

An Analysis of Actuarial Science in Literature

An Honors Thesis (HONR 499)

by

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Abstract

Actuarial Science is a growing field in the larger world of mathematics, insurance, and risk management. However, despite this growth, compared to other similar fields it is not as well known nor is it a well featured profession in the world of novels and literature. As an aspiring writer and future actuary, I seek to someday write engaging stories centered around the profession of an actuary to bring more awareness and interest to the profession. I have selected and analyzed five published novels featuring characters with the profession of actuary. For my thesis I have analyzed these novels, exploring the differences between the stories written by authors with an actuarial background compared to those without, looked at common tropes and elements shared by the texts such as genre and style, explored how the demographics of the novels compare with those of the industry, and how the overall portrayal of actuarial science and insurance in the novels paints the image of the field as a whole.

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I would also like to thank Dr. John Emert for taking time to sit down with me during my initial thesis meeting to help me find a way to express myself by combining my hobby and profession of choice together into what has become this thesis.

And finally, I would like to thank my family, friends, and especially my parents for their support of me during my years of study. It was not always an easy road, but I could not have reached this point in my life as I have without them being there for me.

Process Analysis Statement

Back in high school, I always excelled at math classes so when it came time to decide what to do for college, I always figured that I wanted to do something in a mathematics related field. After some research, I found the lesser known field of Actuarial Science and finding it interesting, I decided to give it a try. Over the past five years I have studied Actuarial Science here at Ball State as well as at a summer internship with a company in Ft. Wayne with whom I will be working after graduation.

At the same time, creative writing has always been an important hobby of mine, having first picked it up when I was younger. Over the years it has influenced different stages and directions of my life as I have explored different genres and styles, while also learning things about myself. As an aspiring author, I have often wondered if there was a way to combine my interest in the actuarial science industry, with its math and insurance focus, into a story that still reaches out and engages with those who are not in the field itself. I have also wondered if anyone else had ever tried to combine the two.

Given my experience over the years answering the ever-common question of “what are you majoring in?,” I have found that the answer of actuarial science has often gotten me more confused looks than ones of understanding, as it seems to be a profession of which not many are aware. Therefore, I was not particularly surprised to find that there are not many fiction stories on the topic, but there were surprisingly more than I initially expected.

After my thesis meeting with Dr. Emert, I took a few days to do some research into novels that seemed to have actuary characters or mentions of actuarial science. After compiling a list, I sat down and located the ones that had the profession serving as a central element in the novels. To write this thesis I have tapped into the knowledge I have learned from the actuarial

science program here at Ball State, the presentations of companies that have come and spoken here at the school, my own experiences working one summer in the field, and further research into aspects of the field to compare and contrast elements of the novels.

In this thesis, I explore a selection of novels that feature actuarial science as a profession in the form of the protagonist or one of the main supporting characters. I explore the connections the profession has with the narratives, as well as the styles the authors choose to use and whether an actuarial science background for the author has any effect on the stories themselves. Finally, I focus on the reputation of actuarial science both in the novels and its visibility as a field today.

Author Biographies

To begin we will look at the backgrounds of the authors for the books selected.

Surprisingly about half of the authors of the books chosen for this paper have some background with the field of actuarial science, while the other half do not. The biographies of the writers with an actuarial history were interestingly enough, harder to track down than the ones of regular professional authors, though some of this may be due to a desire to put some distance between their professional actuarial careers and their novels, or perhaps do simply to the fact that in both cases the actuarial authors started writing at an older age and have written less books than the other authors on this list.

The first of the authors addressed in this paper is Icki Iqbal, author of The Incomplete Man. He was born in India and received his early education in Pakistan, before moving to England where he finished his schooling and practiced as an actuary for thirty years, attaining the rank of Fellow in the Institute of Actuaries in 1971 and Associate in the Society of Actuaries in 1972. While working as an actuary, he progressed up the ranks of life insurance companies, eventually becoming the Director of Royal Life Insurance company for a time. The last eight years of his actuarial career were spent in a management consultant role advising other life insurance companies with their products and business (Phillips, 2013, p. 42).

It was only after his retirement from actuarial science that he took up writing, starting with his autobiography in 2011, followed a year later by The Incomplete Man, which appears to be his most recent book to date. It is interesting to note that Iqbal founded his own publishing company to publish his books, admitting that he found it difficult to go through traditional publishing houses in an interview published by the Society of Actuaries in 2013 (Phillips, 2013,

p. 42-43). Research into his company reveals that it was dissolved in October of 2014, though the site I found had no reasons given (Companies House, n.d.). Also included in this interview he sites several other plans including the goal to create a television series based off The Incomplete Man and further centered around the insurance industry, but further research suggests that those plans are still either in the works or have been benched, as I found no further information on any projects attached to his name (Phillips, 2013, p. 43).

