

Reading *Flatland*

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The antipathy of those who dislike Edwin Abbott's 1884 novella *Flatland* seems to arise for one of three possible reasons: a perceived misogyny, a bland indifference towards the narrator's sociological ruminations, or a disappointment with the book's ending; the protagonist, after all, ends up mocked and abandoned. This last reaction seems to occur most often among those, frequently mathematicians or spiritualists, who devour the entire book and are charmed by the descriptions of higher dimensional life. After cavorting in the wonders of Spaceland, the return to Flatland is a rough landing. Is it possible that each type of dislike results from a misreading of the text?

It is generally recognized that the twin purposes of *Flatland* are to satirize Victorian society, particularly the limitations placed on women, and to provide an exposition of some of the revolutionary new mathematical ideas. If these are indeed the purposes of *Flatland*, we must then ask: How can we tell? and What is the relationship between them? After all, mathematics is hardly necessary for social satire or satire for mathematics, nor is the mathematical imagery particularly innovative (though its execution is brilliant). Perhaps by answering these questions, we can help correct the misreadings mentioned earlier. In particular, the drastic change between the first and second parts of the book should make us look for an overarching purpose which incorporates both the social and mathematical aspects.

Such an overarching purpose lies in the social, philosophical and theological context in which *Flatland* was written. In the past twenty years, several critical essays have placed *Flatland* in the context of Victorian intellectual life, primarily by using Edwin Abbott's other writings as guides. As we look at some of this literature, we will discover that understanding Abbott's intertwined scientific and religious views is essential to the proper interpretation of *Flatland*. While most of this paper is simply a synopsis of the work of others, at the conclusion I will show how their work justifies a comparison of *Flatland* with that great work of Platonic philosophy *The Republic*. This comparison may help illumine *Flatland's* troubling conclusion and is certainly in keeping with Abbott's philosophy and theology.

In 18th century England, Francis Bacon's *Novum Organum* was the undisputed description of how science ought to be practiced. Abhorring hypotheses, he maintained that science was the impartial and unguided collection of facts which were then organized into larger patterns by the process of induction. By the mid-19th century, however, it was recognized that this perception of science was inaccurate, that science needed to proceed by the postulation and testing of hypotheses. There were, however, significant disagreements over how this philosophical revision should be

¹ Thanks to Russ Howell for suggesting the use of *Flatland* in the Multivariable Calculus class I taught at Westmont College in Fall 2006. It was that course which first raised my academic interest in *Flatland*. Russ also provided useful suggestions on an early draft of this paper. Thanks also to Stephanie Taylor for many helpful comments on early drafts of this paper. I am also grateful to Cheri Larsen Hoeckley for a most helpful conversation.

accomplished². Empiricists, who believed all knowledge arises out of experience, battled with Idealists, who believed that knowledge was the attainment of autonomous Truth.

Their main point of contention was the proper role of imagination in science. The idealists maintained that science attempted to describe an absolute, independent reality. Science made progress through the faculties of intuition and imagination. Opposing them, the empiricists, denying imagination a place altogether, saw science as a collection of “convenient mental constructs” used to “[sum] up observations”³. Rosemary Jann, in perhaps the first critical essay on *Flatland*, shows how it is embedded in these debates.

Using Abbott’s book *The Kernel and the Husk* as a guide, Jann demonstrates that Abbott believes that science is “a leap of the imagination, tested against experience”. His position mediates the extremes of the debate by emphasizing the importance of both imagination and reason. In *The Kernel and the Husk*, Abbott quotes an imaginary interlocutor denying the role of imagination in mathematics:

“[In mathematics] at least,” you say, “severe reasoning dominates supreme, and the Imagination has no place. ‘Two and one make [three]’, ‘The angles at the base of an isosceles triangle are equal.’ Surely we may assume that Imagination has nothing to do with these propositions. They must be decided by pure Reason.”

