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The informal logic of John Locke.

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THE INFORMAL LOGIC OF JOHN LOCKE

by

Kevin Gregory Fanicj

A Thesis
submitted to the
Faculty of Graduate Studies and Research
through the Department of
Philosophy in Partial Fulfillment
of the requirements for the Degree
of Masters of Arts at
The University of Windsor

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ABSTRACT

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by

Kevin Gregory Fanick

In this thesis I attempt to lay out and explain Locke's theory of logic. I have tried to show that Locke is an informal logician. I argue that: first, Locke attacks and rejects the formal reasoning of his day; and second, his own positive notion of logic is non-formal.

In the first two chapters I focus on his attack of the logic taught in the seventeenth century. I argue in Chapter I that Locke opposes syllogistic logic as a formal mode of reasoning. In Chapter II I discuss Locke's opposition to the use of seemingly self-evident first principles and scholastic logicians' overall failure to achieve the goals reasoning should achieve.

In my final chapter I lay out and discuss Locke's own non-formal logic. This involves his discussions of demonstration and probability. In the last two sections of this chapter I consider Locke's discussion of what have come to be called fallacies and his identification of some of the psychological barriers that prevent people from reasoning well.
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INTRODUCTION

In the introductory section of his book The Conduct of the Understanding John Locke expresses his displeasure with the study of logic in the seventeenth century. Locke explains that the logic of this period has had a long and important influence on the academic world; however, he is not of the belief that this influence is deserved. He thinks that the rules of logic which have been taught in the schools are not sufficient to guide human understanding properly. Locke writes:

The logic now in use has so long possessed the chair, as the only art taught in the schools for the direction of the mind in the study of the arts and sciences, that it would perhaps be thought an affectation of novelty to suspect that rules that have served the learned world these two or three thousand years, and which, without any complaint of defects, the learned have rested in, are not sufficient to guide the understanding. (p. 4; Section I)

One of his most focused and sustained criticisms of the logic taught in the seventeenth century can be found in Book IV of An Essay Concerning Human Understanding. It is in Chapter XVII entitled "Of Reason" that Locke begins an investigation into human reason and it is in the course of this investigation that he presents many specific criticisms of the logic taught in this period.

From what Locke writes in section 4 of the chapter it is clear that the logic he criticizes is essentially Aristotelian. More accurately, he criticizes logic as the scholars at this time practiced it and, according to him, Aristotle was considered the source of this logic.
Locke argues that the Aristotelian syllogism is not the basis for human rationality: "... God has not been so sparing to Men to make them barely two-legged Creatures, and left it to Aristotle to make them Rational..." (p. 671; 4.17.4).

At the beginning of Book IV Chapter XVII Locke supplies us with several common uses of the word "reason" in this period. He says, 'reason' sometimes refers to true and clear principles and sometimes it refers to the final cause of whatever is being considered. I will not discuss these definitions because they are not important to Locke's chapter or to our investigation. For our purposes Locke defines 'reason' as "a Faculty in Man... whereby Man is supposed to be distinguished from Beasts, and wherein it is evident he much—surpasses them" (p. 668; 4.17.1).

According to Locke, there are two important purposes for reason: to increase man's knowledge of the world; and, to regulate human beliefs. Locke raises the question,

What need is there of Reason? Very much; both for the enlargement of our Knowledge, and regulating our Assent: For it hath to do, both in Knowledge and Opinion, and is necessary... (p. 668; 4.17.1)

In the case of knowledge, reason allows us to perceive the necessary and indubitable connection of ideas, while in the case of opinion, reason allows us to perceive the probable connection of ideas. Locke explains that

In both these Cases, the Faculty which finds out the Means, and rightly applies them to discover Certainty
in the one, and Probability in the other, is that which we call Reason. For as Reason perceives the necessary, and indubitable connexion of all the Ideas or Proofs one to another, in each step of any Demonstration that produces Knowledge: so it likewise perceives the probable connexion of all the Ideas or Proofs one to another, in every step of a Discourse, to which it will think Assent due. This is the lowest degree of that, which can be truly called Reason. (p. 669; 4.17.2)

In the Conduct Locke compares the capacity to reason to a touchstone which people use to test whether they actually possess a piece of gold or something that just looks like gold. In other words, according to Locke, reason is a capacity everyone possesses that can be used to determine whether a piece of reasoning is actually good reasoning or just looks good but is not:

Every man carries about him a touchstone, if he will make use of it, to distinguish substantial gold from superficial glitterings, truth from appearances. And indeed the use and benefit of this touchstone, which is natural reason, is spoiled and lost only by assumed prejudices, overweening presumption, and narrowing our minds. (p. 10; Section III)

The main goal of this thesis is to lay out and explain Locke’s theory of logic. This consists of two parts: first, his criticisms of scholastic logic; and second, his own positive notion of logic. Both parts are intimately connected in his writings, which makes it difficult to look at either separately. Much of my efforts in this thesis have gone into separating these two different aspects of Locke’s logic, and I regard this result as one of the main accomplishments of the thesis. In the first two chapters I focus on his attack of the logic taught in this period. Scholastic logicians used seemingly self-evident principles from which to deduce conclusions about the world via syllogisms. I
argue in Chapter I that Locke is opposed to syllogistic logic as a formal mode of reasoning. I also make the distinction between syllogistic reasoning and his own notion of reasoning (which I call "natural reasoning"). In Chapter II I discuss his opposition to the use of self-evident first principles and scholastic logicians' overall failure to achieve the goals reasoning should achieve. In my final chapter I lay out and discuss Locke's own informal notion of logic. In the last two sections of this chapter I consider Locke's discussion of fallacious modes of reasoning and a few psychological barriers that prevent people from reasoning well.

While this thesis is written to explain Locke's informal theory of logic I have deliberately tried where possible to highlight some of the similarities between Locke and twentieth-century informal logic. This is especially the case in the last two sections of Chapter III. However, I make no claims about Locke's informal logic being exactly the same as twentieth-century informal logic. That would go beyond the scope of the present thesis. I leave the similarities to my reader to ponder.
CHAPTER I

Locke's Attack on Syllogism as Formal Argument

I have two general aims in this chapter: first, to argue that Locke criticizes the syllogism as a formal method of reasoning; and second, to distinguish in a preliminary way his own logic from that of the Scholastics. I will also identify two notions of logic which I have found in Locke's discussions of reasoning in Book IV Chapter XVII of the Essay. The chapter is divided into the following three sections: I) Some important differences in terminology; II) Locke's analysis and criticisms of the syllogism as a formal mode of reasoning; III) A few preliminary conclusions.

Section I: Some Important Differences in Terminology

Before we go any further let us be clear about what Locke means by some of the terms he uses, in particular, "proof," "demonstration," and "deduction." In the twentieth century these terms have precise meanings in the disciplines of mathematics and formal logic; however, Locke's definitions differ from current ones.

In the twentieth century a proof is generally considered the evidence which shows that something is the case. However, for Locke, 'proofs' are those ideas which show agreement (i.e., a connection) between two other ideas, whether the agreement between these ideas is certain or probable: "Those intervening Ideas, which serve to shew thè
Agreement of any two others, are called Proofs..." (p. 532; 4.2.3). Proofs are the intermediate ideas which are required for us to perceive the connection of two ideas which we cannot directly relate. For example, when trying to show whether the claim, "A is larger than C" is true, but the two ideas cannot be directly compared, we may use other ideas to show the connection between idea A and idea C. We may discover that "A is larger than B" and that "B is larger than C". In this example, B would be considered the intermediate idea (i.e., the proof) which brings together A and C to show their connection and the truth of the claim "A is larger than C". In some cases there might be several proofs which show whether two ideas agree or not. Proofs are found in what Locke calls demonstrations, arguments and discourses.

'Demonstration' is a term which for twentieth-century logicians is synonymous with 'deduction'. However, for Locke, demonstration is the process by which the mind is led to perceive the necessary agreement or disagreement between two ideas (i.e., the connection or lack of connection between ideas) through the use of proofs. Locke explains that "Reason perceives the necessary, and indubitable connexion of all the Ideas or Proofs one to another, in each step of any Demonstration that produces Knowledge..." (p. 669; 4.17.2). "Rational knowledge" is the term he uses to describe the result of a demonstration (cf. p. 685; 4.17.17).

Finally, the word "deduction" has been understood in twentieth-century logic to describe only inferences which involve positive premise-conclusion entailments, that is, given that the
premise(s) are true the conclusion must follow. To deny the conclusion of a deductive inference, given that the premises are true, would be to assert or to imply a contradiction. However, Locke's use of the term deduction is different. For Locke, "deduction" is involved in both demonstrations (which lead to certain knowledge) and probable reasoning (which leads to probable judgements). He writes:

"Reason . . . I take to be the discovery of the Certainty or Probability of such Propositions or Truths, which the Mind arrives at by Deductions made from such Ideas, which it has got by the use of its Natural Faculties . . . . (p. 687; 4.18.2)

In this passage 'deduction' refers to the movement of the mind from one idea to the next regardless of whether the reasoning is certain or probable.

It is clear that Locke's uses of the terms "proof," "demonstration," and "deduction" are different from those of contemporary scientists, mathematicians and logicians. To avoid misunderstanding Locke's own logic as well as his criticisms of the logic of his day it is important to keep these different uses in mind.

Section II: Locke's Analysis and Criticism of the Syllogism as a Formal Mode of Reasoning

Now that we are familiar with some of Locke's terminology let us focus on the analysis of syllogistic logic which emerges from his discussions of the syllogism in Book IV Chapter XVII of the Essay. I believe there are three important and unique formal aspects which he identifies with the syllogism. In fact, they stand out in contrast to
his own logic. Locke describes and criticizes syllogistic logic as 
"repetitive," as "artificial" and as a method of reasoning which merely 
requires following a few specific rules. I will deal with each of these 
separately.

A) Repetition

In several places in Chapter XVII Locke describes the syllogism as 
repetitious and criticizes it because he thinks such repetition will 
confuse someone trying to follow the reasoning. For instance, he writes 
that

... The Understanding is not taught to reason by 
these Rules; it has a native Faculty to perceive the 
Coherence, or Incoherence of its Ideas, and can range 
them right, without any such perplexing Repetitions. 
(p. 671; 4.17.4)

In this and other similar passages Locke contrasts syllogistic 
reasoning with natural reasoning. The repetition which is to be found 
in the syllogism does not occur when people employ their native 
capacities to reason.

