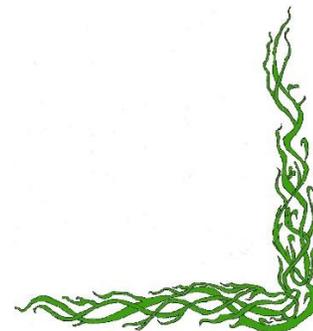
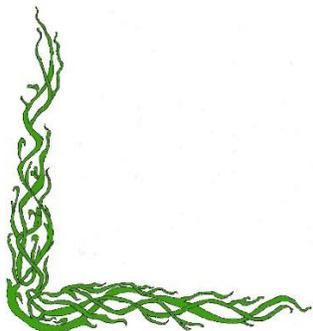


Logic

A Treatise on Logic
by Eravax Krechok, Professor of House Ulwazi



I am a dragonborn. I do not waste time. I do not waste words. What I teach will be useful in any profession, course of study, or situation you encounter for the rest of your life. So pay attention.

Eravax Krechok

Chapter I: Logic and Mathematics

Logic is a lot like mathematics: there are rules that you must follow to arrive at true and precise conclusions. Disobey these rules and you invite error into your thinking.

We will first examine some of the basic rules of logic, followed by examples of its practical application. In the next two chapters we will build on these as we study formal and informal logic, so do not breeze through this chapter: it is important for what follows.

Logic: Definition

Logic is the process by which firm conclusions are drawn from reasonable premises, often in the form of facts, either previously established or concluded from other premises.

Logic is an exact science, much like mathematics: if the rules of sums could be faked or ignored, mathematics would have little value. So also with logic: ignore the rules, and it is worthless.

Logic is a helpful science, and the most helpful one at that. By logic we can arrive at meaningful conclusions, advance the bounds of knowledge known among the sentient races, pursue new areas of study, and persuade others of what is true.

Logic is a defensible art. Logic is a castle, guarding core beliefs through reason grounded in fact. If the grounding of a belief is found to be weak, it will crumble. And so it should: it was poor ground to stand on in the first place.

Logic is an offensive art, tearing down ignorance and replacing it with wise counsel. If a defense cannot be torn down, so much the better: it is well grounded, and should be adopted.

Logic: Basic Rules and Practice

There are both formal and informal ways to approach logic, which will be the subject of the next two chapters. The basics of logic come to this: point, counterpoint, and conclusion.

A “point” is a statement, either true or untrue. If it is true, it will aid in sufficient ground for our conclusion. If it is untrue, it will be discarded for demons to consume, for it is worthless.

A “counterpoint” is a statement directed at a point, either true or untrue. If a counterpoint is true, it will support our conclusion, taking the place of the point it defeated. If it is untrue, it too will be cast aside.

A “conclusion” is an assertion grounded upon facts established in points and counterpoints. The conclusion may then form a point for a further conclusion, advancing the argument, area of study, art of war, or whatever the subject of the inquiry may be.

Examples

There are myriad examples, so we will only use a few here. Consider a discussion between an Earth Mage and an Air Mage: the Earth mage claims:

The earth is immovable.

The Air Mage disagrees, and makes the following counterpoint:

Mountains are movable with enough force, just as the sand on a beach.

Note how the counterpoint of the Air Mage directly contradicts the point. We will discuss that in depth in the next chapter: it is called “clash.” Upon their honest discourse, they come to the following conclusion:

Earth may only be moved by sufficient force, be that great or small.

And from here they may come to further conclusions. Perhaps they assert that the whole world might be moved or even destroyed given enough power and the proper application of that power. If the grounding of the points is firm enough for the conclusions, they may reach that conclusion and have arrived at wisdom.

Conclusion

Wisdom is our goal. Drawing conclusions and advancing our knowledge through firmly grounded points, refuted by the best counterpoints that can be conceived. This is what will keep us from erring into folly and ignorance.

Chapter II: Logical Thinking

Logic takes two forms: formal and informal practice. This is how you can tell someone who has studied logic and those who will make good arguments but lack formal training and thus arrive at truth quite by chance. The latter is the study of the next chapter.

In this chapter we will look at formal logic: standard forms to present points and counterpoints with their logical conclusions. It will be a short chapter, as the forms are easy to understand.

The Syllogism

A syllogism is a set of two points that, when taken together, lead to a conclusion. For example:

Point 1: All fauns have hooves.

Point 2: Hooves clack on rocks.

Conclusion: All fauns clack on rocks.

If one was attempting, for example, to explain to a faun colleague why they should forego sneaking up on an enemy in a cave, one might use this syllogism to convince them not to enter the cave, lest their enemy hear them coming.