Haeworth Robertson also known as Albert Haeworth Robertson III, author of The Silver Pendant, was another author who had roots in actuarial science. Born in Oklahoma on May 10, 1930, he graduated from the University of Oklahoma in 1951 with an undergraduate degree in mathematics and two years later, completed a graduate degree in actuarial science at the University of Michigan (Society of Actuaries, 2017). He started working as an actuary out of college in 1953 while serving with the military in the Air Force. During this time, he worked with a unit of the Department of Defense on a study over the military retirement system (Robertson, 2017).

After leaving the military, he went on to working in numerous personal security programs and as an actuary in both the pension consulting, social insurance, and life insurance industries. He earned the designations of Fellow from the Society of Actuaries, an organization he would later come to be Vice President of for a time, and The Conference of Consulting Actuaries and was also a member of several other actuarial organizations in several countries and internationally (Society of Actuaries, 2017). From 1975 to 1978, he served as Chief Actuary of the Social Security Administration, only resigning in 1978 after amendments were passed and he felt he could do more to help the industry from the outside (Robertson, 2017). After his resignation, he published several books and lectures on problems with social security and

proposed reforms and founded and served as president of The Retirement Policy Institute, Inc., which served as an organization to study and educate about the retirement issues he was so passionate about (Robertson, 2017).

After retiring, he returned to school and took some creative writing classes, eventually leading to the publication of an autobiography and the two mystery novels with an actuarial protagonist, The Silver Pendant being published in 2010 and its sequel The Sirens of San Soucis in 2014. Haeworth died on March 7, 2017 at the age of 86, whether he had more books in the works is unknown, but it was said that he enjoyed meeting with his writing group until the end of his life (Robertson, 2017).

The next author is one of the two non-actuarial rooted authors I explored, Patrick Lynch, author of The Policy. Patrick Lynch is the pseudonym used for the thriller novels written together by authors Philip Sington and Gary Humphreys between 1993 and 2001. The Policy was published in September of 1998.

While not much could be found on Gary Humphreys, Philip Sington is a novelist and playwright born in Cambridge, UK. He graduated from Trinity College with a history degree and worked as a journalist and editor for nine years. In 2006 he published his first solo novel Zoia's Gold and has since published a few other works (Birnie, n.d.). The Policy seems to be his only work relating to the actuarial industry, and Sington himself seems to have no real ties to the field itself.

The second of the non-actuarial authors is K. T. Bowes, author of The Actuary and its two sequels. Like several other authors, Bowes was born and raised in England growing up on an air force base, her parents both being soldiers. Through her childhood, she tended to take the

paths that led to her doing things her own way which often got her into trouble, such as refusing to learn phonetics because she did not like the way it sounded like baby talk (Bowes, n.d.).

For college she traveled to a school in Wales where she earned an English degree and a passion for writing, but immediately out of school she went into law enforcement instead. After years of law enforcement work, she eventually moved from England to New Zealand in 2006 with her husband and four children, where, while working part time with special needs children at a local school, she finally started putting her English degree to use and writing books (Bowes, n.d.). She has since published twenty plus different books in several different series, visiting specific locations and talking to many sources for her information research which she sites as an influence that comes from her being an archivist. The Actuary was published in 2015.

Michael Carniello, the author of Tales from the Rensselaer Scholars Club: The Adventures of the Remarkable Actuary, was not one I could find any personal biography information on aside from a note on one of his earlier books, The Statistician, listing him as living in Illinois. As such, I am uncertain on whether he is an author with an actuarial background or not. His books are self-published, and aspects of his style mimic other actuarial authors as I will touch on later, but other parts of his style are more similar to the non-actuarial authors as well.

Relating the narratives to Actuarial Science

One of the topics to look at regarding the five chosen stories is their connections to the field of actuarial science, specifically what role the field of actuarial science plays, along with how much of an importance are the actuary characters to the plots. Are the actuaries and field crucial for the plot to hold up or could they be used interchangeably with other professions?

To start off, we will begin looking at the actuary characters in the novels. In most cases the main characters share the common overlap of having their main characters be the actuaries or have practiced in the field previously. In The Adventures of the Remarkable Actuary, the protagonist, Mr. Charles, had previous experience as an actuary in an insurance company before moving into the practice of being an independent actuary (Carniello, 2017, p. 5). Similarly, Rohan from The Actuary, is also portrayed as an independently practicing actuary, though I will touch on what is odd about his portrayal later. In other stories such as The Policy and The Silver Pendant, their actuarial protagonists work for a larger insurance company through the course of the novel and never branch off into independent practice. The Incomplete Man is more of a bridge between the two, and a bit of a unique case on its own. The story starts off with its protagonist, Majid Khan, graduating from his university and becoming an actuary with a large insurance company. However early, Majid is moved from actuarial work into claims, and travels between several other departments over the course of the book before eventually being fired (Iqbal, 2012, p. 35-36, 151-153, 213). After this point he becomes like some of the others mentioned above and moves first to independent practice before starting his own smaller company to do a mix of actuarial and other insurance work. It is a bit of an interesting blend of the two job styles. It is also worth noting that non-actuarial writers and actuarial writers have targeted both styles of employment, in having some characters employed independently, and others employed by established companies. So at least from this sample there does not seem to be any bias in employment preference from the type of author themselves.