While he never spends the time to explain carefully what he means 
by those "perplexing Repetitions" of the syllogism, I believe I can 
explain it with the help of several other passages from Chapter XVII and 
some very simple examples. Later in his discussion Locke asks 
rhetorically

... whether the connexion of the Extremes be not 
more clearly seen in this simple and naturalDisposition, than
the perplexed Repetitions and Jumble of five or six Syllogisms . . . (p. 673; 4.17.4)

In interpreting this passage it is important to remind oneself that in a syllogism there are three propositions and a total of three different terms which each of which appears twice. These terms must be repeated and placed in proper sequence in order for the syllogism to be well formed. Take the following standard symbolization of the syllogism (M = the middle term; P = the major term; S = the minor term).

\[
\begin{align*}
\text{All M is P,} \\
\text{All S is M,} \\
\text{Therefore, All S is P}
\end{align*}
\]

In this example the terms (S, P and M) are each repeated twice and placed in a specific order in the syllogism. In an extended discourse, where a person's reasoning is presented using syllogisms, it may be necessary to link several of them together. Putting several syllogisms together leads to repeating the subject and predicate terms, this makes the reasoning more complicated and at times hard to follow—i.e., perplexing. Consider the following symbolization of an extended discourse with M, A, B, C, D, and E:

\[
\begin{align*}
\text{All M is A,} & \quad \text{All B is A,} & \quad \text{All C is A,} & \quad \text{All D is A,} \\
\text{All B is M,} & \quad \text{All C is B,} & \quad \text{All D is C,} & \quad \text{All E is D,} \\
\therefore \text{All B is A} & \quad \therefore \text{All C is A} & \quad \therefore \text{All D is A} & \quad \therefore \text{All E is A}
\end{align*}
\]

In the above example the connection of the extremes (i.e., A and E) requires that all of the variables be repeated, some of them several times (i.e., A is repeated 7 times). The above example might make more sense if we fill in the variables with constants as follows:
<table>
<thead>
<tr>
<th>All humans are mortal</th>
<th>All men are mortal</th>
</tr>
</thead>
<tbody>
<tr>
<td>All men are humans</td>
<td>All Greeks are men</td>
</tr>
<tr>
<td>All men are mortal</td>
<td>All Greeks are mortal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>All Greeks are mortal</th>
<th>All Athenians are mortal</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Athenians are Greeks</td>
<td>Socrates is an Athenian</td>
</tr>
<tr>
<td>All Athenians are mortal</td>
<td>Socrates is mortal</td>
</tr>
</tbody>
</table>

This contrasts with Locke's own conception of reasoning—i.e., natural reasoning, where the ideas in a demonstration or discourse are placed in a non-repetitious sequence. In natural reasoning one lays out the ideas in a simple straightforward manner which allows the mind to perceive the connection between the ideas plainly and clearly. For example, Locke would lay out the above reasoning simply as follows:

**Mortality—Human Beings—Greeks—Athenians—Socrates**

In this case the terms do not require any repetition and the extremes are seen to be linked by "proofs". The link between Socrates and mortality is clearly shown by intervening ideas such as human being, etc. It is readily apparent that there is no repetition when one lays out arguments in the way which Locke recommends.

We have seen that for Locke the repetition of the syllogism is unnecessary and only adds confusion to reasoning. Locke himself proposes a layout of ideas which follows a more natural way of reasoning and avoids repetition.

B) The Artificial Ordering of Ideas

Locke also criticizes the formal aspects of the syllogism when he complains that the actual order of the terms is not "natural" (4.17.8)
or "artificial" (4.17.4). In the Essay Locke considers a familiar
example of a syllogism to illustrate his point.

To shew it in a very plain and easy Example; let
Animal be the intermediate Idea or medius terminus
that the Mind makes use of to shew the connexion
of Homo and vivens: I ask whether the Mind does
not more readily and plainly see that connexion,
in the simple and proper Position of the connecting
Idea in the middle; thus,

```
[ #1] Homo--Animal--vivens,
     [ S -- M -- P ]
```

Than in this perplexed one,

```
[ #2] Animal--vivens--Homo--Animal,
     [ M -- P -- S -- M ]
```

Which is the Position these Ideas have in a Syllogism,
to shew the connexion between Homo and vivens by the
intervention of Animal. (p. 675; 4.17.4)

In this example, the first set of ideas (#1) represents the order
presented in natural reasoning while the second set (#2) represents the
order in syllogistic reasoning. To be more precise the latter
represents the order of ideas found in the major and minor premises of a
syllogism of the first figure:

```
M--P        All animals are alive
S--M        All men are animals
S--P        Therefore, all men are alive
```

However, for Locke, the ideas in the syllogism above should follow a
more simple straight-forward order. Consider Locke's own revised
ordering of this argument:
In the above ordering (W3) the middle term (animal) can be found between the two other terms (Homo and vivens) since the order of the major and minor premises is reversed. In Locke's version the premise which contains the subject of the conclusion is the first premise and the premise with the predicate of the conclusion is the second premise. I take syllogism W3 to follow a more natural sequence of how the ideas are connected. Locke writes:

\[\ldots\text{May one not upon just Ground enquire whether the Form Syllogism now has, is that which in Reason it ought to have? For the Medius Terminus being to join the Extremes \ldots would not the Position of the Medius Terminus be more natural, and shew the Agreement or Disagreement of the Extremes clearer and better, if it were placed in the Middle between them?}\]

(p. 681; 4.17.8)

Syllogistic form is artificial in the way it presents the connection of the ideas in a train of thought. In the syllogism Locke gives us above (W3), the ideas follow what Locke believes is a "more natural" order because the intermediate idea (animal = M) can be found in the middle between the two ideas which it joins together (homo = A, and vivens = B). Repetition is still present in this syllogism; however, the order of the ideas is not as confusing or perplexing.
C) The Syllogistic Rules of Mode and Figure

There are a number of places in Locke's discussion which show that he thinks the faults of syllogistic reasoning arise from the fact that it is based on a strict set of formal rules. He writes:

God has been more bountiful to Mankind than so. He has given them a Mind that can reason without being instructed in Methods of Syllogizing: The Understanding is not taught to reason by these Rules . . . .
(p. 671; 4.17.4)

In this passage Locke emphasizes the association between the syllogism and rules. Now this alone is not a great insight because anyone who has studied the syllogism realizes that certain conditions must be met if it is to be considered valid. However, the significance of Locke's analysis lies in his own belief that human beings are not taught to reason by learning and following syllogistic rules. I believe that the rules which Locke is referring to are those of mode and figure. In section six of Chapter XVII Locke argues that "native rustic Reason" is of more benefit to man than "any scholastic Proceeding by the strict Rules of Mode and Figure" (p. 679; 4.17.6). These passages and others suggest that it is primarily the rules of mode and figure which Locke is criticizing.

Mode and Figure involve rules which regulate how the terms in a syllogism are to be arranged and ordered, that is, these rules regulate the proper form of the syllogism. The mode of a syllogism (or "mood" as it is known to twentieth-century logicians) describes the type of each proposition present in a syllogism (i.e., the major & minor premise and the conclusion). The propositions of a syllogism can be of four types...
or modes: universal affirmative (all A is B), particular affirmative
(some A is B), universal negative (no A is B), or particular negative
(some A is not B). The figure of a syllogism describes the place of the
middle term in the premises of a syllogism. There are four figures of
the syllogism:

\[
\begin{array}{cccc}
M--P & F--M & M--P & P--M \\
S--M & S--M & M--S & M--S \\
S--P & S--P & S--P & S--P
\end{array}
\]

First Figure  Second Figure  Third Figure  Fourth Figure

Each of the above combinations shows us where the middle term and the
major [P] and minor [S] terms might properly be found. Only those
patterns of the syllogism in which the terms are correctly ordered and
arranged can be considered well-formed, and only a well-formed syllogism


---

In an early part of Chapter XVII Locke points out that the
syllogism is sometimes used to discover weakness in what he calls a
"rhetorical flourish." However, as he explains, in order for the
syllogism to accomplish this task the reasoning has to be put into an
"artificial form" and this can only identify problems to a person who
has thoroughly studied the rules of mode and figure.

Indeed Syllogism is made use of on occasion to discover
a Fallacy hid in a rhetorical Flourish . . . But the
weakness or fallacy of such a loose Discourse it shews,
by the artificial Form it is put into, only to those
who have throughly studied Mode and Figure . . . .

(p. 670; 4.17.4)
In a later passage in this section Locke expresses his disillusionment with relying on the rules of mode and figure for detecting problems with the reasoning in a discourse. Locke writes:

I grant that Mode and Figure is commonly made use of in such Cases, as if the detection of the incoherence of such loose Discourses, were wholly owing to the Syllogistical Form; and so I myself formerly thought . . . (p. 676; 4.17.4)

The point I want to emphasize is that Locke sees the syllogism not only as a rule-governed approach to reasoning but specifically as a logic governed by formal rules. It is the rules of mode and figure which lead him to the repetition and artificiality which Locke identifies in the syllogism. His criticisms of repetition and artificiality are the result of his insights into the syllogism as primarily a logic based upon these strict rules of form. As we shall see later, he is not opposed to all rules of reasoning, but the rules he accepts are not formal.

Section III: A Few Preliminary Conclusions

From these preliminary investigations into Locke's views on syllogistic reasoning we can conclude that there is an important difference between his own logic and of that accepted in his day. Locke frequently contrasts these two kinds of logic:

. . . I now find that laying the intermediate Ideas naked in their due order, shews the incoherence of the Argumentation better, than Syllogism; not only as subjecting each Link of the Chain, to the immediate view of the Mind in its proper place, whereby its connexion is best observed; But also because Syllogism shews the incoherence only to those . . . who perfectly understand Mode and Figure, and the
Locke's notion of reasoning (i.e., natural reasoning) emphasizes the mind's perception of the connection— or lack of connection— of the ideas found in a demonstration, a discourse, an argument, etc. This suggests a very informal description of reasoning. On the other hand, what is important to syllogistic reasoning is the form. I think it would be fair to describe the difference between natural and syllogistic reasoning in the following way: natural reasoning is a content-oriented logic while syllogistic reasoning is a form-oriented logic.

Allow me to explain briefly this distinction. I have said that what is important to natural reasoning is that the mind perceives the connection between the ideas in a passage of reasoning. This means that the way in which ideas in a demonstration, a discourse, an argument, etc., fit together depends on the particular ideas involved. Consequently, the content of what is being reasoned about shapes the logical structure of that reasoning. For Locke the logical and material components of reasoning are intimately connected and cannot be separated. On the other hand, the ideas used in a syllogism are not involved in shaping the logical structure of the reasoning. Syllogistic rules of form determine the order in which the ideas are presented, not the reverse. The validity of an inference from premises to a conclusion is independent of the ideas. One can place any set of ideas into a valid syllogism— i.e., one can use any three sets of terms one desires. The content of a syllogism is not involved in determining the logical
correctness of the reasoning. It seems to be Locke's belief that formal methods fall short of providing a satisfactory method of reasoning.