Abbot answers this objection, “Never was assumption more grotesque... I maintain without fear of contradiction that the knowledge of these propositions requires an effort of the Imagination so severe that the very young and the completely untrained cannot attain to it.” Abbott demonstrates his point by showing how in both arithmetic and geometry, the imagination is necessary even to understand the points under discussion:

The whole of what we call “Euclid” is based upon a most aerial effort of the Imagination. We have to imagine lines without thickness, straightness that does not deviate the billionth part of an inch from perfect evenness, perfectly symmetrical circles, and -- climax of audacity! -- points that have “no parts and no magnitude!” (29 - 30)

In emphasizing the role of the imagination in science, Abbott tried to harmonize scientific and religious ways of thought. Demonstrating science’s reliance on imagination allowed religious knowledge to be placed on equal footing with scientific knowledge. Abbott hoped that this would allow him to chart a middle way through both the scientific and religious controversies of his day. Interpreting *Flatland* requires us to understand both sets of controversies.

Thomas Banchoff provides a helpful map of Victorian religious viewpoints of concern to Abbott⁴. To the west, were those who rejected all supernatural aspects of religion and saw only its social aspects as being beneficial. To the east, were the Evangelicals, who wanted the Church of

² I am indebted to Jonathan Smith’s *Fact & Feeling* for this summary.

³ Jann, Rosemary. “Abbott’s Flatland”. The actual picture, particularly concerning mathematics, is, of course, more complicated. See Smith’s *Fact & Feeling* and Chapter 1 of Richards’ *Mathematical Visions*.

⁴ Banchoff, T. “The fourth dimension ...”.

England to hold strictly to orthodox protestantism and emphasized personal experiences with the Divine. To the north, is the Oxford Movement, the Tractarians, such as John Henry Newman. Finally, to the south are the agnostics and atheists who rejected the religious worldview in its entirety. As Banchoff notes, Abbott was particularly worried about the Tractarians and the Atheists. The Oxford Movement, influenced by the Romantic rebellion against the tyranny of Reason, emphasized belief on the basis of scriptural and ecclesiastical authority. Believing the English Church to be at a crossroads, those in the movement sought to force each churchgoer to choose sides in the battles over the future direction of the church⁵. Abbott was strongly opposed to their beliefs. In their affinity for the miraculous and mysterious in religion, a by-product of their emphasis on the practices and beliefs of the early church, Abbott saw the Tractarians as playing into the hands of the agnostics and atheists who rejected a religious worldview altogether.

With our religious rose laid out in this manner, the Broad Church movement, of which Abbott was a part, is in the center of the map. Those in the movement rejected materialism and fervently believed in the supernatural, in the work of God in human hearts, putting them into conflict with the agnostics and atheists. Conflicting with the Evangelicals and Tractarians, they also rejected most accounts of the miraculous. For Abbott, these myths, though once helpful, should be discarded as we grow into spiritual maturity. This process parallels the progress of science: as we learn more about the natural world we discard previous theories, theories that helped us to arrive at our present location. In making this parallel, Abbott put scientific knowledge on par with religious knowledge-- both types of knowledge turn out to be divine revelations embraced by the Imagination. In a sermon preached at Cambridge University, he declaimed:

[A] minister of God has no other choice but to ... bid you, the disciples of the Truth, to accept truth thankfully from every source. We will do more than this: we will not only listen to the authoritative inculcations of science, we will even lean forward to catch her whispers, her conjectures, her floating fancies... (13)

Abbott's views are nicely summarized by his favourite metaphor: To obtain the kernel of truth we must pass through and then discard the husk of falsehood. This husk can be either false scientific theories or mythological religious stories. Jann argues that Abbott's views on imagination "gave accounts of miracles the same status as early scientific theories: both represented the attempts of earlier cultures to explain illusions in terms they could understand." (484) Consequently, for Abbott, both science and Christianity were valid because both "worked". As Jann writes "By showing that the faith and imagination essential to religious truth were equally necessary to the discovery of physical and mathematical truth, he actually endowed all three with equal validity" (481). He thus protected science from the attacks of the more fundamentalist Anglican and Catholic churches, and protected religion from the attacks of the agnostics and atheists. She summarizes Abbott's position:

Abbott in effect tried to forge a more ingenious "natural supernaturalism" that used the mechanism of supernatural knowledge to legitimize the existence of the unseen and the imponderable ... [He] blurs the distinction between the theoretical and the spiritual by basing both in imagination (490).

