

Hi Lena,

Sorry it took me so long to get back to you. I had a bit of a relapse with this bug and I've been sleeping far more than I have been working lately.

Overall this is a much stronger draft than the one you last sent me. I'll walk through it page by page with you, but first let me point out a couple big issues I noticed upon my first reading. You have clearly been playing a bit with the order of your argument, and that's great, but as a result there are a few instances where you talk about a new philosopher, or some sort of new idea, before you take the time to properly introduce them.

Another issue is your use of figures. I'm a big fan of figures, especially when you are discussing things that are tough to visualize. However, you can't just rely on the figure and figure caption alone. Ideally, you should introduce and fully explain the figure and only then conclude with a (see Figure 2).

And finally, you seem to have scurried over to the philosophy side quite a bit. That's certainly not a bad thing, but I am not going to be as much help in those sections. I have not spent much time studying philosophy.

OK – on to the page by page:

Page 1:

I'm always a little hesitant to open a paper with a bunch of questions, but if you want to keep them you should work on your grammar a bit. As written it takes away from what you are trying to say.

This is definitely a good place to bring up the idea of various cosmologies. Perhaps you want to define a "cosmology" a little stronger up front?

Page 2:

First full paragraph: I love the start of this paragraph, but then it seems to wander off in multiple directions. You tell me that Aristotle's two sphere model was one of the most popular cosmologies ever and as a result I'm dying to know what it was, but you don't tell me! Which might be fine at this point, but perhaps a quick teaser? Or make me wait, but tell me something else super interesting to distract me until you explain what the 2sphere model was.

Next you go off into philosophy land. I always get spun about and confused reading philosophy so I can't help you much here.

Page 3:

Ah! The 2 sphere model. Lovely. You claim that this model explains why stones appear to fall to the ground. I don't see that yet (though I think I remember you explain it later in the paper).

Yes, this is one of those points where you quickly mention Oresme but give no idea who the heck that is! Maybe you could also tell me right now when all of these folks were coming up with their cosmologies. Were the atomists before or after Aristotle?

I'm wondering if you need some more references as you talk about what Aristotle believed and did not believe? That's a question for John.

Page 4:

So now you have shells of Aether holding the individual planets. Isn't that a break from the 2 sphere model?

Ah – here you describe why Aristotle thought his model explained falling stones. Good.

I really like the atomists view point, and I love how much earlier they came up with it. But what is your goal in discussing it? Is it to show how the same observations can lead to very different interpretations of the universe? That Aristotle was somehow limited by some previous theories that he did not want to contradict? You should decide what exactly you are trying to convince us of here and make it stronger.

Page 5:

Here you introduce Oresme finally. I like the large quote you have here, but I wonder if it is too long. Can you use some subsection of this and then summarize the rest of it in your own words?

Your quickly mention that the Church incorporated Aristotle's two sphere model into doctrine. I think this is super important and deserves much more attention! Not only do you have scientific precedent to consider when developing a new model, but you have a church poised to excommunicate you as well! That's huge and worth developing into a larger section I think.

Page 6:

I'm pleased that you understand that modern day science is still fighting this same battle. It's hard to give up on one idea and accept another. Perhaps we are not questioning the overall cosmology much anymore (though some certainly do!) but the process of determining the smaller laws is still limited by what is considered to

be 'correct' before the experiment is even begun. I watched you and your fellow students in physics lab struggling with that same issue. Many folks did not want to sample the entire amplitude space of the pendulum because they were already convinced that the period did not depend on amplitude!

I do take issue with your statement that scientific knowledge predicts with appropriate exactness only in 'some cases,' but maybe that is just because I am a scientist and it got my back up! I think modern day "science" REQUIRES that you can make predictions and be able to test them. That is one of the big arguments against string theory right now – in its present form it is not really testable, and thus many physicists would argue that it is actually philosophy, NOT science.

You start discussing Copernicus here, but you don't really introduce him. I think it would be worth explaining who he was with emphasis on the current scientific environment at the time he was studying this problem. You do parts of that later, but I think you need at least some sort of introduction for him at this point.

Page 7

OK. So now we are into the math. You need to explain retrograde motion better. I'm sure you can find some better descriptions in one of those books or online, but if you are having trouble seeing it in your mind let me know and I can help you out. It's a fascinating thing to watch and you can do it yourself.

You keep throwing around the term eccentricity – and it seems that sometimes you mean different things by it.

Figure 1 – deferent is not explained at all. Also, maybe you want to say who came up with this model and what they were trying to explain with it. And isn't this already a break from the two sphere model?

You mention that the theory worked better for Venus than Mercury. You should explain this in clearer terms. Mercury's orbit is far more elliptical and ends up being quite hard to explain completely, even with Kepler's elliptical orbits. It was not completely understood until Einstein came along with his theory of general relativity. I'm not sure you need to go that far (though if you are interested I can explain this to you in more detail at somepoint), but I think it would be good to at least explain why the model worked better for Venus than Mercury.

Oh. Just read ahead a couple sentences. I guess you do that. But I would rearrange things to make it clearer.

Why does the proximity of Mars make Apollonius' theory fail?

Page 9 – I think you need to spent some more time explaining the equant.

Have you mentioned the algamest before?

Page 10

That's a heck of a quote from Copernicus. I wonder if you need it all. You can describe his complaints in your own words.

I don't like the use of a quote to set up the next section.

Bottom of the page. You start referring to your figure without telling us you are referring to your figure. Personally, I am a fan of having the text of a paper completely separate from the figures. You can read the paper without the figures and at least have a decent understanding of what is going on, and you can read just the captions of the figures to understand the figure. I don't like too much cross over between them.

Also, I'm a little unclear about what you are trying to say in this section.

Page 12 – all the figures. Not sure how I feel about them. Quite a few and not necessarily well explained.

Page 13:

First full paragraph : you say that you can't move an object in Copernicus' model without affecting everything else... and then you say that this is more natural and harmonious. I think you need to justify that.

End of the page. All good information about the troubles with tables and bad observations, but you can't forget about your overall argument of the paper. You need to connect all of this back to your main theme.

Page 14: Your quick reference to Neo-Platonism. Seems a little ragged as if you just didn't want to throw out your previous paragraphs about neo-platonism. Perhaps you should try to smooth this out a bit more.

Page 16

I'm wondering if we can work a bit on the mathematics of ellipses. It would be great if you could actually derive that equation yourself. I'm not sure if it is necessary, butwe should talk about it.

Again you are relying too much on the figures rather than describing out the critical pieces in the text.

Conclusion:

I'm pleased to see the church got another shout out here. They certainly had a HUGE influence on scientific thought for many centuries. I still think this is an idea that merits far more words in this paper.

OK, hope that helps. Writing portfolios are due on Thursday morning, correct?

-- Jonathan