But there are counterpoints to this syllogism. If the faun were to, say, walk on his hands (perhaps with contortionism), or if he were to pad his feet with heavy moss wrapped in cloth strapped to his legs, then Point 2 would be false.

And thus comes a critical rule of syllogisms: they are only as strong as the points that comprise them. So be wise in your choice of points, as they will define the strength of your conclusion.

Points for syllogism typically comes in four forms: the “All,” the “No,” the “Some” and the “Some are not.” Each is designed to provide different information, and the severity of the point will determine the strength of the conclusion.

The Enthymeme

An enthymeme is like a syllogism: it uses points to reach a conclusion. Unlike the syllogism, an enthymeme has one stated point and one assumed point, unstated because it is known that the point is true.

So, using the example above, one might assume that all fauns have hooves (as all fauns are born with hooves), or even that hooves clack on rocks (as it is the nature of a rock, being hard, to clack against other hard things, like hooves). The enthymeme is no less true or accurate by assuming one of the points: the truth and strength of the conclusion still rests on the strength and veracity of the points, though.

The Logical Proof

The final form of logical argument is the logical proof: a string of points and conclusions, where one conclusion becomes a point for a further conclusion. The critical thing to remember about a logical proof, though, is that it is hard to create a logical proof with a “Some” or “Some Are Not” conclusion, as one would need to prove that the following conclusion stems only from the “Some” measured by the former syllogism.

Counterpoints are also dangerous to logical proofs, as a strike to an early conclusion can have a ripple effect on later conclusions. So choose your early conclusions with care. You should also be careful with your later conclusions, but the early ones have greater impact on the accuracy of the logical proof as a whole.

Conclusion

Syllogisms, enthymemes, and logical proofs may seem like tedious work: why take the time to put out points and conclusions when one can simply jump to the conclusion? Because to skip the points that lead to the conclusion can cause miscommunication and confusion. And that is vile. Do not encourage this.

Chapter III: Critical Thinking

Some this chapter should be called “informal logic” or “street logic.” This refers to the type of logic that does not follow the formal logical reasoning systems, and I hate these terms, as they imply that we do not use formal logic on the street, or that the so-called “informal logic” has no internal logical form. Neither are true, so I refer to this body of knowledge as “critical thinking.”

The difference between formal and informal logic is how one applies critical thinking to their reasoning. In the case of logical thinking, critical thinking is applied through a formal setting for academic scrutiny. In the case of informal logic, we get raw critical thinking with no trappings. Thus I call it “critical thinking” here.

Forms of Critical Thinking

Of the forms of critical thinking there are two outside of logical thinking. First, we have inductive reasoning. While logical proofs and syllogisms are deductive, working from proofs toward a more universal whole, inductive reasoning begins with the universal and then tests it in specific instances to verify its accuracy.

This form of reasoning is not as precise, but it allows for faster decisions. If we postulate that *the sun will rise in the morning*, we might postulate this because it always does. This is deductive reasoning: from the instances we have observed, we make a conclusion. If we postulate that *the moon will provide prophetic insights*, this will stem from a universal understanding that the moon shares portends of the future, and from there one might induce that studying it will lead to the discovery of a prophecy.

Some may think that one is superior to the other. Neither is: they are merely different ways to apply one’s critical thinking.

The second form of critical thinking is abductive reasoning. It is an interesting science of study, as some conclude that it is not a form of critical thinking at all, but a subset of deductive reasoning. Abductive reasoning looks at a specific set of data, and then looks for the simplest prediction for what may occur.

Abductive reasoning differs from deductive reasoning in that it does not attempt to verify the conclusion. Abductive reasoning gives plausibility, not certainty.

Because of this, it uses points and conclusions, but it does not attempt to come to a certain conclusion. We generally denote this with conclusions that include “May” to indicate plausibility.

I do not like abductive reasoning. In many cases a verifiable conclusion could be reached, but the reasoner stops short. If you can avoid it, use deductive reasoning over abductive reasoning.

Conclusion

Critical thinking is what separates us from the animals. We use it to finetune our actions, change courses of action, and thus shape the destiny of nations. Advisors should take this to heart and devote themselves to the study of logic.

Chapter IV: Logical Fallacies

Logic assists in discerning truth. This also means it aids in the discerning of falsehoods. When a falsehood is presented through poor logic, we call this a logical fallacy.

Here we will look at the three types of logical fallacy: faulty points, faulty conclusions, and misdirection. We will present the fallacies in each section in alphabetical order for simplicity.

Fallacies of Faulty Points

The **Argument from Ignorance** fallacy occurs when the reasoner asserts that a statement must be true (or false) because no one can prove that it is false (or true). This is fallacious, as it does not actually prove the point, but assumes it from a certain silence from the opposition, not because the point is actually defensible.