⁵ The description of the Oxford Movement is essentially due to George Herring in *What was the Oxford Movement?* For Abbott's disagreements with Newman, see *Philomythus* or later in this essay.

These concerns are central in *Flatland* as well. The epigraph indicates the importance of the imagination:

To the inhabitants of Space...In the hope that ... the citizens of [three dimensions] may aspire yet higher and higher to the secrets of four, five or even six dimensions thereby contributing to the enlargement of the imagination and the possible development of that most rare and excellent gift of Modesty.

Throughout the book, there is much (often caricatured) scientific and religious imagery and these are explicitly linked. Placing *Flatland* and Abbott's thought generally between the extremes of the scientific and religious debates, Jann sees *Flatland* as an allegory "aimed at correcting the arrogance of the materialist intellect and dogmatic faith and at demonstrating the progressive force of imagination" (486). Sphere's descent to Flatland is intended to reveal the limited imagination of both atheism and dogmatic faith. Square's progress towards true knowledge of mathematics, physics, and morality is due to the work of the imagination, enabling Square to discard the husk of illusion and progress to the kernel of truth. According to Jann, "Square triumphs to the extent he duplicates Abbott's prescribed journey through illusion to truth" (487).

This understanding of *Flatland's* critique of unimaginative belief helps us to recognize *Flatland* as satire. Sphere, who demonstrates the truth to which imagination leaps, criticizes Flatland's social structure: "Yet many of the best and wisest in Spaceland think more of the affections than of the understanding, more of your despised Straight Lines than of your belauded Circles" (96). Indeed, the second half of the book, where Square is initiated into the mysteries of the third dimension, emphasizes Imagination in order to critique the social structure described in the first half.

What then are we to make of *Flatland's* end where A. Square, the prophet of the third dimension, the proselytizer of imagination, ends up imprisoned and ineffectual? For Jann, the end undermines Abbott's claim that the best education is progression by imagination through the husks of false beliefs. Not only is Square unable to explain his visions to his countrymen, he even begins to forget them himself:

Heavily weighs on me at times the burdensome reflection that I cannot honestly say I am confident as to the exact shape of the once-seen, oft-regretted Cube; and in my nightly visions the mysterious precept, 'Upwards, not Northwards', haunts me like a soul-devouring Sphinx ... the Land of Three Dimensions seems almost as visionary as the Land of One or None; nay when even this hard wall that bars me from my freedom, these very tablets on which I am writing, and all the substantial realities of Flatland itself, appear no better than the offspring of a diseased imagination, or the baseless fabric of a dream. (118)

Although for Abbott, this linking of religion to science guaranteed the certainty of religion, for others certainty is eroded entirely. In Jann's reading, the end of *Flatland* shows the weakness of Abbott's project and casts doubt on the worthiness of his trust in imagination.

But, there is another way of reading *Flatland*. Rather than seeing it as a celebration of Imagination, perhaps we should see it as a cautionary tale of the dangers of Imagination unfettered. In

“A Grammar of Dissent: Flatland, Newman, and the theology of Probability”, Smith, Berkove, and Baker show how *Flatland* emphasizes both the importance of the Imagination and the importance of using Reason to keep it in check. As their guide, they use Abbott’s polemic *Philomythus*.