Another point worth examining is the field of actuarial science focused on in each of the stories. In the real-world, actuarial science has several sub-fields depending on the company's products and services, such as Property/Casualty Insurance, Life Insurance, Health Insurance,

Reinsurance, and Pension/Retirement. In the case of the five novels, four out of five of them focused strongly on the Life Insurance industry, with the fifth not really having any ties to one at all. The Incomplete Man and The Policy both mention other sections of the industry. Majid's company has a Pensions Department which is brought up from time to time but Majid himself is never directly involved with their affairs directly outside of some brief work in claims, and Alex's company is mentioned to be looking to spread into Health Insurance but the matter is never pursued (Iqbal, 2012, p. 149; Lynch, 1998, p. 53).

The focus on Life Insurance specifically may be due to one of the books' other common points: that most of the books' plots focused on some sort of fraud scheme, most commonly in conjunction with the insurance companies themselves, among the other main plots and subplots within the novels. In both The Policy and The Silver Pendant it is the higher up positions in the respective companies who are responsible for the insurance fraud, which in both cases turns out to be money laundering. In The Policy, it is a combination of a dozen people who are upper executives in Providence Life, along with several upper management figures from associated companies. The scheme entails using newly available genetic records that predict the odds of policy holders' likelihood for certain genetic mutations and diseases that could result in them dying early which would normally cost insurance companies large sums of money. Throughout the book, there is an underlying discussion between characters and insurance companies in the background discussing whether these records and tests should be made available to insurance companies to use when deciding whether to accept policies (Lynch, 1998, p. 45, 53-56, 337-340). Whether it is fair from an ethical standpoint, a lot of companies would turn down high risk policies as too many would create high costs for them. It is revealed late in the book that Providence Life has been using this technology by collecting the needed DNA samples from the

seals on the envelopes of application forms sent by applicants (Lynch, 1998, p. 355). They had then been hedging their losses, but still picking enough policies that required payouts made by their company did not look unreasonable compared to those of their competitors. However, their scheme resulted with the company having much more profit than it would normally have-- a number high enough that it would attract too much attention if it was noticed in audits, would be above industry averages. So, the group created another scheme. As they continued running the company as they had been, at the same time they also continue funding some policies that were dropped when the insured could no longer pay but were kept alive on the books until the insured's death (Lynch, 1998, p. 306). Upon that death, they not only claimed the original payout, but also payed out extra from the overflow of funds they needed to keep out of sight. These funds were transferred into an account at a bank run by one of the conspirators and never reached the beneficiaries associated with the names they were under, but instead got split between the group doing the laundering and shipped off into accounts overseas (Lynch, 1998, p. 307). The group had raised billions before the scheme was uncovered upon the death of one of their members when records of his overseas accounts were revealed, and an odd inconsistency in the data was noticed by the main character and actuary, Alex.

A bit of a different scheme compared to The Policy, but similar in some ways, The Silver Pendant's money laundering was done by a smaller group, consisting of only three people in this case. Life insurance policies were written and held by the company DC Capital, but some given to patients who found themselves terminally ill were then bought up by Fox Investments, for promised amounts much larger than the traditional cash surrender value on the polices, which most of the victims took advantage of to pay medical bills and help support their families (Robertson, 2009, p. 490). Fox Investments could afford to pay higher amounts to the

policyholders they bought out, however, because of a clause on the Life Insurance policies that stated the payout amount would be doubled if the policyholder had died in an accident. And so it was that some of the terminally ill policyholders who sold their policies to Fox were killed a couple months after the sales, under the cover of accidents, and the investment company claimed the double indemnity payout, part of the sum of which was split between the investors, who were three men: one who ran Fox, another who ran DC, and a third who had helped invest enough money to start up the Fox operation and took care of the ‘shopping list’ of policyholders that were to be taken out (Robertson, 2009, p. 534).

There are also a few different cases of fraud in The Incomplete Man, though Majid does not get as involved in them as the two protagonists mentioned previously. The main instance that we are given the most hints to is when a subsidiary company of Majid’s company, Camelot, sells the same products as them but at a lower rate that turns more profit as it cuts out the agents and middlemen of the operation. It is later revealed, however, that the company has been selling other policies to be fulfilled by Camelot that offer almost impossible interest rates and would put the company out of business (Iqbal, 2012, p. 139). These policies were once again devised by upper management officials in the subsidiary company and used to raise funds that are moved mostly into their own pockets. Another instance is revealed near the end of the book after Majid has been fired, when several higher management officials of Camelot, who the book has previously painted as shady individuals through other actions, are revealed to have been money laundering and making deals under the table (Iqbal, 2012, p. 247-248). This is only hinted at throughout the story, but mostly just through the otherwise unethical actions of the characters on other matters, such as when Nick sabotages some of Majid’s attempts to run the real-estate section of Camelot by making changes to contracts and increasing offers to clients without

Majid's approval so that Majid's reputation will plummet as he stands a better chance at earning the promotions that will eventually take him to the top of the company (Iqbal, 2012, p. 250).