The **Argument from Incredulity** fallacy is similar, except that it is when the reasoner asserts that a point is true (or false) because the reasoner cannot believe that it could be false (or true). This is fallacious, as it assumes that an unimaginable thing could never be contrary to what one assumes it to be.

The **Begging the Question** fallacy is when the reasoner starts with the conclusion as a premise. So for example, if the reasoner were to say, *No king should be able to execute people because killing is wrong* includes the conclusion as the premise of the argument and thus does not actually build the case for the conclusion.

The **Circular Reasoning** fallacy is when the reasoner assumes the conclusion is true and then uses that assumption to show the veracity of the conclusion. So, for example, if a reasoner were to say, *All fauns are liars*, and *Liars should not be trusted*, therefore *All*

fauns cannot be trusted because they are liars, the idea that fauns cannot be trusted because they are liars is assumed based on the intended conclusion, not proven through a strong point. This is fallacious, and is similar to the Begging the Question fallacy in this respect.

The **Modal** fallacy is when the reasoner confuses possibility with necessity. As you will recall, formal logic uses the following four categories for points and conclusions: “All,” “No,” “Some,” and “Some Are Not.” If a reasoner takes a “Some” and turns it into an “All,” for example, he has committed a modal fallacy, for he has taken the mere possibility and turned it into necessity.

The **No True Elf** fallacy creates an argument by summarily excluding the counterexample. So if the reasoner presents a point saying *No true elf would negotiate with an orc*, instead of building the case for why elves and orcs cannot negotiate, the reasoner attempts to stifle potential counterpoints by adding the word “true,” making it so that any possible counterexample is “not a true elf.” This is fallacious, as it fundamentally changes the discussion from the veracity of the point to the perceptions of the nature of a culture.

The **Part to Whole** fallacy is where an assumption is made by the reasoner that since something is true of the part, it must also be true of the whole. This is fallacious as it chooses to assume a point instead of proving it, and by that assumption it falls into error. This is most commonly done in enthymemes and syllogisms, especially where a particular culture unfamiliar with a fact makes an assumption about a point without verifying it.

The **Red Herring** fallacy is when the reasoner presents a point that has nothing to do with the conclusion to draw the attention of the audience (or counterpoints from respondents) to take away from their notice of the conclusion. This is fallacious as it detracts from the discovery of truth and instead attempts to derail any productive discussion that might be occurring on the topic.

The **Straw Man** fallacy borrows the image of a scarecrow in a field: it is easier to take down a scarecrow in a fight than a real person, and thus it is fallacious for a reasoner to address a fake

counterpoint that is standing in the place of the real counterpoint. The fallacy lies in correlating the two, when they are different.

The **Whole to Part** fallacy is the opposite of the Part to Whole. In this case, the reasoner assumes that if something is true of the whole it must also be true of the part. It is a fallacy for the same reason as the Part to Whole fallacy: assuming a point that may not be true is fallacious.

Fallacies of Faulty Conclusions

Affirming the Consequent is when the reasoner assumes the conclusion because of the presence of a previously established point or conclusion. So, for example, if *All centaurs have four legs* leads to the conclusion that *All centaurs have trouble scaling cliffs*. If the reasoner is told that *Centaurs have trouble scaling cliffs*, he might assume that this is because *centaurs have four legs*. But this is not necessarily true: hill goats have four legs, but they have no trouble scaling cliffs. Perhaps the reason centaurs have difficulty is their weight, or the shape of their hooves, not having four legs.

The **Appeal to Emotion** fallacy is when the reasoner reaches a conclusion based on an emotion (fear, anger, pity, flattery, etc.) instead of arriving at the conclusion based on solid points.

Denying the Antecedent is the opposite of Affirming the Consequent. Here the reasoner assumes that since a point leads to a conclusion, if the point is not the case, then the conclusion is not the case. So, for example, if *All trolls have magical regenerative blood* one might conclude that *All trolls can regenerate their limbs*. If the reasoner discovers that *Trolls do not have magical regenerative blood*, and thus assumes that *Trolls cannot regenerate their limbs*, he has denied the antecedent. It is very possible that another contributing factor will create the same conclusion, like *All trolls have regenerative skin*, not just the point that has been established. He denies the antecedent.

The **Hasty Generalization** is where someone assumes a point that is integral for the conclusion, but the assumed point is false. This is commonly done with the enthymeme, but can also be done in other forms of critical thinking.

The **Modal Scope** fallacy is similar to the modal fallacy, except that it involves the conclusion and not the points. If a person takes a possible conclusion and instead turns it into a necessity in a case where such a necessity is unwarranted, the argument is fallacious.