Written seven years after *Flatland*, *Philomythus* is an attack on the theology and religious practice of John Henry Newman, who prior to converting to Catholicism, was a leader and public face of the Oxford Movement. *Philomythus* is particularly concerned with the use of analogy in Newman’s *Essay on Ecclesiastical Miracles*. In that essay Newman claims that belief in the miracles of Scripture (such as the resurrection of Jesus) should lead to belief in the miracles claimed by the church. To make this claim, Newman develops an argument from analogy. For example, Newman writes:

Writers, however, like Douglas, are constantly reminding us that we *need* not receive the Ecclesiastical miracles, *though* we receive those of the New Testament. But the question is not whether we *need* not, but whether we *ought* not to receive the former, as well as the latter; and if it really is the case that we ought not, surely this must be in consequence of some positive reasons, not of a mere inferiority in the evidence. (4.70)

Newman criticizes not only those who disbelieve in miracles, but also those who are predisposed to disbelieve in miracles. According to Newman, such a mentality shows a lack of imagination. Abbott responds fiercely to such claims. In *Philomythus*, he imagines a dialogue along the following lines:

Newman: A fact is not false simply because it is unproven. Evidence is not the test of truth. Thousands of people in Central Africa have no ‘evidence’ that ice exists and would deny that it exists. Yet ice exists.

Abbott: People deny and are quite right in denying the existence of everything for which they have no evidence, direct or indirect. There may be regions of four, five or fifty dimensions, but we are not so constituted to act on any “may be” that is not at least suggested by some evidence. We should regard as non-existent all alleged facts for which there is no evidence, direct or indirect. We should regard as highly improbable all statements that contradict our knowledge of the fixed and orderly course of things. (91-92, paraphrased)

Smith, Berkove, and Baker summarize nicely the contrast between Newman and Abbott:

[For Abbott] Imagination and Reason are distinct and separate faculties: Imagination, operating not deductively but inductively on a foundation of fact comes first, ‘leap[ing] to general conclusions, mostly premature or false, but all containing a truth from which the falsehood must be eliminated’. Faith is, for Abbott, a ‘form of Imagination’ but it must be subjected to the test of Reason, which eliminates the falsehood and arrives a truth by pointing out differences, making distinctions, and testing explanations.

In Abbott’s eyes, Newman violated the process in two ways. First, he did not establish a groundwork of fact but simply used his Imagination to leap directly to general truths from

idiosyncratic feelings and impressions or from the dictates of ‘authority’. Second, he then applied Reason not to test his Imaginative claims but to confirm them.”

In his *Essay on Ecclesiastical Miracles*, Newman frequently argues for the truth of the miracles performed by the saints. He does so by forming analogies between the miracles claimed by the church and those claimed in the Bible. He does not provide evidence for such facts, but asserts that we should be inclined to believe in them on the basis of precedent. Abbott is appalled at such reasoning and emphasizes repeatedly that belief requires evidence. The imagination racing ahead by drawing analogies between concepts is a necessary tool in the pursuit of truth, but it must always be held in check by a reason which compares the predictions of the imagination with experience.

Turning to *Flatland*, Smith, Berkove and Baker notice that every argument marshalled by Sphere for the existence of Spaceland, and every argument marshalled by Square for the existence of Flatland is an argument by analogy, and thus an act of the imagination. These arguments, however, invariably fail to convince. Indeed, Square is only convinced of the existence of Spaceland when he is forcibly removed from the plane. Furthermore, arguments for the existence of higher dimensions are not the only arguments by analogy in *Flatland*. Smith, Berkove, and Baker point out that Square’s description of Flatland’s social structure is an extended analogy between physical characteristics, intelligence, and morality. We have already seen that Square is not to be trusted when it comes to the nature of Flatland’s inhabitants. Indeed, not only does Sphere correct Square’s conception of social reality, but Square, himself, in the first part of the book frequently unwittingly undermines the very points he is trying to make. Seeing *Flatland* as a critique of materialists for not being imaginative enough and of the Tractarians as being too imaginative helps us understand Square’s ignominious fate: Square’s imprisonment is just punishment for his reliance on uncontrolled imagination.

