selected novels — End of Eternity and Robots and Empire and closely follow Asimov’s analyses and critiques on different aspects of society as he creates what he himself has termed as social science fiction.

Chapter II: The Foundation Trilogy and the Concept of Psychohistory

The original Foundation Trilogy has afforded important materials, for both the scientist and social scientist, for analysis in the various social implications and issues that are present within the stories and also the use of psychohistory as a tool to find possible solutions to the problems faced by humanity and bring about social changes. The original Foundation Trilogy began with the publication of Foundation in 1951. It was originally a series of eight short stories published in Astounding Magazine between May 1942 and January 1950. The first four stories were published as Foundation and the remainders were published in pairs as Foundation and Empire in 1952 and Second Foundation in 1953. According to Asimov the early stories were inspired by Edward Gibbon’s The History of the Decline and Fall of the Roman Empire. The premise of the trilogy, based on the ideas set forth in Gibbon’s book, revolves around the concept of psychohistory, a concept of mathematical sociology (analogous to mathematical Physics) devised by
Asimov and his editor John W. Campbell. Using the law of mass action, it can predict the future, but only on a large scale for it is error-prone on a small scale. Here is how Asimov defines psychohistory in the novel:

PSYCHOHISTORY—...Gaal Dornick, using nonmathematical concepts, has defined psychohistory to be that branch of mathematics which deals with the reactions of human conglomerates to fixed social and economic stimuli ... Implicit in all these definitions is the assumption that the human conglomerate being dealt with is sufficiently large for valid statistical treatment. The necessary size of such a conglomerate may be determined by Seldon's First Theorem which ... A further necessary assumption is that the human conglomerate be itself unaware of psychohistoric analysis in order that its reactions be truly random ...

The plot of *The Foundation Trilogy* focuses on the growth and reach of the Foundation against a backdrop of the decline and fall of the Galactic Empire. The series draws, at a much deeper level, from later historical events and closely follow the 19th century narrative of Manifest Destiny, and on Europe's experience with Hitler and Nazism. *The Foundation Trilogy* is obviously not about these historical events but they are the source of the stories' thematic resonance. The focus of the books is on the trends through which a civilization might progress, specifically seeking to analyse their progress, using history as a precedent. Although any science fiction novels
such as Nineteen Eighty-Four also do this, their focus is upon how current trends in society might come to fruition, and act as a moral allegory on the modern world. *The Foundation Trilogy*, on the other hand, looks at trends in a wider scope, dealing with societal evolution and adaptation rather than the human and cultural qualities at one point of time.

The first book of the trilogy, *Foundation*, begins at a time when the Galactic Empire seems to be at the height of its power. Hari Seldon, the mathematician who has spent his life developing psychohistory, recognizes the decay within the Empire and by using his concept of psychohistory predicts the fall of the Empire. Stagnation of thought along with the increasing dependency of Trantor, the capital of the Empire, on the other planets for their major supplies makes it weak and susceptible to attack. Much like the Roman Empire, the vastness of the Empire makes it increasingly difficult for the centre to retain control and influence especially on the peripheries. The subordinate kingdoms started gaining more and more power with the centre unable to check this trend. This is very similar to nineteenth century England, which, at that time, controlled India, large swaths of Africa and China, Australia and Canada. Just as the British Empire it began to crumble from within when it was at its peak, so also the Galactic Empire was slowly weakening as the subordinate planets started to break
away. In both the British and Galactic Empires, the efforts made to contain the nationalist movements spreading throughout their colonies drained both empires economically and politically.

With the fall of the Galactic Empire, civilization is once again plunged into a dark age. Historically, this is greatly influenced by the fall of the Roman Empire and the dark ages that followed. A period of ignorance and superstitions was cast upon the once great empire as all knowledge seemed to have been lost. Religion comes into the fore as a means of mass control and when this lost its influence, trade and commerce took over. The rise of Traders and Merchant-Princes in *Foundation* is influenced historically by the rise of the bourgeoisie and nationalism. The book ends with the growth of the First Foundation, a part industrial, a part bureaucratic-technological society.