The **Tu Quoque** fallacy is when the reasoner asserts that something must be the case (or not be the case) because the opposing reasoner has acted the same way the reasoner has. In effect, he says, “you did it too,” and that is not substantial grounds to prove a conclusion.

The **Two Wrongs Make a Right** fallacy is when a reasoner argues that a claim is justifiable because it helps to arrive at a good or desirable ending, not because it is proven to be true, good, or desirable in and of itself.

Fallacies of Misdirection

The **Ad Hominem** attack is where the reasoner attacks the person rather than the argument. This is distinguished from using the established character of the target as a point in your conclusion (a liar is not trustworthy, for example). Instead, if the person turns to pejorative language without returning to its effect on the argument, you have a logical fallacy.

There is also a subset of the Ad Hominem called **Poisoning the Well**, wherein because of an Ad Hominem attack against the person, we also cannot trust anything they say because of who they are. This is fallacious, as it rejects the verifiable veracity of claims based on the person, not the actual merits of the arguments.

The **Appeal to Authority** is where the reasoner says that since a person who is an authority in a field says something is the case it

is true. This most commonly appears in abductive or inductive reasoning, and is false, as authorities may either be misinformed of the specific case, or the authority may be understood incorrectly.

The **Chronological Snobbery** is where someone draws a conclusion purely based on whether the point is new. This is not invoked if an old theory is discarded due to a previous conclusion: it is the refusal to consider an old idea because of the fact that it is old, not because of its proven veracity.

The **Equivocation** occurs when a word has two meanings and they are used interchangeably to falsely persuade someone of a point or conclusion's veracity. So for example, if the reasoner were to claim that *All trees have bark*, and that *All dogs have bark*, and thus that *All dogs must be trees*, one of the fallacies in this argument is an equivocation: the word "bark" has multiple meanings here.

Equivocation also occurs when ambiguity of the meaning of a word is used to confuse or disarm the listener. So for example, if one were to report to a king that, *This man has stolen nothing*, the reasoner could be equivocating if the thief took something that he believed was owed him, but was not his, for by some definitions he has not stolen anything. But the aim of the reasoner's use of the word is to use a word with a meaning that may be inferred that is not actually true in that case.

The **Historian** fallacy assumes that people of the past analyzed a situation in the same way people today look at it. This is fallacious because in the moment not all facts are known to the parties that make a decision, and thus it is not always true that they make their decision as we would do so from the comfort of our current day.

The **Motte-and-Bailey** fallacy derives its name from the castle of the same makeup. It involves two arguments, one being easy to defend (the "motte") and one being more controversial (the

"bailey"), and conflates the defense of one with the defense of the other. This is fallacious: both must stand on their own merits.¹

The **Post Hoc** fallacy occurs when the reasoner assumes that because something comes after something else, it was therefore caused by that something else. So for example, *The centaurs attacked our outpost, therefore the centaurs caused the economy to collapse*. It may be that the centaur raid caused the economy to collapse, or it could be heavy taxes, poor leadership, or a centaur seer seeing that the economy was already going down, so now was the time to attack the outpost as there would be no aid coming for some time. The centaur raid didn't cause the collapse, it merely coincided with it, making the argument fallacious.

The **Presentism** fallacy is similar to the Historian fallacy: if the reasoner projects modern standards (especially moral and ethical) from the current day onto the past, this is fallacious: not all cultures will view an incident the same way from one generation to the next, let alone from one century to the next, or even longer periods of time. This is fallacious, as it assumes points that are not true.

Conclusion

Logic takes time to master: you must know how to properly reason, and what types of reasoning to avoid. Ultimately your goal is to discern truth, and to present it in a way that is both wise and sound. This is the burden of the virtuous reasoner: to arrive at truth not only so that truth may be presented, but also to present it in a way that is honest and defensible.

If you do this, you will rise to the highest levels of influence in your kingdom, your acquaintances, and your kin. Pursue it without fear, and you will never fall.

¹ Which, admittedly, is unfair to the name of motte-and-bailey, as the castle either stands or it falls in that setup: holding the motte is typically enough to eventually reclaim the bailey. But that's beside the point.

About the Author

Evarax Krechok is a graduate and past instructor of House Ulwazi, one of the most powerful magic schools in the world. Raised the son of a the magus of Queen Suyassa Gethtil of the Island of Renaaz, Evarax was raised in a world of magic, tactics, and the affairs of governance. He recounts that the first formal subject he studied was logic, and at House Ulwazi he excelled due to his strong grasp of the subject.

He now serves as a scholar and advisor to Queen Suvassa, and lives with his wife and nine children at the Court of Renaaz. He loves flying around the island with his family, teaching pupils in formal and informal logic, and admonishing young and old alike to be more succinct and clear in their words and thought.



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