Besides looking at the role of the companies and industry in the story, I also want to focus a bit more on how the mathematics behind actuarial science plays out in the stories themselves. In the case of three of the books with actuarial protagonists who work for larger insurance companies, the mathematics are more of what one would expect, and it is only when the characters encounter red flags in the data that they start to attract unexpected notice. The way the numbers are used and run all seem standard for what one might expect from an actuary in the industry, at least from the details we are given in the books. Alex and Alan's companies are described as using computer databases to store their policy data, and the actuaries use other software and coding to access this data and help them with running their calculations. The Policy and The Incomplete Man both go into some description on what their characters look for when looking at data and when it comes to explaining the discrepancies found, they seem to hold up well based on my current knowledge of actuarial science. The Silver Pendant does not go into a lot of detail overall, explaining broader concepts and skimming the surface when it comes to the mathematics themselves, preferring to simply tell us the math has been done instead of going into how. For example, the novel speaks of a mortality experience study project Alan receives relating to the deaths show at the beginning of the novel, but never goes into the process of how he collected information or calculations, simply stating three more unusual conclusions he discovers, which direct his focus later in the novel. (Robertson, 2009, p. 196-217, 356). It is interesting to note along with this topic that both of the actuarial authors fall into this category along with one of the non-actuarial authors. It would seem that the duo behind the penname Patrick Lynch did their research and consulted actuaries to some degree on the topic, whom they

credited in their acknowledgements at the beginning of the book, as their explanations of the mathematics from Alex's prospective did make sense and as far as I am aware, neither of the two had any actuarial background. The book also featured a few different running jokes that I have heard several times from both my fellow students and practicing actuaries, such as assuming actuaries are like tax accountants and the joke of: How can you tell the difference between an introverted and extroverted actuary? An extroverted actuary stares at the other person's shoes instead of his own. These details gave the story another interesting level of feeling more authentic to the industry itself, which is further proof that the authors did their research into the industry (Lynch, 1998, p. 13-14).

Beyond those three, however, Adventures of the Remarkable Actuary and The Actuary both handle the job of an actuary a bit differently. While Mr. Charles in The Remarkable Actuary seems to use the same formulas and process as a normal actuary would, at least as far as we know with how much he explains to us, the way it is worded gives it a bit more of a mysterious and mystical feel. Upon getting some information and numbers from his clients including the age, some medical history, marital status, wellness habits, the usual things one might expect, he is able to produce what he claims to be the remaining number of years that they have left to live, and he uses that number to derive a premium amount that they pay him for the eventual payout he will give them upon their death (Carniello, 2017, p. 10-11). Now the overall process does not seem wrong in concept. The general idea of what he is doing makes sense with how life insurance premiums are calculated and from large samples of data it is possible to predict average ages of when someone might die. But what makes Mr. Charles's process interesting is that most of the time he seems to do it on the notepad and simple calculator he carries, without the aid of a database of previous data, and he just plugs the numbers in to get his answer

(Carniello, 2017, p. 10-11). He is also predicting individual ages of death for each individual case unlike finding the more general average for an overall group. While it could be possible to calculate specific base ages, the coefficients for the variables of the equation would have to be based on an existing pool of data which is typically partly the pool held by employers and partly industry statistics depending on pool sizes. These averages would likely change year to year based on medical advancements and regulation changes in the insurance industry. From my understanding, while some variables Mr. Charles is using are calculated on a case to case basis in company plans, some costs tend to be lumped together and divided more evenly between all the policy holders. So Mr. Charles's method may just be resulting from his smaller client pool and the fact that his clients have very specific needs he tries to cater towards, which is why they may have been rejected or not gone to a bigger company instead. Another thing that is interesting about Mr. Charles's line of work is that he also works to protect his clients, as they are an investment to him, and he needs to bring in necessary premiums from them before their deaths or else he risks a loss. This requires him to not only fulfill an actuarial role, but in the case of some of his clients, also adopt a more protective role which in some cases requires him to do some detective work as well. It is an interesting mix of roles that deviate from the traditional actuarial role that one would expect.

The last of the actuaries I want to address is Rohan from The Actuary. Now this book is a bit different from the others as the actuary character is not the main character and thus not the narrative point of view. The protagonist, Emma, unfortunately, does not go into great depth on what Rohan does, partly because except for one brief section, she is never around to see him at work. But from what we do learn he seems much less like an actuary and much more like something else. While Rohan's job is described as protecting his clients from risk, the way we

see him go about doing that is less mathematical and more action based. For the mission Rohan undertakes in the book, we learn that data was stolen from a company that serves as his client. However, to go about getting it back, Rohan assembles a team and undertakes what would be more suited for an action/spy movie than what one might expect from an actuary (Bowes, 2015, p. 281-283). The concept of number crunching and calculations are brought up in a few lines of the story, but Rohan is never really shown doing anything of the sort in the book itself. And with the expertise and skill sets he and his co-workers have, its likely they do not do a lot of it. Why actuary was chosen as his profession for this novel is still not entirely clear to me, however the author has written sequels, so perhaps he does more traditional actuarial work in one of those.