In *Flatland*, however, Abbott is doing more than simply criticizing arguments by analogy. If that was all he was doing, why wrap this kernel in the husk of mathematics? If the entire book is as a parable about the right and wrong uses of imagination, why was it necessary to use mathematical imagery? For the remainder, we will be concerned with uniting the social, religious, and mathematical themes of *Flatland*; the geometry fits too nicely into the narrative for it not to be important.

In his book *Fact & Feeling* on Baconian science in Victorian literature, Jonathan Smith has a helpful chapter on *Flatland*. Developing Jann’s work, Smith situates *Flatland* with respect to a fall-out of that debate: disagreements on the nature of mathematics. These debates, sparked in part by recent popularizations of non-Euclidean and higher dimensional geometries, carried on the empiricist-idealist wars in mathematical realms. The empiricists argued that the very idea of non-Euclidean geometry showed that geometry was derived from experience: since it is possible to conceive non-Euclidean spaces, our preference for Euclidean space must be derived from our experience. The idealists disputed the contention that we could conceive such non-Euclidean or higher dimensional spaces, arguing that there was a difference between what we could conceive and what we could imagine.

After extensive analysis of *Flatland*, Smith concludes that Abbott “negotiates” the empiricist and idealist positions. For Abbott, the imaginative inductions required to pass from physical points

and lines to their mathematical idealizations ultimately lead us to “a realm of faith”. These mathematical idealizations, however, are *more real* than their physical counterparts.

Abbott’s beliefs are similar to those of the poet Samuel Taylor Coleridge. Coleridge was one of the originators of the Broad Church Movement, and like Abbott, was educated at Cambridge. While at Cambridge, Coleridge was heavily influenced by a resurgence of neoplatonism⁶. Abbott was sympathetic to Coleridge’s neoplatonism, but differed in an important way. Smith distinguishes Abbott’s platonism from that of Coleridge (and Plato!) by emphasizing that for Abbott all imaginative leaps must be tested by reason and experience. We know that scientific claims and religious claims are true, because they work. Applying, this insight to *Flatland*, Smith concludes, “Abbott seems to be suggesting that the experience of different spaces is possible, but that possibility does not mean that such spaces exist ... nor does it mean that we can perceive what experience in those spaces would be like.” (208)

Given Coleridge’s documented neoplatonic influences and Abbott’s classical training, perhaps the presence of overt Platonic sympathies in *Flatland* can contribute to our understanding of its goals and methods. Indeed, *Flatland* is not the only place where we can find platonism in Abbott’s life and thought. He is like Socrates, not only in his belief in the world of Forms and his emphasis on developing virtues such as love and goodness, but even in his embrace of the Socratic method⁷. Socrates’ aspirations were, through the Socratic method, to bring his pupils to a knowledge of the Good. In *The Republic*, Socrates outlines a method by which an able student might progress from knowledge of the physical world to an encounter with the true Forms of Justice and Goodness.

Although, *Flatland* cannot be seen as a narrative version of *The Republic*, there are remarkable similarities between it and the two most famous sections of *The Republic*. Most of *The Republic* is organized around the questions, “What is a just man?” and “What is a just society?”. In Book VI, discussion turns to the questions of how we can know the Good, the Beautiful and the Just. Socrates provides the image of the Divided Line to explain how we can progress from awareness of the physical world to awareness of the world of Forms. This path is mirrored by the modes of perception which range from supposition at the lowest level to Reason at the highest level. In Book VII, Socrates elaborates these ideas using the Allegory of the Cave.

