assumes this general picture of inductive arguments. The relationship of ***support*** or ***following from*** becomes one of good explanation. Evidence for a theory is strong, or good, or sound if, and only if, the theory ***best explains*** the relevant data that is being offered as evidence. This definition of good evidence gives us a very useful device for testing purported evidence. That device is the subject of the next chapter. But before heading into all of this, let's do a review exercise.

AN ARGUMENT FROM THE HEADLINES (CIRCA 2008)

You've sat down for a big family dinner. Your very political cousin starts the conversation by telling you all that President Bush's nominee for the Federal District Court is in trouble because he plagiarized a law journal article. You're a little skeptical, and challenge your cousin by asking her what evidence she has for this serious charge. She responds by saying, "I read it in the New York Times." You go on line and find the article below. Does the information in this article provide you with good evidence that Mr. O'Neil is guilty of plagiarism? Chapter Two will provide a way of answering this evaluative question. Your task at present, however, is simply to complete the first step in the inference to the best explanation recipe, and put the argument into schematic form.

The following article appeared in the *New York Times*, July 4, 2008.

July 4, 2008
Copying Issue Raises Hurdle for Bush Pick

By ADAM LIPTAK

WASHINGTON — As chief counsel to the Senate Judiciary Committee, Michael E. O'Neill helped steer the Supreme Court nominations of John G. Roberts Jr. and Samuel A. Alito Jr. through the confirmation process. An expert on judicial nominations, Mr. O'Neill later spoke with pride to a legal magazine about helping place "some difficult federal judicial nominees" onto the lower federal courts.

The shoe is now on the other foot. President Bush nominated Mr. O'Neill to be a judge on the Federal District Court here last month, and there are signs that his nomination might be a difficult one as well.

Last year, a peer-reviewed legal journal, the Supreme Court Economic Review, issued a retraction of an article by Mr. O'Neill in 2004. "Substantial portions" of the article, the editors wrote, were "appropriated without attribution" from a book review by another law professor. In addition, at least four articles by Mr. O'Neill in other publications contain passages that appear to have been lifted from other scholars' works without quotation marks or attribution.

Long passages in the 2004 article are virtually identical to the book review, which was published in 2000 in the Virginia Law Review and was written by Anne C. Dailey, a law professor at the University of Connecticut.

For instance, Professor Dailey wrote: "Bounded rationality is not a refutation of the rational actor model; to the contrary, it attempts to fine-tune the model to take account of predictable cognitive limitations and biases. Despite occasional references to irrationality in the literature, there is nothing in fact irrational about bounded rationality."

Four years later, Mr. O'Neill wrote this, without quotation marks or attribution to Professor Dailey: "Bounded rationality is not a refutation of the rational actor model; to the contrary, it seeks to recalibrate the neoclassical model to take account of predictable cognitive limitations and biases. Despite occasional references to irrationality in the literature, there is nothing especially irrational about bounded rationality."

In an interview on Thursday in the dining room of his home in Chevy Chase, Md., Mr. O'Neill was contrite about the duplications, blaming "a poor work method." He said he often mingled research materials and his own work in a single computer file. "I didn't keep appropriate track of things," he said. "I frankly did a poor and negligent job."

Mr. O'Neill, a boyish 46-year-old who wore jeans and a wrinkled blue button-down shirt, said he had never

knowingly passed off other scholars' statements as his own. "So much of it is sort of dry and straightforward stuff," he said. "To me, it all sounds generic and plain. I didn't catch it."

Deborah L. Rhode, an authority on legal ethics at Stanford, said the retraction by the Supreme Court Economic Review was "extremely unusual" and amounted to "a textbook case of conduct that casts doubt on someone's fitness for judicial office."

"That's a serious form of misconduct in an academic career," Ms. Rhode said. "I would think it would be viewed equally seriously in a judicial career. In my judgment, that would be disqualifying."

In an interview, Senator Arlen Specter, the Pennsylvania Republican who was chairman of the Judiciary Committee until last year, said he had known for some time about the questions concerning Mr. O'Neill's scholarship.

"I heard him out on it and put it in the balance of everything else I knew about him," Mr. Specter said. "I believe he is an excellent prospect for the district court."

"He was my chief counsel and staff director at a very difficult time," Mr. Specter continued, referring to the nominations of Chief Justice Roberts and Justice Alito, the withdrawn Supreme Court nomination of Harriet E. Miers and a host of legal issues, including civil rights, bankruptcy and asbestos litigation.