The difference between natural and syllogistic reasoning is important, for I think it begins to show the informal logic of Locke. I also think that Locke's dissatisfaction with syllogistic reasoning as a useful and adequate method reflects the concerns some twentieth-century logicians have raised about the usefulness and practicality of formal logic. In the course of examining the other aspects of Locke's informal logic we shall find other similarities as well as some dissimilarities between Locke and twentieth-century informal logicians.
CHAPTER II

Further Features of Locke’s Attack on Scholastic Logic

In this chapter I shall consider in more detail Locke’s criticisms of the logic taught in his own time. This logic includes not only the syllogism per se, but also the belief that all knowledge can be derived from self-evident first principles called maxims. In section one I shall attempt to identify the philosophers who put forward the logic which Locke was attacking and identify some of the claims which they made for that logic. In section two I shall identify some of Locke’s grounds for thinking that this logic failed to achieve the goals he believed logic should achieve—i.e., the proper goals of reasoning. In my concluding section I shall discuss the question whether Locke thinks scholastic logic has any legitimate use at all.

I) What was Scholastic Logic and Who were Some of its Proponents?

In the introductory section of The Conduct of the Understanding Locke gives us his view of seventeenth-century logic. He writes:

The logic now in use has so long possessed the chair, as the only art taught in the schools for the direction of the mind in the study of the arts and sciences, that it would perhaps be thought an affectation of novelty to suspect that rules that have served the learned world these two or three thousand years, and which, without any complaint of defects, the learned have rested in, are not sufficient to guide the understanding. (p. 4.)
For Locke, the logic of the schools is at best an insufficient tool for properly guiding our minds in the study of the arts and sciences, which is to say, in obtaining substantial knowledge. When Locke speaks of those "rules that have served the learned world these two or three thousand years" he is referring to the rules of the syllogism first developed by Aristotle in the *Prior Analytics* and faithfully used by later logicians. However, the use of syllogistic rules is not the only element of scholastic logic Locke finds insufficient. In his book *Locke and the Compass of Human Understanding* John Yolton gives us an indication of what it is about the logic of this period which Locke opposes. He explains:

There was a method claimed for science by men of this period—John Sergeant is one, whose book, *The Method to Science* (1696), lends its title to this chapter—a method of deducing from principles, which Locke was careful to attack and reject. This was a method to knowledge used by the Schoolmen and claimed to apply to all knowledge, including knowledge of nature. Their methodological dictum was 'ex praecognitis et praecoconcessis' (4.7.8). (p. 90.)

What Locke rejects is a method used by the logicians of this period in their attempts to discover and obtain substantial knowledge of the world. This method consisted of two elements. First, the laying down of principles of logic or reason, often called maxims. Second, the use of these principles of logic to deduce new knowledge of the world via the syllogism.

John Sergeant (1622-1707) was a main proponent of this method in the seventeenth century. He was an outspoken critic of both Descartes and Locke. In his book *John Locke and the Way of Ideas* Yolton explains
that Sergeant believed the syllogism could be used to demonstrate all knowledge.

Besides having written one of the longest attacks against Locke of any of his contemporaries, Sergeant was an exponent and stout defender of the syllogistic method, his *The Method to Science* (1696) being an elaborate defense of this method of reasoning. The term 'science' in this work is used loosely to indicate any body of organized knowledge which can be demonstrated from principles by means of deductions . . . . Whether the subject-matter be physics, morality, or religion, Sergeant was convinced that the truths of that discipline could be demonstrated by the syllogism. (p. 76.)

Those who followed this method were called the 'old dogmatists.' These men used the method of disputation to defend their conclusions, tracing all truths back to what were referred to as principles of logic (*The Compass of the Human Understanding*, p. 90).

In 4.7.8 Locke says the scholastics believed maxims to be at the foundation of all knowledge. According to him, scholastic maxims were those truths first known to the mind and fundamental to all other parts of knowledge. He writes:

> The Rules established in the Schools, that all Reasonings are *ex praecognitis, et praecessis*, seem to lay the foundation of all other Knowledge, in these Maxims, and to suppose them to be *praecognitae*; whereby, I think, is meant these two things: First, That these Axioms, are those Truths that are first known to the Mind; and, secondly, That upon them, the other parts of our Knowledge depend. (p. 595; 4.7.8)

Locke believed that scholars in general subscribed to the view that maxims formed the foundation of all knowledge. He characterizes the schools of his time as doing nothing more than following this method.

Opening Book IV Chapter XII he writes:
It having been the common received Opinion amongst Men of Letters, that Maxims were the foundations of all Knowledge; ... the beaten Road of the Schools has been, to lay down in the beginning one or more general Propositions, as Foundations whereon to build the knowledge that was to be had of that Subject. (p. 639; 4.12.1)

Two frequently cited examples of these principles were the law of identity (i.e., 'what is, is') and the law of contradiction (i.e., 'the same thing cannot both be and not be'). Yolton writes:

In addition, there must be principles of reason. The laws of identity and contradiction in traditional logic are the most frequently cited examples. Sergeant insists in many places that knowledge must be capable of being reduced to such principles of reason, which principles are intuitively true." (pp. 79-80.)

However, the point is not just that these principles are intuitive, as Yolton explains, but that they are analytic in nature. That is, the law of identity and contradiction are true by their very definition and not by any empirical data we might gather to verify their truth. In other words, all empirical knowledge about the world could be deduced from laws such as the law of identity or the law of contradiction --i.e., analytic truths--which are not empirical.

II) Scholastic Logic's Failure to Achieve the Proper Goals of Reasoning

A) Finding Proofs

While Locke raises many specific criticisms about both maxims and the syllogism, many of Locke's criticisms of scholastic logic are based on its failure to achieve some of the main goals which Locke has for logic and reasoning. Locke notes at least three different goals of
reasoning which scholastic logic fails to achieve. The first two goals involve finding proofs and making new discoveries. According to Locke, these two tasks are the most important and the most difficult which human reasoning can perform and the syllogism is of no use at all to us in carrying them out. He says:

...it [the syllogism] fails our Reason in that part, which if not its highest Perfection, is yet certainly its hardest Task, and that which we most need its help in; and that is the finding out of Proofs, and making new Discoveries. (p. 679; 4.17.6).

I believe that when Locke writes of "the finding out of Proofs" he is referring to the discovering or uncovering of the intermediate ideas which connect two other ideas together in a line of reasoning or discourse. In other words, it is finding out what you need to know in order to draw a certain conclusion. Locke gives us the following example of this in 4.17.4:

... a view of the connexion of all the intermediate Ideas that draw in the Conclusion, or Proposition inferred. v.g. Men shall be punished.--God the punisher.--just Punishment.--the Punished guilty--could have done otherwise--Freedom--self-determination, by which chain of Ideas thus visibly link'd together in train, i.e. each intermediate Idea agreeing on each side with those two it is immediately placed between, the Ideas of Men and self-determination appear to be connected ... (p. 673; 4.17.4)

In the above passage finding out the intermediate ideas, such as, "God the punisher," "just punishment," "the punished guilty," etc. for Locke is in effect discovering or uncovering those ideas which join the ideas of "Men" and "Self-determination" together in order to draw the
conclusion that men are self-determined beings. The syllogism is of no assistance in the discovery of intermediate ideas. Locke writes:

The Rules of Syllogism serve not to furnish the Mind with those intermediate Ideas, that may show the connexion of remote ones. This way of reasoning discovers no new Proofs, but is the Art of marshalling, and ranging the old ones we have already. (p. 679; 4.17.6)

In this passage Locke makes it clear that he believes the syllogism to be really only a technique of arranging and presenting to others intermediate ideas which have already been discovered. But man has no need of this method of reasoning for arranging and presenting knowledge. He writes:

... Syllogism comes after Knowledge, and then a Man has little or no need of it. ... Syllogism, at best, is but the Art of fencing with the little Knowledge we have, without making any Addition to it. (p. 679; 4.17.6)

B) Discovering New Truths

The second goal of reasoning, in Locke's view, is to make new discoveries. When he refers to this goal I understand him to have one of two things in mind: either the discovery of new knowledge to advance what he calls the "sciences," or the discovery of some unknown truth in general. Yolton explains that at this period

The term 'science' covered any body of knowledge. Locke spoke, for example, of 'natural philosophy and the other sciences', or of 'divinity, ethics, law, politics and other sciences'. He also contrasted experimental science with a perfect science of natural bodies. The latter was the notion of a demonstrative or deductive knowledge of nature, based on some few first principles. The former was Locke's reference to natural philosophy, that is science in our sense: physics, physiology, anatomy and so on.
For Locke, the discovery of new knowledge to advance the sciences means scientific discovery and he clearly doesn't believe the scholastic methods achieve this goal. In the Conduct he describes the general methods of the scholastics as a "mismanagement of the understanding". He thinks the scholastics end up confusing "airy useless notions" for substantial knowledge:

Whereas men designed for scholars have often their heads so filled and warmed with disputes on logical questions, that they take those airy useless notions for real and substantial knowledge, and think their understandings so well furnished with science that they need not look any farther into the nature of things, or descend to the mechanical drudgery of experiment and inquiry. This is so obvious a mismanagement of the understanding, and that in the professed way to knowledge, that it could not be passed by; to which might be joined abundance of questions, and the way of handling of them in the schools. (p. 94.) section XLII

For Locke, it is clear that substantial knowledge is not obtained from maxims. In Book IV Chapter VII he asserts that these principles never form the foundation of knowledge and were not used by those who made some of the first contributions to man's knowledge of the world. Locke writes:

'Tis as plain that they are not, nor have been the Foundations whereon any Science hath been built. There is, I know, a great deal of Talk, propagated from Scholastick Men, of Sciences and the Maxims on which they are built... general Maxims were not the Foundations on which the first Discoverers raised their admirable Structures, nor the Keys that unlocked and opened those Secrets of Knowledge. (pp. 598-599.) 4.7.11

In 4.7.11 Locke goes on to argue that maxims are of no use at all in discovering any truths. He writes:
They [maxims] are not of use to help Men forwards in the Advancement of Sciences, or new Discoveries of yet unknown Truths. Mr. Newton, in his never enough to be admired Book, has demonstrated several Propositions, which are so many new Truths, before unknown to the World, and are farther Advances in Mathematical Knowledge. But for the Discovery of these, it was not the general Maxims . . . that help 'd him (p. 599; 4.7.3)

Locke holds that Newton did not rely on scholastic maxims to demonstrate new truths and advance the mathematical sciences, this is not to say he doesn't believe there are certain basic truths or principles which man can discover to help him learn about the world. I will discuss these in more detail in Chapter Three.