Socrates introduces the allegory by saying, “Here allegory may show us best how education-- or the lack of it-- affects our nature. Imagine men living in a cave with a long passageway stretching between them and the cave’s mouth.”(514) Since childhood these men have been shackled in place and can see only directly in front of them. They are forced to watch a shadow puppet show upon the wall of the cave - their own Flatland⁸. Socrates asserts that the total reality for these prisoners would be the shadow world upon the wall. Socrates then describes how liberation might occur:

⁶ see Jones, T. *The Broad Church*

⁷ See “A Great Headmaster” *The Chanticleer* LXXXV (1926)
<http://www.math.brown.edu/~banchoff/abbott/PDF/greatHM.pdf>

⁸ As pointed out by Banchoff, T. “From Flatland to Hypergraphics...” and perhaps others.

“One prisoner is freed from his shackles. He is compelled to stand up ... turn around, walk, and look toward the light. He suffers pain and distress from the glare of the light. So dazzled is he that he cannot even discern the very objects whose shadows he used to be able to see.”

This is echoed in *Flatland* when Square describes his forcible removal into Spaceland:

There was a darkness; then a dizzy, sickening sensation of sight that was not like seeing ... Either this is madness or it is Hell.’ ‘It is neither,’ calmly replied the voice of the Sphere, ‘it is Knowledge...’. (93)

After remarking on how the man or woman must become acclimated to the light, Socrates concludes,

Habituation, then, is evidently required in order to see things higher up. In the beginning he would most easily see shadows; next, reflections in the water of men and other objects. Then he would see the objects themselves. From there he would go on to behold the heavens and the heavenly phenomena-- more easily the moon and starts by night than the sun by day... Finally, I suppose, he would be able to look on the sun itself, not in reflections in the water or in fleeting images in some alien setting. He would look at the sun as it is, in its own domain, and so be able to see what it is really like. (516)

Square’s process of illumination is similar. Indeed, reflecting on the revelations obtained in Spaceland he writes:

[L]ight comes to us alike in our homes and out of them, by day and by night, equally at all times and in all places, whence we know not. ... I --alas, I alone in Flatland-- know now only too well the true solution of this mysterious problem; but my knowledge cannot be made intelligible to a single one of my countrymen; and I am mocked at -- I, the sole possessor the truths of space and of the theory of the introduction of Light from the world of Three Dimensions-- as if I were the maddest of the mad! (11)

The allegory of the cave continues, “Now supposing he recalled where he came from. Supposing he thought of his fellow prisoners and of what passed for wisdom in the place they were inhabiting. Don’t you think he would feel pity for all that and rejoice in his own change of circumstance?” (516c) Similarly after his experiences in Spaceland, Square exotes,

I awoke rejoicing, and began to reflect on the glorious career before me. I would go forth, methought, at once and evangelize the whole of Flatland. Even to Women and Soldiers should the Gospel of Three Dimensions be proclaimed. (111)

At this point Socrates explains that this is an allegory of the philosopher’s apprehension of the Good. The prisoner’s cave is our own visible order, the journey upward is the soul’s journey through the intelligible order. Describing those who have experienced such revelation, Socrates says:

Their souls will ever feel the pull from above and yearn to sojourn there...By the same token, would you think it strange if someone returning from divine contemplation to the miseries of men should appear ridiculous? What if he were still blinking his eyes and not yet readjusted to the surrounding darkness before being compelled to testify in court about the shadows of justice or about the images casting the shadows? What if he had to enter into debate about the notions of such matters held fast by people who had never seen justice itself? (517)

This, of course, is what happens to Square when he is forced to testify about his experiences. Socrates, points out that if the enlightened one attempted to release the prisoners and lead them up, prisoners would most certainly kill him (517). Square escapes the ultimate punishment, but does not fare particularly well in his attempts to enlighten his countrymen.