Several of the stories also mention actuarial exams, and while they do not go in depth on the process, as most of the actuaries are either old enough that they have finished taking them, or they get so involved with the plot that it is not a focus. However, it is a detail that I liked to see which made the actuarial characters seem a bit more realistic, as the exams were something that were stressed to me during my schooling and one of the major things that employers seemed to be looking for on resumes, so they are definitely something that industry considers important.

Literary devices and narrative

Moving away from the actuarial side of things, I also wanted to look at some of the literary elements used in the narratives and compare them between writers to see if there are any differences in the styles, genres, or tropes that differ between the authors of different backgrounds.

The first thing I will look at is the genres of the different stories. Overall most of the books fall into either the mystery or thriller genre, with some fitting into both. Now this is not too surprising, as schemes such as insurance fraud and money laundering set themselves up well

as the basis for a mystery story, and the input actuaries have to the data side of things makes them a good role to discover the initial inconsistencies and clues that get things started if another lead is not revealed earlier, such as the questionable death of Michael Eliot in The Policy (Lynch, 1998). The Policy follows the format of a traditional mystery story, using several of the common tropes such as red herrings and a scavenger hunt for clues to discover the truth while it weaves together two seemingly unrelated subplots which connect at the end. The thriller genre joins it in the rising pressure and conflict Alex suffers while dealing with a series of events that cause several deaths of people she worked with, which eventually spiral on and become a threat to her life as she starts to realize she has gotten herself involved in something bigger than she expected (Lynch, 1998, p. 147).

The Adventures of the Remarkable Actuary also falls into the mystery genre. The book opens early with one of Mr. Charles's clients suffering from an attack on his life, which leads Mr. Charles to investigate along with the help of a police investigator (Carniello, 2017, p. 21-23). Though this plotline is resolved by midbook, through it we are introduced to several key characters and information that leads us into the underlying mystery that takes the shape of trying to understand the mystery surrounding the Rensselear Scholars Club, of which he is a part. Once again unrelated connections take shape and tie together: the abrupt deaths of some of his colleagues at the club, a lecture given by his old college professor and friend, and others he encounters trying to expand his business. Though in this case the clues are not necessarily as obvious and, in some cases, easier to skip or miss completely compared to other mysteries. There are also some points that Mr. Charles seems to figure out when little to no information is really revealed to the reader on the subject before explanation is given, though some of this could be from assumed actuarial background knowledge that some might not possess. This book too

contains elements of a thriller, though with Mr. Charles's generally calm and level-headed personality, the scenes are not quite as effective and the stakes do not seem as high, even when his life is supposedly on the line such as the climax at the end when he, unarmed, attempts to outwit his old teacher who has come to shoot him for knowing too much, in the Scholars building. So, whether it was intended to be a full thriller is up in the air.

The last of the main mystery genre books is The Silver Pendant, which is unique in the sense that unlike the other four books referenced in this thesis, it sticks to a much more similar plot line, not really deviating into side plots or much description and exposition. All the information it presents is clearly tied to the overall plot and mystery behind why terminally ill policyholders who sold policies to Fox Investments are turning up dead. This makes the clues very easy to recognize and the story relatively simple to piece together. As more information is revealed, it still contains a few minor twists on how some of the characters tie together in the end regarding their motivations, such as the two seemingly competing companies actually being related, and how much DC Capital's executive was really in control of the operation, while suspected mastermind Tony Roselle was more of just a lucky (Robertson, 2009, p. 516-538). But overall it mostly serves as a bare-bones skeleton of a more traditional mystery layout. Like the other two, it also attempts to elevate late game stakes by putting the pressure on the life of the main character but due to its more simplistic and explanatory writing style, the story moved very quickly, and I found it harder to really find myself concerned over the wellbeing of the protagonist simple due to not having enough time to really get involved in the narrative.

One of the two books not really falling into the mystery category is The Actuary. While there are some minor mystery subplots in the story regarding the truth behind Rohan's mother and brother's actions, the bulk of the story focuses around the returning romance of Emma and

Rohan, and how they find each other and start to rekindle their love after years, working through the issues from their past (Bowes, 2015, p. 380). As a reader, I am not as fluent in traditional romances or the tropes, but as far as I can tell it seems relatively straight forward in what one would expect. Action scenes do happen on occasion and much like the others, Emma's life is threatened at several points to add some tension and excitement to the story, but the romance is the main focus and any subplots and other genres take a backseat.