It is not only maxims that have no use in acquiring new knowledge or advancing the sciences; Locke also believes the syllogism is of little use for these tasks. Locke writes in 4.17.4:

... I am apt to think, that he who shall employ all the force of his Reason only in brandishing of Syllogisms, will discover very little of that Mass of Knowledge, which lies yet concealed in the secret recesses of Nature . . .. (p. 679; 4.17.6)

In his view the syllogism is more likely to confuse than to inform the human mind:

... I appeal to common observation, which has always found these artificial Methods of reasoning more adapted to catch and intangle the Mind, that to instruct and inform the Understanding. (p. 677; 4.17.4)

According to Locke, those who seek the truth never use syllogistic logic— that is, the form of syllogistic reasoning. Locke writes: "And hence it is, that Men in their own inquiries after Truth never use
Syllogisms to convince themselves, (or in teaching others to instruct willing Learners)" (p. 675; 4.17.4).

C) Detecting Flaws in Other Peoples' Reasoning

There is a third purpose which reasoning should perform and that is to help in detecting the flaws and weaknesses in other people's reasoning (see Essay, p. 677). Just as the syllogism is not necessary for making inferences correctly it is also not necessary for detecting fallacies. Locke writes:

Indeed Syllogism is thought to be of necessary use, even to the Lovers of Truth, to shew them the Fallacies, that are often concealed in florid, witty, or involved Discourses. But that this is a mistake will appear, if we consider, that the Reason why sometimes Men, who sincerely aim at Truth, are imposed upon by such loose, and as they are called Rhetorical Discourses, is that their Phancies being struck with some lively metaphorical Representations, they neglect to observe, or do not easily perceive what are the true Ideas, upon which the Inference depends. (pp. 675-676; 4.17.4)

In this passage Locke offers his own explanation of why men become persuaded by fallacious reasoning. He thinks it occurs because men fail to focus on the true ideas involved in an argument. That is why Locke contends that it is an analysis of the ideas involved in a discourse not the use of the syllogism, which will reveal a flaw or a weakness—i.e., a problematic inference in an argument:

Now to shew such Men the weakness of such an Argumentation, there needs no more but to strip it of the superfluous Ideas, which blended and confounded with those on which the Inference depends, seem to shew a connexion, where there is none; or at least do hinder the discovery of the want of it; and then to lay the naked Ideas on which the force of the Argumentation depends, 'in their due order, in which Position
the Mind taking a view of them, sees what connexion they have, and so is able to judge of the Inference, without any need of a Syllogism at all. (p. 676; 4.17.4)

What I take Locke to be suggesting in this passage is that the best method for determining whether an argument is sound or fallacious simply involves laying out the primary inferences of that argument in a simple, straight-forward manner.

III) Does Scholastic Logic have a Legitimate Use?

Given Locke’s criticisms of scholastic logic, one might wonder whether he views this logic as having any legitimate use. I believe Locke thinks scholastic logic has no important use at all. However, one would be hard pressed to find a passage anywhere in Chapter XVII which explicitly states this view. Locke does say:

I do not pretend to have found, or discovered here any of those right helps of Art, this great Man of deep Thought mentions: but this is plain, that Syllogism, and the Logick now in Use, which were as well known in his days, can be none of those he means. (p. 680; 4.17.7)

The reference to "this great Man of deep Thought" is to Richard Hooker (1553-1600), an English philosopher and theologian who wrote an eight volume work entitled The Laws of Ecclesiastical Polity, and a thinker for whom Locke shows great respect. In this passage Locke makes it clear that while he may not claim to have found the "right helps" to reason which Hooker demands, he is at least sure that the syllogism is not one of them.
Locke does consider whether there is a proper use for the syllogism; however, his comments amount to more a criticism of syllogistic logic than an account of a legitimate use. According to Locke, the primary use of the syllogism (in the seventeenth century) has been in the schools where people have practiced disputation for its own sake, even to the point of arguing for obvious falsehoods:

> Of what use then are Syllogisms? I answer, Their chief and main use is in the Schools, where Men are allowed without Shame to deny the Agreement of Ideas, that do manifestly agree; or out of the Schools to those, who from thence have learned without shame to deny the connexion of Ideas, which even to themselves is visible. (p. 675; 4.17.4)

The point in this passage is that the use of the syllogism in the schools has taught people to ignore and blatantly deny the actual relationship between things as they are found in the world. In other words, the teaching of the syllogism in the schools has desensitized its users to the way things are related to one another in reality.

How might this occur? For scholastic logicians, what is important is the formal pattern of the reasoning and not the actual content of what is being reasoned about. Therefore, it can be formally perfectly acceptable to have a syllogism in which the premises and the conclusion are known to be false, for the implication of the syllogism is valid or logically acceptable solely on the ground that the reasoning fits one of the correct formal patterns. For example, consider the following syllogism:

All fish have scales,
All human beings are fish,
Therefore, All human beings have scales.
In this syllogism all of the propositions are false; however, it is valid because the formal pattern of the reasoning is correct. (What makes it "correct" is that if the two premises were true, then the conclusion would have to be true. To put it another way, it would entail a contradiction to affirm the premises but deny the conclusion.) I believe Locke thinks it is a serious mistake to encourage people to employ their reason to deny the actual relationship between things as they are found in reality; for it is man's faculty of reason which helps him to determine what is true and what is not. He writes that the "very invention of Forms of Argumentation, wherein the Conclusion may be shewn to be rightly inferred, did great service against those, who were not ashamed to deny any thing" (p. 671; 4.17.4).

However, in other parts of Chapter XVII Locke is far less critical of the methods of scholastic logicians. Very early in section IV of Chapter XVII he states that all sound inferences can be expressed using the syllogism: "And I readily own, that all right reasoning may be reduced to his [Aristotle's] Forms of Syllogism" (p. 671; 4.17.4). In fact, at the end of section IV Locke appears to offer his approval to those who use the syllogism in order to assist them in discovering the truth. He writes:

And if Men skill'd in, and used to Syllogisms, find them assisting to their Reason in the discovery of Truth, I think they ought to make use of them. . . . Some Eyes want Spectacles to see things clearly and distinctly; but let not those that use them therefore say, no body can see clearly without them. . . . If use of those Spectacles has so dimmed its Sight, that it cannot without them see consequences or inconsequences in Argumentation, I am not so unreasonable as to be against the using them. (p. 678; 4.17.4)
How can these passages be reconciled with all of Locke's criticisms of the syllogism in the chapter? Rather than conclude that he is confused or that he contradicts himself, I think the best way to account for his apparently incompatible comments is to consider the circumstances under which he was writing the Essay. In the seventeenth century scholastic logic would have been the academic standard. Logicians and their students would have been familiar with the rules and procedures of scholastic logic. So, Locke's audience would have probably been comfortable with the traditional schools of logic, whereas he, on the other hand, opposed their methods. Therefore, in order to gain some influence on his readers' thoughts about logic and to avoid provoking scholastic logicians into an outright condemnation of the Essay, Locke does not directly condemn the use of scholastic logic. He attempts to appease those who believe they need to use the syllogism. He does not insist that philosophers completely give up using the syllogism; yet he is trying to move their way of doing logic away from the use of strictly formal procedures and analytic principles. He wants to encourage them to adopt a broader view where the methods are more informal and a line of reasoning is judged on the basis of the connection of the ideas involved.

What I have tried to do in this chapter is to place Locke's criticisms of the syllogistic logic into a larger context. The logic of the schools which he criticized claimed to discover new knowledge and evaluate the reasoning of others on the basis of both maxims and syllogistic reasoning. I have not gone into all of Locke's criticisms
of maxims because there is nothing comparable to it in
twentieth-century logic and a main part of my concern in this thesis is
to show where Locke's comments on logic are relevant to
twentieth-century informal logic. However, Locke's attack on the
scholastic's use of maxims is no less important than his attack on the
purely formal aspects of the syllogism. His rejection of maxims is important to his claims about the starting point of any reasoning which
leads to the discovery of new knowledge. I now turn, in Chapter III, to
a discussion of Locke's own notion of logic, in order to see how his
logic will accomplish the goals which the scholastic logic failed to
achieve.
CHAPTER III

Locke's Account of Natural Reasoning

Having discussed Locke's contrast between two kinds of logic in Chapter I, and his specific criticisms of syllogistic logic in Chapter II we may now turn to an examination of his own notion of logic. Locke's logic is based on what I earlier called his conception of natural reasoning. There are four parts to his analysis of natural reasoning, and I shall look at each in turn. In Section I of this chapter I consider his account of demonstrative reasoning--the type of reasoning that leads to certain knowledge. In Section II I consider his analysis of probability; in Section III I examine his account of incorrect reasoning patterns; and in Section IV I look at his explanation of how certain mental attitudes prevent one from thinking correctly. These discussions will show how Locke thinks logic can be put to use, and how the four aspects of his logic set it apart from that of many of his contemporaries and, I believe, make it similar (especially those discussed in sections II-IV) to the account of logic now being developed by many twentieth-century informal logicians.

Before I begin to discuss these specific parts of Locke's own logic I think something should be said in general about that logic. As I have already suggested, Locke's own view of logic is very different from the one traditionally encountered in the seventeenth century. As we have seen, the logic of the schools centered primarily on the use of
the syllogism and certain principles of reason called maxims. The scholastics claimed all knowledge could be deduced from these two elements. I argued in Chapter 2 that Locke thinks they cannot be used to achieve the goals of discovering or confirming any knowledge. I believe Locke’s own notion of logic differs in aim from the seventeenth-century scholastic accounts. He views the scholastics’ methods largely as a set of techniques devised to obtain victory in a dispute:

> And hence it is, that Men even when they are baffled and silenced in this Scholastique way, are seldom or never convinced, and so brought over to the conquering side... and go away, worsted as they are, with the same Opinion they brought with them, which they could not do, if this way of Argumentation carried Light and Conviction with it, and made Men see where the truth lay. And therefore Syllogism has been thought more proper for the attaining Victory in dispute, than for the Discovery or Confirmation of Truth, in fair Enquiries. (pp. 677-678; 4.17.4)

John Locke was a thinker motivated by practical concerns. In Book I Chapter I of the Essay he says that one of the primary purposes of writing the work was to provide an understanding of man’s rational faculties so he could gain the knowledge he needs to improve the conduct of his own life. Locke writes:

> Our Business here is not to know all things, but those which concern our Conduct. If we can find out those Measures, whereby a rational Creature put in that State, which Man is in, in this World, may, and ought to govern his Opinions, and Actions depending thereon, we need not be troubled, that some other things escape our Knowledge. (p. 46; 1.1.6)

In his opening comments in the Conduct Locke also makes it clear that man’s only means of controlling his actions lies in a better use of the understanding:
The last resort a man has recourse to in the conduct of himself is his understanding . . . the man which is the agent determines himself to this or that voluntary action upon some precedent knowledge, or appearance of knowledge . . . It is therefore of the highest concernment that great care should be taken of the understanding, to conduct it right in the search of Knowledge and in the judgements it makes.
(pp. 3-4; Section I)

It is Locke's concern for improving the conduct of individuals through improving their reasoning powers which sets him apart from his contemporaries.