Mr. Specter said Mr. O'Neill's nomination "has been thoroughly vetted on a number of levels," including by the Federal Bureau of Investigation and the White House. "I was told it went to the president," he said.

Emily A. Lawrimore, a White House spokeswoman, said Mr. O'Neill had been "completely forthcoming" from the start of the vetting process and had "expressed remorse for his actions."

"He was highly recommended to President Bush," Ms. Lawrimore said of Mr. O'Neill, "and the president is confident he will make an excellent judge."

Friends and colleagues describe Mr. O'Neill as a creative, fair and exceptionally able lawyer. He is a graduate of Brigham Young University and Yale Law School, and he served as a law clerk to Justice Clarence Thomas on the Supreme Court and Judge David B. Sentelle of the United States Court of Appeals for the District of Columbia Circuit. He is working on a master's degree in writing fiction.

The flawed 2004 article was not an isolated incident. Passages in the other articles by Mr. O'Neill, now an associate professor at George Mason University School of Law, also bear striking similarities to other scholars' work.

Shown a copy of a 2000 article by Mr. O'Neill in the Brigham Young University Law Review, Gerald M. Caplan, a former Justice Department official and former dean of the McGeorge School of Law in Sacramento, said it included a verbatim reproduction of a passage from a 1985 article he wrote in the Vanderbilt Law Review. Mr. O'Neill did not quote or cite Professor Caplan.

"Well, he's got me word for word," Professor Caplan said.

"And there is some evidence that it's not innocent or inadvertent," he added, referring to the nature and extent of the duplication.

"It shows him to disadvantage," Professor Caplan said. "If I were on the Judiciary Committee, I would want to know more."

Similarly, parts of a 2000 article by Mr. O'Neill in the George Mason Law Review bear a striking similarity to a

1997 article in the Michigan Law Review by Neal Kumar Katyal.

Professor Katyal, of the Georgetown University Law Center, said he knew Mr. O'Neill and admired him.

"Mike is an innovative thinker and has always had integrity in my many dealings with him," Professor Katyal said. "I can't imagine that he would intentionally copy this banal point from my article."

Daniel D. Polsby, an editor of the Supreme Court Economic Review and the dean of the George Mason School of Law, said he had learned about the similarities to the book review in a letter from its author, Professor Dailey. (Professor Dailey declined to comment.)

"It was my opinion at the time that this was negligent behavior," Dean Polsby said, "and he was duly chastised. The idea of O'Neill committing a theft is just impossible. It's just impossible."

But the law school and Mr. O'Neill agreed that the lack of attribution in the article would have serious consequences for him as a law professor. "By agreement, by a handshake," Dean Polsby said, "he stepped away from tenure and will reapply for it."

Mr. O'Neill said the law school's investigation concluded that his conduct had not been willful.

"The range of possible sanctions was a hug and a cookie to firing you," he said. "They felt like it was a significant mistake on my part. They didn't think it was intentional."

Asked how he would have viewed a judicial nominee like himself in his old job on the Judiciary Committee, Mr. O'Neill answered elliptically.

"I've tried to have a decent reputation with people," he said. "It's certainly my fault. You'd like to be not just defined by the mistakes that you make in life."

FINAL THOUGHTS ON CHAPTER ONE

In order of importance here are the "learning outcomes" (just a fancy way of saying the things I hope you got out of it) for Chapter One.

- How to "schematize" an argument
- The structure of arguments that provide (good) evidence (inference to the best explanation)
- That the whole book is about using Inference to the best explanation to assess evidence

If you would like to practice more on schematizing arguments, here are a couple of examples.

PRACTICE EXERCISES

EXERCISE ONE

Here is an article from the *New York Times*. It contains evidence for a theory about the death of William Henry Harrison. Schematize the argument that is contained in this article.

SCIENCE

What Really Killed William Henry Harrison?

By JANE McHUGH and PHILIP A. MACKOWIAK MARCH 31, 2014

William Henry Harrison, the ninth president of the United States, holds a distinction that with luck will never be equaled: He was our shortest- serving president, dying on April 4, 1841, after just a month in office.

What killed him? Historians have long accepted the diagnosis of Harrison's doctor, Thomas Miller: "pneumonia of the lower lobe of the right lung, complicated by congestion of the liver."

The pneumonia was thought to be a direct result of a cold the 68-year-old Harrison caught while delivering a numbingly long Inaugural Address (at 8,445 words, the longest in history) in wet, freezing weather without a hat, overcoat or gloves.