A bit harder to pinpoint a genre for is The Incomplete Man. While it shares some of the same insurance fraud plotlines as the others, the way it paints them in the narrative is less as a mystery and more of just something going on in other parts of the company that Majid is not involved with directly. At the same time, it never really reaches the emotional highs and lows or action levels to really fit into the category of thriller either, though it once again does seem to make some attempts, such as the section of the book where Majid's problems begin to compile, and it seems as though he may be forced to take a drastic fall that could ruin his career and put him in a dangerous situation, due to all the framing he has suffered. This might be intentional, as Majid himself is shown to have some issues when it comes to his own lack of emotion, but if the choice was made to make him less responsive to the events going on around him, then the consequences of it having less of an impact on the audience of the book are still noticeable whether intended or not. It is also worth noting that the book was self-published by its author, and in an interview he mentions that he went that route because he found it difficult to get accepted and published through traditional publishing houses (Phillips, 2013, p. 43). So I consider it a possibility that perhaps the book was intended to be one or both of the aforementioned genres but unfortunately, just fell flat of hitting either mark, lacking the proper editing of the initial draft and having been published too soon. This idea is further expanded by a

review from Amazon, where I purchased the book, which stated that while the reviewer felt the book had potential, it was too dry and mathematical and felt more like someone was information dumping things rather than telling a story (ATP, 2013).

The other option is that the story might have been intended to be a Bildungsroman, or a coming of age story, showing the growth of Majid over the course of the story and events of his life. This genre is also possible given the story's longer time frame, with the opening chapters set at Majid's university days and the last one ending twenty-five years later. The later part of the book also has several time-skips between chapters, jumping a few months to several years in some cases, until the next major event in Majid's life occurs or consequences arise for some past action. The book also puts a lot of focus into Majid's relationship developments with other characters and how they affect him. The first two paragraphs of the book itself open with a day he claims that he will never forget, the third line stating, "I met two people who were to play leading roles in my life." (Iqbal, 2012, p. 1). The following pages introduce us to Nick Knights and Ellen Evan, the former who serves as Majid's rival and one of his main antagonists throughout the book, and the later the woman he falls in love with and eventually marries. Both serve as motivating factors who heavily impact Majid's growth and decisions, and therefore the course of the story through both direct and indirect actions. Ellen serves as his support, and he often goes to her for advice when he is forced to make tough decisions, such as when he is offered a higher position in a different department that will start him on a path where he can climb the ranks of the company, but would take him out of the actuarial field where he had previously planned to make his career. He ultimately accepts the role after getting her support and realizing that it may help him eventually relocate closer to her in the future. She is also credited for making him more human, as she pushes him away from thinking strictly by numbers and the

more robotic, less empathetic mindset sometimes associated with heavily math minded individuals (Iqbal, 2012, p. 21, 216). Through the story he works to maintain a relationship with her over a long distance, which comes with a variety of problems he is forced to overcome, most of which are in some way tied to his more emotional side (Iqbal, 2012). Contrasting, Nick Knights serves as his professional on-the-job rival, who he constantly compares his accomplishments against. Having both been competitive back at their university, the fact that they ended up different departments of the same company adds another layer of conflict to the story, as they both strive to reach the top of the corporate ladder, but ultimately only one of them can have it. Through the story they are forced to work together in instances, but there is always an underlying tone of conflict between them, and the stress from some of that often bleeds into and negatively impacts other parts of Majid's life, such as the times when staying later in the office limits his times with Ellen and begins to push them apart, which eventually leads to their temporary breakup.

Another literary device I wanted to look at was how the books handled the point of view (POV) of the stories. Both The Adventures of the Remarkable Actuary and The Incomplete Man use first person, while the remaining three work in third person limited. However, on top of that The Silver Pendant and The Policy both include third person limited scenes from characters beyond their initial protagonists. In The Policy such chapters are used more sparingly and mainly to provide us with clues before Alex possess them so we can put things together ourselves. These scenes are often used to fill in gaps in the story where Alex is not directly involved, but give us useful information for later, such as Liz's initial calls to Margaret regarding Eliot's overseas accounts, or the deaths of some characters later at the hands of Donald Grant (Lynch, 1998, p.

92-96, 210-219, 309-317). Such information is later brought up in conversation for Alex to learn about but is fleshed out and given in greater detail to the reader through those scenes.

In the case of The Silver Pendant, all the chapters not from Alan's point of view are set close to the beginning. It is a bit of a more unusual set up, with the first three chapters explaining the deaths of three completely unrelated people, and it is written in such a way that it feels a bit like the start of three different stories. After introducing Alan in the fourth chapter, it goes on to cover basic introductions and motivations of a few more key characters before returning to Alan and beginning to show the overall plot and how it all connects. The format gives a lot of information at the beginning and for an unprepared reader, it can catch one a bit off guard as everything seems unrelated and there is no real sign of a plot until about a third of the way into the narrative. While this could be considered sloppy writing, when given a chance it did work well enough once things started moving. The reader was already introduced to most of the characters and their roles so when they were brought up by name or in passing, there was less explanation needed at the time.