I) Demonstration

An essential part of Locke's own logic involves a process he calls "demonstration." In Book IV Chapter XV Locke puts forth the following definition:

... Demonstration is the shewing the Agreement, or Disagreement of two Ideas, by the intervention of one or more Proofs, which have a constant, immutable, and visible connexion one with another . . . . (p. 654; 4.15.1)

What does Locke mean by this definition? Let us begin by getting clear about some of the terms Locke uses. I pointed out in Chapter I that the term "proofs" refers to intermediate ideas which show a connection or lack of connection between two ideas. Locke writes:

Those intervening Ideas, which serve to shew the Agreement of any two others, are called Proofs; and where the Agreement or Disagreement is by this means plainly and clearly perceived, it is called Demonstration, it being shewn to the Understanding, and the Mind made see that it is so. (p. 532; 4.2.3)

According to Locke, it is by demonstration which we obtain certain knowledge. In Book IV Chapter XVII of the Essay Locke explains that
"Demonstration ... produces certain knowledge, which may be called Rational knowledge ..." (p. 684: 4.17.15). Locke defines rational knowledge as "the perception of the certain Agreement, or Disagreement of two Ideas, by the intervention of one or more other Ideas" (p. 685: 4.17.17).

To understand what Locke means by this we need to understand what he means by such expressions as "perceiving the certain agreement or disagreement of two ideas." At a glance one might wonder what in the world Locke means by perceiving the connection between ideas. One might get the impression that Locke is talking in a mysterious or mystical fashion. That is, when human beings perceive the certain agreement or disagreement between ideas, they see some mysterious visual picture in their brains corresponding to entities which exist in the mind (be they material or immaterial). For example, it may be thought that when Locke writes of perceiving the connection between the ideas of "man" and "self-determination" or that "one and one equal two" he thinks that there are some sort of entities existing in our own minds which we are able to see and examine. I believe that this interpretation of Locke is misleading; nothing could be farther from the point which he is trying to make. "Perceiving the certain connection between ideas" is a way of trying to explain expressions similar to "I know, understand or see what is going on." Locke is using words like 'perceive' in a purely cognitive sense and should not be interpreted literally. In 4.2.5 it seems clear that Locke is aware of this point.
If there be Sight in the Eyes, it will at first glimpse, without Hesitation, perceive the Words printed on this Paper, different from the Colour of the Paper: And so if the Mind have the Faculty of distinct Perception, it will perceive the Agreement or Disagreement of those Ideas that produce intuitive Knowledge. If the Eyes have lost the Faculty of seeing, or the Mind of perceiving, we in vain enquire after the quickness of Sight in one, or clearness of Perception in the other. (p. 533: 4.2.5)

In this passage Locke views the perception of the agreement or disagreement of ideas as analogous to the perception of visible objects through the eye. However, never is this analogy taken to be anything more than that. I believe Locke uses this visual analogy because he wants to describe our rational processes in the simplest and clearest terms without becoming too technical or too confusing.

Quite often when I have a flash of insight I say "Now I see what is going on, or I see the connection between everything clearly." If my professor or classmates responded to me by saying "What do you mean when you see a connection? I see nothing at all." I would probably think they were strange; for they would not understand how I am using the word "see" in this instance.

This same point can be applied to Locke's use of several other terms. For instance, central to Locke's notion of logic is his use of the word "idea." Locke makes it clear from very early on in the Essay that what he means by the word "idea" is nothing more than what human beings have before their consciousness when they are said to be thinking. In fact, Locke apologizes to his reader in 1.1.8 for having used the term so much in the Essay:
... I must here in the Entrance beg pardon of my Reader, for the frequent use of the Word Idea, which he will find in the following Treatise. It being that Term, which, I think, serves best to stand for whatsoever is the Object of the Understanding when a Man thinks. I have used it to express whatever is meant by Phantasm, Notion, Species, or whatever it is, which the Mind can be employ'd about in thinking; and I could not avoid frequently using it.

(p. 47; 1.1.8)

The point I want to emphasize from this passage is that Locke is not using of the word "idea" in a strange way in the Essay. Rather he is simply trying to identify and highlight that which we have before our minds when we think and reason, whatever that might be. For example, there are many concepts to be considered in the course of reading this thesis. When we consider these concepts we refer to what Locke calls ideas.

The same can also be said of the terms which Locke uses in his explicit definitions of knowledge. In Book IV Chapter I, entitled "Of Knowledge in General", Locke defines and explains what he means by knowledge in general:

"Knowledge then seems to me to be nothing but the perception of the connexion and agreement, or disagreement and repugnancy of any of our Ideas. In this alone it consists. Where this Perception is, there is Knowledge..." (p. 525; 4.1.2)

As he goes on to explain in this passage to say that we know "White is not black" is nothing more than perceiving that the idea of white does not agree with the idea of black. Locke identifies this example as an instance of intuitive knowledge. In Book IV Chapter XVII intuitive knowledge is defined as "the perception of the certain Agreement, or Disagreement of two Ideas immediately compared together" (p. 685;
4.17.17). What is important about intuitive knowledge is that two ideas are perceived to agree or disagree from an immediate or direct comparison. Unlike demonstrative knowledge, with intuitive knowledge there is no need for any intermediate ideas. Locke writes:

The different clearness of our knowledge seems to me to lie in the different way of Perception, the Mind has of the Agreement, or Disagreement of any of its Ideas. For if we will reflect on our own ways of Thinking, we shall find, that sometimes the Mind perceives the Agreement or Disagreement of two Ideas immediately by themselves, without the intervention of any other: And this, I think, we may call intuitive Knowledge. . . . Thus the Mind perceives, that White is not Black, That a Circle is not a Triangle, That Three are more than Two, and equal to One and Two. Such kind of Truths, the Mind perceives at the first sight of the Ideas together, by bare Intuition, without the intervention of any other Idea; and this kind of Knowledge is the clearest, and most certain . . . . (pp. 530-531; 4.2.1)

Demonstrative or rational knowledge, however, involves the human mind perceiving the agreement or disagreement between two ideas through the use of one or more intermediate ideas. Locke explains the necessity of using intermediate ideas because in many cases the two ideas which we examine to determine whether they agree or disagree cannot be directly compared:

The next degree of Knowledge is, where the Mind perceives the Agreement or Disagreement of any Ideas, but not immediately. . . . the Mind cannot always perceive presently the Agreement or Disagreement of two Ideas . . . . because those Ideas . . . . cannot by the Mind be so put together . . . . when the Mind cannot so bring its Ideas together, as by their immediate Comparison . . . . it is fain, by the Intervention of other Ideas (one or more, as it happens) to discover the Agreement or Disagreement, which it searches; and this is that which we call Reasoning. (pp. 531-532; 4.2.2)
An example of rational knowledge which Locke gives us is discovering the equality or inequality of the three angles of a triangle and two right angles. According to Locke, we cannot know that the angles of a triangle are equal to two right angles by directly comparing one set of angles with the other two. Consequently, what we must do is find some other angles (i.e., some intermediate ideas) which we can use to determine the equality of the three angles of a triangle with two right angles. Locke explains this example as follows:

Thus the Mind being willing to know the Agreement or Disagreement in bigness, between the three Angles of a Triangle, and two right ones, cannot by an immediate view and comparing them, do it: Because the three Angles of a Triangle cannot be brought at once, and be compared with any other one, or two Angles... In this Case the Mind is fain to find out some other Angles, to which the three Angles of a Triangle have an Equality; and finding those equal to two right ones, comes to know their Equality to two right ones. (p. 532; 4.2.2)

Now, even though the human mind has no intuitive knowledge of the equality of the angles of a triangle to two right angles, the demonstration of this equality requires intuitive steps. That is, each step of the demonstration (i.e., going from the idea of the angles of a triangle to an intermediate angle etc.) is accomplished by intuition. Locke explains this step as follows:

Now, in every step Reason makes in demonstrative Knowledge, there is an intuitive Knowledge of that Agreement or Disagreement, it seeks, with the next intermediate Ideas, which it uses as a Proof: For if it were not so, that yet would need a Proof... So that to make anything a Demonstration, it is necessary to perceive the immediate Agreement of the intervening Idea, whereby the Agreement or Disagreement of the two Ideas under Examination (whereof the one is always the first, and the other the last in the Account) is found. (pp. 533-534; 4.2.7)
Locke also emphasizes that great care must be taken in demonstrations in order not to leave out any necessary steps, and because the demonstration is not intuitive in its entirety, memory is necessary to bring together all of the intuitive parts of the demonstration:

In demonstration, 'tis true, there is intuition too, but not altogether at once; for there must be a Remembrance of the Intuition of the Agreement of the Medium, or intermediate Idea, with that we compared it with before, whom we compare it with the other; and where there by many Mediums, there the danger of the Mistake is the greater. (p. 684; 4.17.15)

In a long demonstration there is always a danger that one may not pay close enough attention to all of the connections between the ideas and Locke explains that men are often taken in by falsehoods which are put forth as certain knowledge:

This intuitive Perception of the Agreement or Disagreement of the intermediate Ideas, in each Step and Progression of the Demonstration, must also be carried exactly in the Mind, and a Man must be sure that no part is left out; which because in long Deductions ... Memory does not always so readily and exactly retain: therefore it comes to pass, that this is more imperfect than intuitive Knowledge, and Men embrace often Falshoods for Demonstrations. (p. 534; 4.2.7)

Take note that Locke uses the word "deduction" to describe the steps from one idea to another via a number of intermediate ideas. As I mentioned in Chapter 1 this use is very different from that of twentieth-century logicians. The clearest evidence of this point is that Locke uses the word "deduction" when discussing both demonstrative and probable reasoning. Locke explains:

Reason therefore here, as contradistinguished to Faith, I take to be the discovery of the Certainty or Probability of such Propositions or Truths, which the Mind arrives at by Deductions made from such Ideas, which it has got by the use
of its natural Faculties . . . (p. 689; 4.18.2)

In the twentieth century deduction has been defined as a necessary
entailment. For example, given that "P → Q" and "P" are true, "Q"
must follow. The conclusions of syllogisms are also considered to be
deductive. However, for Locke, 'deduction' is something entirely
different; it includes probable reasoning where the conclusions drawn
do not follow necessarily. Locke's term has a much broader meaning than
that of twentieth-century formal logicians. He never defines deduction
in the Essay or any of his other works that I have read; nevertheless, I
believe that deduction refers to the process of moving from one idea to
the next in a demonstration or a probable line of reasoning. It seems
to me to be a word which is more a description of a methodical process
by which we reason than a description of the inference present in an
argument. That is, for Locke, the word 'deduction' refers to the step
by step thinking process involved in demonstrative and probable
reasoning.