Socrates and his pupils then discuss how the education of the philosopher may be achieved. How can one be lead from shadowlands into light? One of the key components of the education they describe is training in mathematics. “They should persist in their studies until they reach the level of pure thought, where they will be able to contemplate the very nature of number... [C]alculation thrusts the soul upward compelling it to consider pure number”. Socrates and his pupils value not only calculation, but also geometry: “Geometry has to do with unchanging reality... it would tend to draw the soul upward toward truth.” (527) Eventually they conclude that after plane geometry, the philosopher, the ruler of their city, should “proceed from the second dimension to the third, where we would have to consider cubes and all things sharing the attribute of depth... First, it is a difficult subject, and since it has nowhere found favor, there is little incentive to study it. Second, students need someone to direct them.”

This role for mathematics is prefigured in the Divided Line from Book VI of *The Republic*. The Divided Line depicts how the soul progresses to true perception of the Forms, in particular Justice, Beauty and Truth. Mathematics is a key stage on this road of development. In fact, Plato places mathematics as the step just prior to apprehension of the Good by means of the Dialectic (Socratic method).

Returning to *Flatland*, we recall how Abbott is situated in the debates over mathematics education and the role of hypotheses. He views hypotheses, both scientific and mathematical, as necessary conveyances on the road to Truth. They do not arise solely out of experience, they require an act of imagination. But neither are they themselves the truth. They must be tested by Reason against experience, which is the highest method for approaching Truth.

We can now see why the imagery of *Flatland* is perfect for Abbott’s methods. Square is a skilled mathematician (particularly in plane geometry); it is because of his mathematical abilities that Sphere picks Square to receive the revelation of the third-dimension. Square seems ideally suited to follow Socrates’ path to true knowledge. Indeed, Square’s journey parallels that of Socrates’ philosopher: Square is wrested out of the cave of Flatland and is forced into the 3rd dimension “studies sadly neglected”, is then compelled to return to the cave, looks ridiculous and is imprisoned by those he came to free.

If Square is so ideally suited for the journey, why then does he ultimately fail? We can see two main reasons:

1. The rabble in the cave are content with their shadows; they cannot abide the revelations that would throw their social and theological systems into turmoil.

2. Square attempts to use analogy to persuade. Analogy, however, is unconvincing. Each individual must be given the Divine light of inspiration. Each person needs their own imaginative leap.

In *Flatland*, Abbott is outlining the true approach to knowledge of the Good, unfortunately Square is not careful to remain on the path. By relying on the analogical method, leaves the path of true knowledge and so cannot attain to knowledge of the Good.

As recognized by Smith, Berkove, and Baker, the parallel between Square and John Henry Newman extends beyond their use of analogical reasoning to their very conception of God. Square cannot conceive of a God who embraces love as a worthy attribute; a trait ascribed also to Newman by Abbott in *Philomythus*:

The Love of God, as it is described in the new Testament, appears to have been either absent or quite latent in him [Newman]: and he himself spoke of Love as a “Preservative Addition” to Fear-- a kind of after-thought in the scheme of the Christian religion. ... [He failed] to attain that cheerful trustful faith which has characterized many Christians far less pious than himself... (38)

As Thomas Banchoff⁹ points out, Abbott himself testifies to this critique of Square in *The Spirit on the Waters*:

Mathematics may help us to measure and weigh the planets, to discover the materials of which they are composed, to extract light and warmth from the motion of water and to dominate the material universe; but even if by these means we could mount up to Mars or hold converse with the inhabitants of Jupiter and Saturn, we should be no nearer to the divine throne, except so far as these new experiences might develop in our modesty, respect for facts, a deeper reverence for order and harmony, and a mind more open to new observations and to fresh inferences from old truths. (32)

Square is, then, on one level a Newman-figure, but perhaps he can also be compared to Abbott himself¹⁰. After all, Abbott saw himself as a traveller on the path towards true Knowledge. Indeed, he was privileged with religious knowledge that his countrymen: the Tractarians, the Evangelicals, the Atheists lacked. Square’s demise is then a warning to Abbott himself about the dangers of knowledge. Perhaps Abbott was even aware of such dangers himself. Square takes a very different approach to evangelization than Abbott did. Square sought to overturn Flatland society with his new revelations. Abbott, however, always valued erroneous thought as one step towards truth and this led him to a radically different conception of evangelization. In his Cambridge

⁹ Banchoff, T. “From *Flatland* to Hypergraphics...”