As far as first person compared to third person narratives go, they both have their respective strengths and weaknesses, but overall the two author groups do not seem to have a strong preference one way over the other, as roughly one of each can be associated with both. If the first genre assumption of The Incomplete Man is used, then there is more overall variety in genre from the non-actuarial writers, but this could be attributed to more practice in the creative writing craft, which allows them a better understanding of how to weave multiple genres together in a more effective way than newer writers, but it also might just come down to the preferences of the writers themselves.

Lastly for this section I wanted to touch on the tones and voices in the books, and the differences in the works done by actuarial and non-actuarial authors. As touched on in the sections above, both actuary written books and The Adventures of the Remarkable Actuary tended to have a heavier focus on explanation when it came to the mathematics in their stories. They touched on more of the specifics when equations or insurance processes were brought up, sometimes to the point where it got a bit too heavy. The Incomplete Man had some moments where Majid's dissection of situations provided a bit more information than was necessary for the context, such as some of the longer sections of negotiation when Majid and his department attempt to buy up smaller real estate firms to incorporate into their business (Iqbal, 2012, p. 167-169).

Yet when it comes to the voices of the protagonists themselves, the writing seemed to have less emotion and, in some cases, "personality" than the two non-actuarial novels. The protagonists' worry or reactions to their struggles just seemed less intense and did not connect on the scale to make me relate with them near as much. Majid is an example previously touched on, but Mr. Charles also exhibited a surprisingly clear head and lack of emotion in some situations where one would have expected him to perhaps be bit more irrational, such as being shot at and having his life threatened (Carniello, 2017, p. 165-168). The protagonists' voices were weaker than those of The Policy and The Actuary. Some of this could also have to do with the fact that in the later two novels and somewhat in The Remarkable Actuary, the authors built more on the protagonists' lives outside of what was strictly required for the plot. They showed us the characters engaging in other interests and side plots that built them into stronger characters. While Majid was mostly focused on his work, The Silver Pendant was just too short and the story over too quick for Alan to really develop any sort of depth.

Demographics in the novels and industry

Taking a step back from the novels a bit, another thing I wanted to look at is the comparisons of how the industries and characters in the novels compare to the present-day industry.

According to DataUSA's tables based on 2016 data, about seventy percent of the actuarial workforce are male, with only about thirty percent being female (DataUSA, n.d.). This lines up comparably with the demographics shown in the novels, with four of five of the main actuaries being male, which is a bit lower than the data, but we are also dealing with a much smaller sample size. Looking at The Policy specifically, the demographics of the actuarial department in Alex's office also seem to fit into this range, though perhaps a bit lower on average, with herself and one other co-worker being female actuaries, against five to six mentioned male actuaries. Beyond that the rest of her office, however, is primarily male, as are the offices of Majid and Alan in the respective books. Though this may be affected by modern demographics, in the cases of some of the stories it may be due to the trend of greater numbers of male characters and authors in fiction. The statistics from an analysis of The New York Times Best Seller list show that from between 1950 and 2010, bestselling novels in both literary and mystery genres are generally skewed towards having male authors, and therefore may also lean more towards male protagonists. The statistics are as low as fifteen percent in the early years of the data and have since moved closer to fifty percent, and it is still averaging a bit short of an equal average mark (Cima, 2017).

As far as age demographics go, female actuaries on average are also younger than their male counterparts by about roughly four years according to DataUSA. That combined with the lower number of them, leaves no surprise that in all the books any upper management roles are

filled almost exclusively by male characters. Overall though, the age demographic of the main actuaries in the books are around or a bit lower than the mid-thirties averages for both genders, with actuarial protagonists Alan and Alex skewing younger than the average, and others a bit older like Mr. Charles and Rohan. Due to the longer timeline of Majid's book, he is portrayed as both younger and older than the average as the story takes him from his early twenties into his forties by the end.

Racial diversity is another weaker area in both the stories and the industry itself. As of 2016, Actuarial Science is still a majority white-dominated industry, with eighty-one percent of the workforce identifying as white (DataUSA, n.d.). While most of the books themselves do not draw much attention to the races or ethnicities associated with their characters, based on the names and backgrounds, and those of the authors, we can probably assume that most are intended to fit into that majority category. The one book that does touch on race, however, is The Incomplete Man, whose character Majid is of East Asian background, having been born in India and raised in Pakistan, and features a few other characters who are of non-white ethnicity. The book also touches on cultural differences between Majid's homeland where his parents still live, and England where he currently lives. One of the main subplot conflicts in the story is Majid's hesitancy to tell his mother about his relationship with Ellen, as Ellen is Jewish, and Majid is worried about his Islamic mother's reaction (Iqbal, 2012, p. 77-79). The book also touches on other religions and some real-world conflicts surrounding them, as shown by an early debate done during Majid's university years, focused around the conflicting idea of Israel in the Middle East from the view of Islamic and Jewish parties.