In his book The Uses of Argument Steven Toulmin explains some of the
different uses people have for the word 'deduction'. Toulmin writes:

Sherlock Holmes, at any rate, never hesitated to say that he
deduced, e.g., that a man was recently in East Sussex
from the colour and texture of the fragments of soil he left
upon the study carpet; and in this he spoke like a character
from real life. An astronomer would say, equally readily,
that he had deduced when a future eclipse would occur from
the present and past positions and motions of the heavenly
bodies involved. (p. 121.)
I think that Locke’s use of the word ‘deduction’ could also appropriately fit these two examples. As Toulmin goes on to point out, it has been suggested that the word ‘deduce’ means the same as ‘infer’:

As Ryle implies, the meaning of the word ‘deduce’ is effectively the same as that of ‘infer’, so that, wherever there are established warrants or set procedures of computation by which to pass from data to a conclusion, there we may properly speak of ‘deductions’. A regular prediction, made in accordance with the standard equations of stellar dynamics, is in this sense an unquestionable deduction; and so long as Sherlock Holmes also is capable of producing sound, well-backed warrants to justify his steps, we can allow that he too has been making deductions—unless one has just been reading a textbook of formal logic. The protestations of another sleuth that Sherlock Holmes was in error, in taking for deductions arguments which were really inductive, will strike one as hollow and mistaken. (p. 121.)

There are just two final points that I wish to address before moving on to a discussion of probable reasoning. The first concerns the extent to which Locke believes demonstration is useful. In Book IV Chapter II he argues that mathematics is not the only area in which one might rightly use demonstration. He suggests that a lack of effort by people to apply demonstration properly to other areas of knowledge has made people think that demonstration was not applicable elsewhere:

It has been generally taken for granted that Mathematicks alone are capable of demonstrative certainty: But to have such an agreement or disagreement, as may intuitively be perceived . . . [is] not the privilege of the Ideas of Number, Extension, and Figure alone, it may possibly be the want of due method, and application in us; and not of sufficient evidence in things . . . . (p. 534; 4.2.9)

Locke goes on to argue that wherever the mind can perceive the immediate agreement or disagreement of ideas it is capable of intuitive knowledge and where the mind can perceive this immediate agreement or disagreement
with intermediate ideas demonstration is possible (pp. 534-535; 4.2.9).

He singles out one discipline in particular: "... Morality is capable of Demonstration, as well as Mathematicks..." (p. 516; 3.11.16). In his chapter "Extent of Human Knowledge", Locke illustrates this by telling us that there is a demonstrative connection between the concepts of 'justice' and 'property':

Where there is no Property, there is no Injustice, is a Proposition as certain as any Demonstration in Euclid: For the Idea of Property, being a right to any thing; and the Idea to which the Name Injustice is given, being the Invasion or Violation of that right; it is evident, that these Ideas being thus established, and these Names annexed to them, I can as certainly know this Proposition to be true, as that a Triangle has three Angles equal to two right ones. (pp. 549-550; 4.3.18)

He also suggests that there is a demonstrative connection between the concepts of 'government' and 'liberty'. He writes:

Again, No Government allows absolute Liberty: The Idea of Government being the establishment of Society upon certain Rules or Laws, which require Conformity to them; and the Idea of absolute Liberty being for any one to do whatever he pleases; I am as capable of being certain of the Truth of this Proposition, as of any in Mathematicks. (p. 550; 4.3.18)

The final point I want to discuss with reference to deduction concerns my comments on maxims (or principles of logic) in the previous chapter. As I pointed out in Chapter II, Locke believed that the maxims used by the scholastics of this period were of no use in discovering knowledge. However, this is not to say that Locke doesn't believe there are certain basic truths or principles. He believes that man can discover certain fundamental truths which will serve as the basis for further reasoning and result in the discovery of a great number of new
truths about the world. In the *Conduct* Locke points out that Newton had discovered just such a fundamental truth:

There are fundamental truths that lie at the bottom, the basis upon which a great many others rest, and in which they have their consistency. These are teeming truths, rich in store, with which they furnish the mind, and, like the lights of heaven, are not only beautiful and entertaining in themselves, but give light and evidence to other things that without them could not be seen or known. Such is that admirable discovery of Mr. Newton, that all bodies gravitate to one another, which may be counted as the basis of natural philosophy; which of what use it is to the understanding of the great frame of our solar system, he has to the astonishment of the learned world shewn, and how much farther it would guide us in other things, if rightly pursued, is not yet known. Our Saviour's great rule, that *we should love our neighbour as ourselves*, is such a fundamental truth for the regulating human society, that I think by that alone one might without difficulty determine all the cases and doubts in social morality. (pp. 94-95; Section XLIII)

It is unclear just how one arrives at these truths. Are these discovered through demonstration or are these intuitive insights used in demonstrations of other truths about the world? Locke doesn't tell us. My guess is that these truths are discovered through observation and demonstration, although I must admit that Locke doesn't supply very many hints that this is the case. Nevertheless, it should be noted that Locke's notion of fundamental truths at least appears to be different from the scholastic notion of maxims in one important respect. Locke's fundamental truths are substantial claims about the world whereas the scholastic maxims appear to be entirely analytic.
II) Probable Reasoning

In addition to having the capacity to reason to certain knowledge via demonstration man also has the power to reason to probable conclusions. Locke writes:

... God has set some Things in broad day-light; as he has given us some certain knowledge, though limited to a few Things in comparison... So in the greatest part of our Concernment, he has afforded us only the twilight, as I may so say, of Probability. (p. 652; 4.14.2)

According to Locke, human beings have certain knowledge of very few things. Therefore, probable reasoning is very important. Without it human beings would have little to help them when they attempted to conduct their actions properly:

... Man would be at a great loss, if he had nothing to direct him, but what has the Certainty of true Knowledge. For that being very short and scanty, as we have seen, he would be often utterly in the dark, and in most of the Actions of his Life, perfectly at a stand, had he nothing to guide him in the absence of clear and certain Knowledge. (p. 652; 4.14.1)

Probable reasoning fills in the gaps where rational knowledge is defective:

Probability then, being to supply the defect of our Knowledge, and to guide us where that fails, is always conversant about Propositions, whereby we have no certainty, but only some inducements to receive them for true. (pp. 655-656; 4.15.4)

The name which Locke gives to this capacity is the faculty of "Judgement". In Book IV Chapter XVII of the Essay Locke defines judgement as
the thinking or taking two ideas to agree, or disagree, by the intervention of one or more ideas, whose certain Agreement, or Disagreement with them it does not perceive, but hath observed to be frequent and usual. (p. 685; 4.17.17)

What is central to this mode of reasoning is that the human mind takes ideas to agree or disagree without perceiving their connection as in a demonstration:

The Faculty... is Judgement. Whereby the Mind takes its Ideas to agree, or disagree; or which is the same, any Proposition to be true, or false, without perceiving a demonstrative Evidence in the Proofs. (p. 653; 4.14.3)

The ideas in a line of probable reasoning are presumed to be connected. Locke explains probable reasoning elsewhere by saying that in a line of probable reasoning the ideas appear to be connected, and therefore the mind is induced to judge the conclusion to be true or false (p. 654; 4.15.1).

The precise difference between demonstration and probable reasoning lies in a lack of intuition (i.e., an immediate, visible connection between ideas) in each step of the reasoning. Locke writes:

And herein lies the difference between Probability and Certainty... all the parts of Knowledge, there is intuition; each immediate idea, each step has its visible and certain connexion; in belief not so. (p. 655; 4.15.3)

Locke illustrates this point nicely by using a mathematical demonstration he referred to earlier. As I have explained, it is an intuitive knowledge of the agreement of the intermediate ideas (i.e., proofs) in this demonstration which allows us to conclude with certainty that the sum of the angles of a triangle are equivalent to two right
angles. However, if one were told by a mathematician that the three angles of a triangle are equal to two right angles without having gone through the demonstration one would judge but not know this to be true. One would have to rely upon the credibility of the source. Locke explains:

But another Man who never took the pains to observe the Demonstration, hearing a Mathematician, a Man of credit, affirm the three Angles of a Triangle, to be equal to two right ones, assents to it; i.e. receives it for true. In which case, the foundation of his Assent is the Probability of the thing, the Proof being such, as for the most part carries Truth with it: The Man, on whose Testimony he receives it, not being wont to affirm any thing contrary to, or besides his Knowledge, especially in matters of this kind. (p. 654; 4.15.1)

According to Locke, there are two broad grounds upon which to evaluate probable truths. First, he considers the degree to which a claim conforms to our knowledge, observation and experience. That is, whether a claim corresponds to what we have already established from our past observations and experiences.

If I my self see a Man walk on the Ice, it is past Probability, 'tis Knowledge: but if another tells me he saw a Man in England in the midst of a sharp Winter, walk upon Water harden'd with cold; this has so great conformity with what is usually observed to happen, that I am disposed by the nature of the thing it self to assent to it . . . . (p. 656; 4.16.5)

Because the claim that someone in cold weather walked on frozen water conforms to our past experience we are very likely to believe it to be true. However, if we could not rely on our past experiences we would have to use other means to determine the truth of the claim. Locke's second ground for evaluating probable claims involves evaluating the
testimony of those making the claims. Locke outlines six criteria for evaluating the testimony of others:

In the Testimony of others, is to be considered, i. The Number. 2. The Integrity. 3. The Skill of the Witness. 4. The Design of the Author, where it is a Testimony out of a Book cited. 5. The Consistency of the Parts, and Circumstances of the Relation. 6. Contrary Testimonies. (p. 656; 4.16.4)

Using the testimony example of a man walking on "water harden'd with cold" Locke illustrates how these points are put to use. He writes:

... if the same thing be told to one born between the Tropicks, who never saw nor heard of any such Thing before, there the whole Probability relies on Testimony: And as the Relators are more in number, and of more Credit, and have no Interest to speak contrary to the Truth; so that matter of Fact is like to find more or less belief. (p. 656; 4.16.5)

In this case the number, credibility and motivations of those relating the story to a man who has never observed anyone walking on ice would have to be assessed to determine the probable truth of the claim.