¹⁰ Such a comparison is made, for instance, in Gilbert’s “Upward, not Northward...”. Gilbert sees both Square and Abbott as seeking a new direction for creative expression at the end of the Victorian age. Though this reading does not take into account Abbott’s critique of Newman’s overactive imagination, the comparison may still be helpful. Banchoff and others have pointed out the pun present in the name of Edwin Abbott Abbott’s alter ego: A Square.

sermons, he discusses how those of the Broad Church might convince others that science and Christianity can be harmonized:

“Meantime it is our wisdom to wait, and, as long as we are in the twilight, not to move on rapidly, as though we were in the full brightness of noon. If we will but be ready to make all truth welcome, light will come to us in God’s good time.” (xiii)

Square is, therefore, a tragic figure: one who was prepared for the path of Truth-seeking but who one who placed too much confidence in the imagination. Despite this overconfidence, he is unable to make the imaginative leap from mathematics to the final notch on the divided line. Like Newman in both his unfettered imagination and desire for social upheaval, Square ultimately plays into the hands of those with no imagination, those who deny the third-dimension or the supernatural altogether and who inflict on him the punishment awaiting the philosopher who returns to the Cave.

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Berkove, L. "A paradoxical American appropriation of *Flatland*" *Extrapolation*. Kent: Fall 2000. Vol 41. Iss 3 pg 266, 6 pages.

Brings attention to an article in *San Francisco Call* which includes unattributed excerpts from *Flatland* and attacks spiritualism by criticizing analogical reasoning.

Gilbert, Elliot L. "*Flatland* and the quest for the new." *ELT* 34 (1991): 391-403.

Sees *Flatland* as treating the necessity for imaginative insight into problems of science.

Jann, Rosemary. "Abbott's *Flatland*: Scientific Imagination and 'Natural Christianity'" *Vict. Stud.* 28 (spring 1985): 473-90.

Puts *Flatland* in debate over role of imagination in science. Sees Abbott criticizing both scientific atheists and religious fundamentalists.

Smith, Jonathan. *Fact and feeling: Baconian science and the 19th century literary imagination*. UW Press, Madison: 1994

Places *Flatland* in debate over using *The Elements* as a textbook and develops discussion of role of imagination in science begun by Jann. Begins discussion of limitations of analogical reasoning.

Smith, Jonathan, Lawrence I. Berkove, and Gerald A. Baker. "A Grammar of Dissent: *Flatland*, Newman, and the Theology of Probability". *Vict. Stud.* 39 (winter 1996): 129-50.

Considers *Flatland* as a critique of imagination ungoverned by reason. Uses *Philomythus* as an interpretative guide.

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Considers *Flatland* as a possible response to the article "A New Philosophy" which appeared in the *City of London School Magazine* in 1877. Compares Abbott's development of "rational" Christianity to W.R. Hamilton's development of the quaternions.

Historical Context

Herring, George. *What was the Oxford Movement?* Continuum. London, 2002.

Considers the people and ideas of the Oxford Movement and how they changed over time. Considers not only people such as Pusey, Newman, and Froude but those who agreed with and were influenced by the movement, but were not central to it. Very readable.

Jones, Tod E. *The Broad Church: A biography of a movement*. Lexington Books. Lanham, 2003.

An enthusiastic survey of the people involved in the Broad Church movement. Has a very nice chapter on S. T. Coleridge.

Richards, Joan. *Mathematical Visions: The pursuit of geometry in Victorian England*. Academic Press. Boston, 1988.

Considers the professional, philosophical, and educational uses of mathematics in Victorian England. Focuses particularly on the role of non-Euclidean geometry in the empiricist-idealist debates and the controversies over the use of Euclid's *Elements* as a textbook. A classic.