But a new look at the evidence through the lens of modern epidemiology makes it far more likely that the real killer lurked elsewhere — in a fetid marsh not far from the White House.

The first clue that the pneumonia diagnosis was wrong lies in Miller's own apparent uneasiness with it. "The disease," he wrote, "was not viewed as a case of pure pneumonia; but as this was the most palpable affection, the term pneumonia afforded a succinct and intelligible answer to the innumerable questions as to the nature of the attack."

Harrison — who had had some medical training as a young man — summoned Miller to the White House on March 26, complaining not of a lung ailment but of anxiety and fatigue. Miller did not bleed him, as was the standard treatment for pneumonia at the time. (More about what he did do in a moment.) But Miller may have overlooked a clue that was in front of his nose.

In those days the nation's capital had no sewer system. Until 1850, some sewage simply flowed onto public grounds a short distance from the White House, where it stagnated and formed a marsh; the White House water supply was just seven blocks downstream of a depository for "night soil," hauled there each day at government expense.

That field of human excrement would have been a breeding ground for two deadly bacteria, Salmonella typhi and S. paratyphi, the causes of typhoid and paratyphoid fever — also known as enteric fever, for their devastating effect on the gastrointestinal system.

Two other antebellum presidents, James K. Polk and Zachary Taylor, developed severe gastroenteritis while living in the White House. Taylor died,

while Polk recovered, only to be killed by what is thought to have been cholera a mere three months after leaving office.

Harrison had a history of dyspepsia, or indigestion, which potentially heightened his risk of infection by gastrointestinal pathogens that might have found their way into the White House water supply.

Although we have no record of how he managed his dyspepsia, the standard treatment in the 1840s was carbonated alkali, which would have neutralized the gastric acid that otherwise kills harmful bacteria. In the absence of the gastric acid barrier, gastroenteritis can be caused by as few as one ten-thousandth the number of bacteria usually needed.

In 1841 there was no effective treatment for enteric fever. The most a doctor could do was adhere steadfastly to medicine's most sacred tenet, primum non nocere — first do no harm.

At least Miller did not bleed the president. But he gave him a host of toxic medications that were then considered the standard of care — including opium, which retards the intestine's ability to rid itself of microbial pathogens, facilitating their invasion into the bloodstream.

Enemas, which Miller repeatedly gave to Harrison, are also potentially dangerous in such patients. They can perforate ulcers produced by S. typhi and S. paratyphi in the ileum, the lower end of the small intestine, through which the bacteria would be able to escape from the intestine into the bloodstream, resulting in sepsis.

As he lay dying, Harrison had a sinking pulse and cold, blue extremities, two classic manifestations of septic shock. Given the character and course of his fatal illness, his untimely death is best explained by enteric fever. Pneumonia was a secondary diagnosis — as Harrison's hapless doctor perhaps suspected all along.

Jane McHugh is a writer in San Antonio. Dr. Philip A. Mackowiak, a scholar in residence at the University of Maryland, is the author of "Diagnosing Giants: Solving the Medical Mysteries of Thirteen Patients Who Changed the World."

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EXERCISE TWO

The following is from a corny popular song from my youth. We can view it as Connie presenting evidence for her theory that he (let's call him Fabian) was smooching her best friend, Mary Jane. Your task is to schematize her argument for this hypothesis. If you would like to listen to this song, here's the You Tube url:
https://www.youtube.com/watch?v=C2WnMBKtG8g

(yeah, yeah, yeah, yeah, yeah, yeah)
(yeah, yeah, yeah, yeah, yeah, yeah)

When you left me all alone at the record hop
Told me you were goin' out for a soda pop
You were gone for quite a while, half an hour or more
You came back and man oh man this is what I saw

Lipstick on your collar told a tale on you
Lipstick on your collar said you were untrue
Bet your bottom dollar you and I are through
Cuz lipstick on your collar told a tale on you, yeah

You said it belonged to me, made me stop and think
Then I noticed yours was red, mine was baby pink
Who walked in but Mary Jane, lipstick all a mess
Were you smoochin' my best friend, guess the answer's yes

Lipstick on your collar told a tale on you
Lipstick on your collar said you were untrue
Bet your bottom dollar you and I are through
Cuz lipstick on you collar told a tale on you, boy

Told a tale on you, man

FADE

Told a tale on you, yeah

Connie Francis, *Lipstick On Your Collar*