However, according to Locke, even a credible witness is unlikely to convince someone who has never seen or heard of a man walking on a frozen body of water. He tells the story of the King of Siam who did not believe the Dutch ambassador who told him that in winter a body of water in his country became so hard that it could support the weight of a man or an elephant. Such an account was "quite contrary" to the king's experience (p. 656; 4.16.5). Indeed Locke seems to endorse this scepticism of the King of Siam. He stresses the dangers of relying on the opinion of others:

There is another, I confess, which though by itself be no true ground of Probability, yet is often made use of for
one, by which Men most commonly regulate their Assent, and upon which they pin their Faith more than any thing else, and, that is, the Opinion of others; though there cannot be a more dangerous thing to rely on, nor more likely to mislead one; since there is much more Falseness and Error amongst Men, than Truth and Knowledge. (p. 657; 4.16.6)

What Locke is talking about here is blindly following the common and accepted views of others. He thinks it is wrong to believe something to be probably true just because it is the view of others and in 4.20.17 makes the point clear:

... the ... last wrong Measure of Probability I shall take notice of, and which keeps in Ignorance, or Error, more People than all the other together, is that which I have mentioned in the fore-going Chapter, I mean, the giving up our Assent to the common received Opinions, either to our Friends, or Party; Neighbourhood, or Country. How many Men have no other ground for their Tenets, than the supposed Honesty, or Learning, or Number of those of the same Profession? As if honest, or bookish Men could not err; or Truth were to be established by the Vote of the Multitude: yet this with most Men serves the Turn. (p. 718; 4.20.17)

According to Locke, the opinions of others is never grounds by itself to judge a claim or view to be probably true or false. When one is judging the opinions of others there are the following matters to consider: 

... the conformity of our Knowledge ... the certainty of Observations 
... the frequency and constancy of Experience, and the number and credibility of Testimonies" (p. 657; 4.16.6).

What is clear from all of Locke's examples of probable claims is that there is no strict a plan for evaluating the testimony of others. His criteria for evaluating testimony are more like a number of helpful pointers to be kept in mind when assessing testimony; however, which points are relevant to a case varies from case to case.
What is also clear from these examples is that the 'likeliness' of the conclusions of probable reasoning vary a great deal, from very likely to highly unlikely. Locke explains that

"... most of the Propositions we think, reason, discourse, may act upon, are such, as we cannot have undoubted knowledge of their Truth; yet some of them border so near upon Certainty, that we make no doubt at all about them; but assent to them as firmly, and act, according to that Assent, as resolutely, as if they were infallibly demonstrated ... But there being degrees herein, from the very neighbourhood of Certainty and Demonstration, quite down to Improbability and Unlikeness, even to the Confines of Impossibility ..." (p. 655; 4.15.2)

Let us consider some of the different circumstances which yield varying degrees of probability. The first involves what Locke calls a "particular matter of fact." This occurs whenever a constant observation of something produces a consistent result to all who have observed it. According to Locke, these circumstances yield the highest probability. He writes:

'The first therefore, and highest degree of Probability, is, when the general consent of all Men, in all Ages, as far as it can be known, concurs with a Man's constant and never-failing Experience in like cases, to confirm the Truth of any particular matter of fact attested by fair Witnesses: such are all the stated Constitutions and Properties of Bodies, and the regular proceedings of Causes and Effects in the ordinary course of Nature. (p. 661; 4.16.6).

Locke calls these types of investigations arguments "from the nature of Things themselves." He supplies several examples of this type of investigation:

... That Fire warmed a Man, made Lead fluid, and changed the colour or consistency in Wood or Charcoal; that Iron sunk in Water, and swam in Quicksilver; These and the like Propositions about particular facts, being agreeable to our
constant Experience ... and being generally spoke of, (when mentioned by others,) as things found constantly to be so ... (p. 662; 4.16.6)

According to Locke, particular matters of fact, such as these, come so close to certain knowledge that we have little choice but to believe they are true and act accordingly. He gives this degree of belief the name "assurance." He writes:

These Probabilities rise so near to Certainty, that they govern our Thoughts as absolutely, and influence all our Actions as fully, as the most evident demonstration: and in what concerns us, we make little or no difference between them and certain knowledge: our Belief thus grounded, rises to Assurance. (p. 662; 4.16.6)

The second degree of probability is somewhat more complicated.

Locke writes that

... The next degree of Probability is, when I find by my own Experience, and the Agreement of all others that mention it, a thing to be, for the most part, so; and that the particular instance of it is attested by many and undoubted Witnesses ... (p. 662; 4.16.7)

This second degree of probability involves two points: first, that one's experience of something conform to what is generally observed to be the case; and second, that one's experience be confirmed by many reliable witnesses. For Locke, historical accounts of people or events provide the best examples of this level of probability. "Confidence" is the name he gives to it:

... History giving us such an account of Men in all Ages; and my own Experience, as far as I had an opportunity to observe, confirming it, that most Men preferr their private Advantage, to the publick. If all Historians that write of Tiberius, say that Tiberius did so, it is extremely probable. And in this case, our Assent has a sufficient
foundation to raise it self to a degree, which we may call
Confidence. (p. 662; 4.16.7)

In historical accounts of people and events particular matters of fact
are confirmed by the concurrent testimony of many historians.

In these examples, where experience and testimony support one
another, there is a high level of probability; however, when experience
and testimony are in conflict it is very difficult to assign
probability. In fact, Locke explains that under these circumstances
"tis impossible to reduce to precise Rules, the various degrees wherein
Men give their Assent" (p. 663; 4.16.9).

In the case of the testimony of witnesses Locke suggests that we
apply a rule used in English law. According to this rule, the farther
removed a testimony is from the original source the less force or
probability it carries:

... though the attested Copy of a Record be good Proof, yet
the Copy of a Copy never so well attested, and by never so
credible Witnesses, will not be admitted as a proof in
Judicature. (p. 663; 4.16.10)

Locke suggests this rule because he had found that a common practice was
to accept the beliefs passed down from ages ago as if they were
demonstratively true:

I find amongst some Men, the quite contrary commonly
practised, who look on Opinions to gain force by growing
older; and what a thousand years since would not, to a
rational Man, contemporary with the first Voucher, have
appeared at all probable, is now urged as certain beyond all
question, only because several have since, from him, said it
one after another. (p. 664; 4.16.10)
Locke's point is that the probability of a claim doesn't increase if the only evidence for the claim is a single testimony which many later cite as evidence. The frequency of citing the original for a claim never lends more probability to the claim than what is established by the original evidence (p. 664; 4.16.11).

Locke divides probable claims in another way. They either involve matters of fact or purely speculative matters "which being beyond the discovery of our Senses, are not capable of any such Testimony" (p. 665; 4.16.5). The degrees of probability which have been discussed involve matters of fact for they concern things or events which can be observed to exist and about which testimony can be given. However, there are also purely speculative matters which concern things beyond the discovery of our senses (p. 665; 4.16.5). According to Locke, speculative matters consist of two sorts: first, the existence and nature of both finite immaterial and material beings; and second, the causes that lie behind nature:

Such are, 1. The Existence, Nature, and Operations of finite immaterial Beings without us; as Spirits, Angels, Devils, etc. Or the Existence of material Beings . . . our Senses cannot take notice of, as whether there be any Plants, Animals, and intelligent Inhabitants in the Planets, and other Mansions of the vast Universe. 2. Concerning the manner of Operation in most parts of the Works of Nature . . . (p. 665; 4.16.12)

Locke makes the point that in the operation of most of nature, we can only see and know the effects of events in nature; however, the causes of these events can only be guessed at and conjectured about (p. 665; 4.16.12). Locke gives us examples of just the kinds of things which we can see the effects but only guess at their causes. For example, we see
the effects of a flame on the wax of a candle; however, we can only conjecture on what causes the candle wax melt. He believes that in such speculative matters probability can only be established by analogy (p. 665; 4.16.12). He explains in the Conduct that analogies are of great use in natural philosophy; however, he stresses that analogy should be used with care and be applied only when the cases are entirely similar (pp. 87-88; Section XL).

III) Where Our Reasoning Goes Wrong: Other Reasoning Patterns

In addition to his discussions of demonstrative and probable reasoning Locke has some other comments relating to logic and its use. He discusses several different patterns of reasoning which are commonly referred to today as fallacies; he also discusses certain impediments to reasoning, which I like to refer to as psychological blocks or barriers to reasoning well. I will investigate the first of these two topics in Section III and the second in Section IV.

Towards the end of Book IV Chapter XVII of the Essay Locke makes reference to four different kinds of argument which people commonly use, either to convince their opponents of the truth of their position, or at least to silence them. The first pattern of reasoning involves supporting a claim merely by appeal to one's own reputation or the reputation of others who support it. In other words, one supports one's opinion by an appeal to authority. Locke calls this reasoning "Argumentum ad Verecundiam":

"Argumentum ad Verecundiam":
When Men are established in any kind of Dignity, 'tis thought a breach of Modesty for others to derogate any way from it, and question the Authority of Men... Whoever backs his Tenets with such Authorities, thinks he ought thereby to carry the Cause, and is ready to style it Impudence in any one, who shall stand out against them. This, I think, may be called Argumentum ad Verecundiam. (p. 686; 4.17.19)

The second pattern of reasoning which Locke identifies and discusses involves challenging another person either to accept your view as the correct one or to supply a view which is better. If the other cannot come up with a better view then yours is to be accepted as correct by default. In other words, an arguer makes an appeal to the ignorance of his opponent in order to prove that his position is true. Locke calls this reasoning "Argumentum ad Ignorantiam". He writes:

... Another way that Men ordinarily use to drive others, and force them to submit their Judgements, and receive the Opinion in debate, is to require the Adversary to admit what they allege as a Proof, or to assign a better. And this I call Argumentum ad Ignorantiam. (p. 686; 4.17.20)

The third pattern of reasoning which Locke lists he calls "Argumentum ad Hominem". This argument technique involves drawing out some inconsistencies between what a person is expressly committed to and the implications of those commitments. In other words, it is argued that a claim should be rejected if the person holding this claim also holds some views that are inconsistent with it. Locke writes: "A third way is, to press a Man with Consequences drawn from his own Principles, or Concessions" (p. 686; 4.17.21). The problem with Locke's explanation of ad hominem is that he does not supply us with an example. In fact, nowhere else in the Essay or in any other of his writings that I have looked at does Locke discuss this kind of reasoning. Nevertheless,
Locke's notion of the ad hominem fallacy does appear to correspond with one twentieth-century form of this fallacy. Douglas Walton in his recent book *Informal Fallacies* discusses two forms of this fallacy: circumstantial ad hominem and an abusive variety "often called character assassination." It is the circumstantial ad hominem fallacy which is relevant to Locke's discussion. According to Walton, the most common form of this fallacy is the charge that an "arguer does not practice what he or she preaches":

The classic example of the circumstantial ad hominem is an argument we will call the sportsman's rejoinder. When accused by a critic of sacrificing innocent hares or trout for his amusement, the sportsman replies to his critic, "Why do you feed on the flesh of harmless cattle?" Commonly this reply is said to commit a fallacy because the sportsman does not try to prove it is right to sacrifice animals for his amusement, but rather dwells on the critic's own circumstantial inconsistency posed by the fact that the critic himself eats meat. (p. 47.)

