

# *Journal of Theoretics*

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## **Mankind's First Scientist and Philosopher**

The use of logic in our society today is all to scant and it seems to be a dying art, especially among our politicians. Even as scientist, how many of you have actually taken a logic course, read Aristotle or Socrates, or even know what a syllogism is? I'll wager that it is less than 10% (though much higher for those who read the Journal of Theoretics). So today, let's learn a little Theoretics where logic is used in conjunction with science to develop theories. Let me take you back to the first scientist who used logic to advance science, his name was "Grog".

*There once was a caveman named Grog, who once saw lightning hit a dead tree, which then went up in flames. He concluded that trees burn, so he took a burning branch from the tree and tried to make another tree burn. But this other tree was alive and green, and it would not burn. He then tried to light another dead tree and it did burn. So Grog then determined that only dead trees burn.*

Grog had taken a single circumstance (*a dead tree burns*), extrapolated from it a working theory (*all trees burn*), which he tested and found to be invalid. He thereby revised his theory and tested it (*dead trees burn*), finding his modified theory to be valid.

In terms of logic, there are a couple of things that we can point out that would have helped Grog:

- You can't extrapolate from "some" that the same will hold true for "all".
- If there is one exception to a theory then the theory is invalid and needs to be revised to account for that exception and others like it.

This is where science and logic can collide. Since it is often impossible to prove in the real world that something holds true for "all" we use a working theory that assumes this until we find an exception that makes our theory invalid, then we must revise our theory to account for that exception and all others like it.

Let's go back and see what Grog did next.

*Grog after burning all of the dead trees outside his cave, then needed to find something else to burn in order to keep his fire going. He then thought since only the dead trees burned and not the living ones, then all dead things must burn. At that time a bird flew into his cave and died. He tried to set it on fire but it did not burn. He tried the same to a mammoth that he had slain last week and it too did not burn. So he concluded that dead animals do not burn but since dead trees burn, he began to wonder if dead plants would burn since trees are plants. He found a dead bush nearby and to his joy it too lit on fire. Grog's new theory was that dead plants burn.*

Again Grog tried to generalize from what he knew (observed experimentally) but found it to be invalid (*all dead things burn*), so he revised it (*dead plants burn*) and found it to be experimentally valid. But if Grog had known about logical fallacies, he would have known that what he was about to do next would be wrong.

*Grog was happy and then thought that since dead plants burn, then anything that burns is a dead plant. So Grog felt pretty safe building a fire next to a black pond that was near his cave, until that black pond ignited and burned a horrible black smoke that forced Grog to leave his home. Grog's distant ancestors would become rich though as that black pond turned out to be oil bubbling up from the ground. Grog though learned that the converse of statement is not necessarily true. Hence he not only became our first scientist but also our first philosopher.*

Here, Grog thought that "If A then B" is true then "If B then A" must be true. Though in this case, we can easily see why Grog is wrong, in science it is often more subtle and harder to realize that we are making an error in logic. For instance in diabetics, we can say:

*If the insulin level is low then the glucose is high. **A True statement.***

The converse would therefore be:

*If the glucose is high the insulin level is low. A False statement.*

Though this last statement seems to make sense and sounds true, it is False. Glucose levels can be high for other reasons such as insulin resistance, where people have normal or high levels of insulin but they also have antibodies that make it ineffective, and therefore the glucose levels are high. Also people who are on steroids can have high glucose levels while their insulin levels remain in the normal range.

You are safe in saying that “If some A then some B” and visa versa, but this doesn’t get you very far in the theory department. In theory development we must look for absolutes as best as we can test them and once we have found exceptions that invalidate our theory, we must revise it in such a way that it can account for the exceptions that we have found.

So let us take a moment to thank Grog, mankind’s first scientist and philosopher.

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