View of the Industry

While there is still plenty of room to grow in terms of diversity and visibility for different genders, races, and ethnicities in both actuarial science focused novels and the writing industry as a whole, there is also room for growth in the portrayal of the industry in literature overall as well.

From my own personal experience, most people I encounter in everyday life do not have any real understanding of what actuarial science is or have even heard of an actuary in the first place. Those who do typically have a good friend or family member who is an actuary or know someone who majored or is majoring in it. Actuary is not a well-known profession in society outside of the lists we see pop up now and then online which lists jobs with good growth prospects or pay, but even then, people do not know what it is that actuaries really do. When told its insurance and statistics related, they tend to think of accounting or underwriting, not realizing that an actuary's job has a specific name and a skill-set different from the later.

This view of the greater overall view of the profession is not shown quite the same in the books. The Actuary comes closest, with most characters not really understanding what Rohan does, though once again he seems to only loosely be a traditional actuary. The Remarkable Actuary, also has several of Mr. Charles's clients question what exactly he is, and by extension what the service is he does for them, but most of the other patrons of the club that he interacts with know what it is he does, either from being in the same or similar fields. This is more or less the basis for how most of the other stories address it, if they do at all, with the actuary character mostly interacting with those in their or similar professions and therefore, not having to deal with the confusion and misconceptions from characters who are not familiar with the industry.

As for how the actuaries are viewed in the societies of the books, there does not seem to be a strong opinion one way or another. Insurance itself seems to play the role of the villain in

most of the stories, which does echo some public opinion of people in real life. I have heard family members or non-insurance majors complain that insurance charges too much or is ultimately a scam despite the good they can do. The idea that all insurance companies are money laundering and use their technology to get ahead is not completely accurate though, because while there are bad companies there are also ones that do their best to serve their clients as well. Several of the companies that regularly visit Ball State for recruitment in the actuarial program have talked at length how they put programs in place to help their clients, and in some cases employees, improve their health with incentives that urge them to have a healthier lifestyle. However, due to the constant increase in premiums on insurance and high costs in industries such as health care, it is not hard to believe that when it comes to picking villains for stories focused around actuarial science, insurance companies would be an obvious place to look.

I think the portrayal of the industry in the novels provides some context to some significant points both the literary industry and the actuarial industry could work on going forward. While the favored portrayal of the insurance industry may be one of villains now, perhaps it does not always have to be that way. With some companies working to provide better service to their clients and employees, perhaps the skew may eventually begin to shift, and insurance begin to be viewed in a better light. Down the road in a few years, while we will still likely have corruption plot lines, perhaps we will have some where insurance companies serve as forces of good that help characters as well, painting a better view of the good the industry can do as well as the people who work in it.

And while the demographics in the books may be comparable to the industry, I think it also highlights in more depth some of the diversity problems with the industry itself. Only so much of the decision to use a majority of male protagonists is influenced by the author's gender,

but a good part is also influenced by what is seen and common in the setting. Actuarial science and insurance is one of the industries that is only more recently starting to try and shift away from a male dominated field. And if it and other industries can make the progress of moving towards a more equal playing field, that alone might influence the demographics presented in literature and media.

Along with the views of the industry, this thesis experience has also given me insight into how people view math and math related fields in the context of stories and how to better portray them to a non-math minded audience. Sometimes less can be more when it comes to more complex ideas and giving enough of an overview for the reader to follow while not being overly confusing can do more for a story than trying to explain every aspect of an unfamiliar idea. This is especially something to keep in mind when it comes to genres like mystery, where readers are always on the hunt for clues to solve the mystery of the story, and too much of a focus on unnecessary information can confuse them, as can burying clues too deeply in things they cannot easily understand. Part of the fun of a mystery is reaching the same correct conclusion as the characters at the end of the story and being able to say one followed and solved it. Having a story that throws in a surprise twist at the end or buries some clues too deeply into needed prior knowledge will confuse some readers if they cannot come to understand how the characters reach the conclusions they do. Math can be a tricky topic, and there are reasons a lot of people prefer to avoid if they can. A lot of it builds off of what comes before, and if one understands, things all make a lot sense and it can look easy, but to someone without the background and understanding it can simply be overwhelming and off-putting. Nonetheless, having a background or finding sources with the background can do a lot to add to the authenticity of portrayals in works and add another layer that can capture the attention of readers who are familiar with it.

Also, having read works written by actual actuaries and not just ones written by authors with industry consultants gives me more hope that there are ways to combine my industry of choice into novels that can hold interest and tell a good story. The authors had their weaknesses but with more effort and editing some of that might have been fixed, and even without it an author's first book is never perfect, and the writing craft is something that I have often been told grows and evolves with time. If more people were willing to take the chance and write more stories about actuaries, and more actuaries were take the chance and write books themselves, matched with the pushes I have seen for the growth of gender, ethnic, and racial diversity in stories, who knows what the next generations of books could look like.

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