I think that with the aid of this example we can now better understand what Locke is involved in this fallacy and what relevance to has to twentieth-century logic.

The last argument technique Locke mentions he calls "Argumentum ad Judicium". Locke explains it as using ideas drawn from the foundations of demonstrative knowledge or probability:

... the using of Proofs drawn from any of the Foundations of Knowledge, or Probability. ... This alone of all of the four, brings true Instruction with it, and advances us in our way to Knowledge. (p. 686; 4.17.22)

What Locke seems to be proposing here is an alternative to the appeal to the "maxims" that provide the foundation of reasoning for Aristotelians
like Sergeant. I showed earlier (at the end of section I of this chapter) that Locke recommends that reasoning be founded on substantive principles which are themselves well-established. For example, Newton’s principle of gravitation would be something which we might begin with in an argument where we were trying to discover new truths about the world. Locke contrasts this method of argument with the other patterns of reasoning he has been discussing:

\[\ldots\text{ I may be modest, and therefore not oppose another Man’s Persuasion: I may be ignorant, and not be able to produce a better: I may be in an Error, and another may shew me that I am so. This may dispose me, perhaps, for the reception of Truth, but helps me not to it; That must come from Proofs, and Arguments, and Light arising from the nature of Things themselves, and not from my Shamefacedness, Ignorance, or Error.} \text{(p. 687; 4.17.22)}\]

One important point should be stressed about the other three sorts of argument: Locke does not outright condemn them as fallacious patterns of reasoning. Nevertheless, it is clear that he does not look favourably on them as means of discovering what is true.

It is peculiar that Locke never uses the term ‘fallacies’ when he refers to the first three patterns of reasoning even though he does mention fallacies earlier in Book IV Chapter XVII and also devotes an entire section in the Conduct to this topic. In 4.17.4 he notes that the scholastic forms of discourse are not any less likely to avoid fallacies than plainer ways of argumentation:

\[\ldots\text{ of whatever use Mode and Figure is pretended to be in the laying open of Fallacy \ldots those scholastique Forms of Discourse, are not less liable to Fallacies, than the plainer ways of Argumentation \ldots} \text{(p. 677; 4.17.4)}\]
In Section XLII of the Conduct, Locke explains why people commit fallacies. Often fallacies involve slanting an investigation in one direction due to the biases and inclinations of those involved in the investigation. Locke writes:

... the right use and conduct of the understanding, whose business is purely truth and nothing else, is that the mind should be kept in a perfect indifferency, not inclining to either side, any farther than evidence settles it by knowledge, or the overbalance of probability gives it the turn of assent and belief... (p. 90; Section XLII)

Locke goes on to explain that a person's biases and inclinations often lead him to alter the ideas to suit the desired end that he wishes to reach. Locke calls this "plain and direct sophistry"; however, he does not mean that it is always intentional (p. 90-91; Section XLII). Sometimes these patterns are intentional and sometimes they are unintentional.

Locke recommends the following strategy to avoid being taken in by the fallacious arguments of others. First, a person must have a clear idea of what is involved in a question under investigation (i.e., be clear about the subject matter of the question or dispute). Second, when reviewing an author's argument a person should pay close attention to the ideas involved and not the words the author uses. It is important to pay close attention to the way the ideas in question agree or disagree with one another and words can lead a person in the wrong direction:

He that does this will be able to cast off all that is superfluous; he will see what is pertinent, what coherent, what is direct to, what slides by the question. This will
readily shew him all the foreign ideas in the discourse, and where they were brought in; and though they perhaps dazzled the writer, yet he will perceive that they give no light nor strength to his reasonings. (p. 92; Section XLII)

Locke acknowledges that this procedure is not easy to follow. In fact, it will be "hard and tedious" for those who are not used to performing these operations, and therefore he does not expect everyone to be able to do this:

This, though it be the shortest and easiest way of ... keeping one's self from being misled by great names or plausible discourses ... it is not to be expected that every one (amongst those few who really pursue truth) should this way guard his understanding from being imposed on by the wilful or, at least, undesigned sophistry, which creeps into most of the books of argument.
(p. 92; Section XLII)

Locke suggests that if one does not have the skill to follow this difficult strategy then one can pursue at least one other strategy. A person can at least pay close attention to the precise question under investigation, making sure that the terms originally used are not altered to favour one side of the question (p. 93; Section XLII). Locke goes on to explain that

... every one can do who has a mind to it: and he that has not a mind to it, it is plain makes his understanding only the warehouse of other men's lumber; I mean, false and unconcluding reasonings, rather than a repository of truth for his own use, which will prove substantial and stand him in stead when he has occasion for it. And whether such a one deals fairly by his own mind, and conducts his own understanding right, I leave to his own understanding to judge. (p. 93; Section XLII)

The point Locke wants to stress is that the lack of ability on the part of some to carry out a full examination of another's reasoning is not a lack of intellectual capacity but rather a lack of practice. According
to him, everyone is born with the potential to reason well and it is only the lack of exercise which holds some people back:

We are born with faculties and powers capable almost of any thing, such at least as would carry us farther than can easily be imagined; but it is only the exercise of those powers which gives us ability and skill in any thing, and leads us towards perfection. . . . As it is in the body, so it is in the mind; practice makes it what it is . . .
(p. 13; Section IV)

IV) Psychological Blocks to Reasoning Well

However, reasoning well is not just a matter of practice because, as Locke points out, there are other things which we must be careful of when we reason. According to him, there are three general problems

. . . that men are guilty of in reference to their reason, whereby this faculty is hindered in them from that service it might do and was designed for. And he that reflects upon the actions and discourses of mankind will find their defects in this kind very frequent and very observable.
(p. 6; Section III)

The first miscarriage concerns those people who seldom reason for themselves but rely on

. . . the example of others, whether parents, neighbours, ministers, or who else they are pleased to make choice of to have an implicit faith in, for the saving of themselves the pains and trouble of thinking and examining for themselves. (p. 6; Section III)

This does not mean that people should never listen to their parents, friends, etc. However, what Locke does suggest is that the important decisions in a person's life should be reasoned through for himself.
The second problem Locke identifies involves putting one's passions in the place of reason. Some people use emotions to govern their actions and never use their own reason or pay attention to that of others "any farther than it suits their humour, interest, or party ...." (p. 6; Section III). This second problem might be best understood in association with the twentieth-century fallacy of 'appeal to pity'. When people employ this fallacious mode of reasoning an appeal is made to one's emotions as a substitute for giving reasons for a position. Reasoning of this sort is wrong, for the emotions can never be substituted for giving sound reasons for a position, a point which Locke clearly recognizes. An appeal to one's emotions might be appropriate in some cases; however, only when reasons for a position are given first.

The third problem Locke identifies is based on an inflated view of one's own abilities as a reasoner. This results in a lack of consideration for all that needs to be looked at in evaluating some position. These people tend only to consider one side of an issue when there are many. Locke writes:

... of those who readily and sincerely follow reason, but, for want of having that which one may call large, sound, round-about sense, have not a full view of all that relates to the question and may be of moment to decide it. We are all shortsighted, and very often see but one side of a matter ... (p. 6-7; Section III)

Locke recognizes that human beings cannot consider all sides of an issue at one time. In fact, quite often we make decisions about things with only a partial view of what needs to be considered:
our views are not extended to all that has a connection with it. From this defect I think no man is free. We see but in part and we know but in part, and therefore it is no wonder we conclude not right from our partial views. (p. 7; Section III)

One suggestion that Locke makes to get around this shortcoming is to speak and consult with others in order to gain an understanding of other views and perspectives. Locke explains:

... since no one sees all, and we generally have different prospects of the same thing, according to our different, as I may say, positions to it, it is not incongruous to think nor beneath any man to try whether another 'may not have notions of things' which have escaped him, and which his reason would make use of if they came into his mind. (p. 7; Section III)

Locke refers to these three problems as miscarriages of man's capacity to reason; however, I think that they might be thought of as psychological blocks or barriers which prevent us from reasoning well. These are the kinds of things which one must attempt to overcome in order to reason better. In a book titled *Invitation to Critical Thinking* Barry speaks of "blocks to critical thinking" which... impede us from arriving at a reasonable basis for belief. They are obstacles that we must not only be aware of but work zealously to avoid following blindly. Otherwise they will thwart our efforts to become more effective thinkers. (p. 10.)

Some of the blocks Barry outlines include cultural conditioning, reliance on authority, hasty moral judgement, frame of reference (to be explained below). His discussion of 'reliance on authority' in many ways seems very similar to Locke's discussion of the first of Locke's three miscarriages of reasoning:
Authority is an expert outside ourselves. The expert can be a single individual (a parent, a teacher, a celebrity, a clergy member . . . a group of individuals . . . or even an institution). Whatever its form, authority is a common source of belief and knowledge . . . But there's a danger: We can so rely on authority that we stop thinking for ourselves . . . Following authority blindly is a block to critical thinking as well as an evasion of autonomy. (pp. 11-12.)

Barry's discussion of 'frame of reference' makes the point that our own perception of reality is limited:

All of us have a tendency to see ourselves and the world according to our own frame of reference . . . This frame of reference limits our perception . . . Lacking a rich and accurate frame of reference, we cannot think critically. (pp. 19-20.)

I think Barry's talk of 'frame of reference' is similar to Locke's third miscarriage of reasoning. That is, where Locke attempts to make people aware of their limitations and suggests how they might become better thinkers.

These similarities between Locke and Barry may also extend and overlap with other informal logicians. However, I have neither the time nor the space to investigate them all. What I have covered in this last section are just a few points on which both Locke and some informal logicians can be seen as having similar concerns about how certain psychological attitudes interfere with the ability to reason well.

However, the similarity I see between John Locke and twentieth-century informal logicians extends beyond the identification of a number of fallacies or a number of psychological blocks to reasoning. I believe Locke and twentieth-century informal logicians share the basic
recognition that reasoning well is important to one's personal development. Barry writes:

You need the knowledge of how to act freely as a human being. Specifically you must first be able to learn for yourself. Lacking this knowledge you remain a slave to the ideas of others and the machines programmed by them. You must know how to think for yourself. If you don't you can never go beyond what others have learned or thought and again you remain enslaved to the ideas of others. In a word, you must know how to learn to think for yourself... Indeed it's safe to say that lacking critical thinking skills, you will never know how to learn and think for yourself. (p. 21.)

The view so well expressed in this paragraph about the value of man's capacity to reason is also the view of John Locke. It is Locke's desire to aid others to reason well for themselves in order that they might conduct their lives better.
FOOTNOTES


3Steven E. Toulmin, The Uses of Argument (Cambridge: Cambridge University Press, 1958)

*John W. Yolton, Locke and the Compass of Human Understanding (Cambridge: Cambridge University Press, 1970)


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