The second book of the trilogy, *Foundation and Empire*, takes place a hundred years after the end of the events in the first book. The Empire has ceased to exist, Trantor has been sacked by a “barbaric fleet” and only a small rump of twenty agricultural planets remains. Most of the galaxy has split into barbaric kingdoms as the Empire enters into a more rapid phase of decline and civil wars. The Foundation has become a dominant power in the galaxy, controlling its regions through its trading networks. Leadership of
the Foundation has become degenerate. In response to the internal corruption within the Foundation, roughly thirty other planets belonging to it, which have become wealthy on their own through extensive trade, begin to plan a succession war against the Foundation. In addition, an external threat also arises in the form of a mysterious man known only as The Mule. The Mule possesses the ability to sense and manipulate the emotions of others, usually creating fear or total devotion within his victims. He uses this ability to take over the independent systems bordering the Foundation and has them wage a war against it. As mentioned, the stories in *Foundation and Empire* draw heavily on Europe’s experience with Hitler and Nazism. Hitler was able to take over a country in crisis and pose a threat to every other country surrounding Germany. He started by first conquering or unifying the small countries that broke away from Germany and then he turned his eye to the rest of the world.

The last book of the trilogy, *Second Foundation*, continues where *Foundation and Empire* leaves off. In Part I of the book, “Search by The Mule,” The Mule has become the ruler of the Foundation and he stands as the most powerful force in the galaxy. The only threat to his power and eventual rule over the entire galaxy is the Second Foundation. Hari Seldon has created two Foundations before the fall of the Galactic Empire. He has
placed them at opposite ends of the galaxy. The location of the First Foundation is Terminus, which stands at the periphery of the once powerful Galactic Empire but the location of the Second Foundation is always kept secret. The Mule goes in search of this elusive Second Foundation with the intent of destroying it. He is thwarted by agents of the Second Foundation who are also telepaths like him. In Part II of *Second Foundation*, The Mule is now dead and fifty years have passed since his death. The people of the First Foundation built a device that can join all telepathic abilities and in their quest to find the Second Foundation, they conclude that Terminus itself is the location of the Second Foundation as the disc of a galaxy has no end but leads back to the same point. Thus they declare the Second Foundation destroyed after arresting roughly fifty telepaths in Terminus. The Second Foundation is actually located in Trantor, at the centre of the galaxy. It is located at the social end of the Galactic Empire. This final episode of the trilogy is again very similar to the events in Europe towards the end of the Second World War. Hitler’s downfall began with his overreaching ambition and consequent failure to conquer Russia. He spread his military powers too thinly over the other countries of Europe which united to put an end to his menace. Finally Germany was defeated and taken apart to ensure it never posed a threat to the world again.
Psychohistory is the framework upon which Isaac Asimov's Foundation rests. It provides for diverse episodes about a variety of characters over a period 400 years, and those “episodes feature a number of strong-minded individuals seeking solutions to a series of problems as they arise” (Gunn 42). In the novel, these problems have all been fore-ordained long ago by Hari Seldon's science of psychohistory. He, however, never reveals this foreseen future beforehand for fear that the knowledge may result in individual attempts to interfere with the eventual events he deemed necessary for the overall progression of mankind. He only made recordings that were sealed in a vault and would open only at strategic points in history referred to as a Seldon Crises. The recordings would inform the main characters of Seldon’s awareness of their current predicaments and assure them that it is all part of a bigger picture that has been calculated by psychohistory. Although at the time of crises they struggle with the dilemma present, the courses of action eventually taken by the main characters have all been foreseen by Seldon, and they realise later always, that it was the only logical course they could have taken.

Psychohistory is defined by Asimov as a “‘profound statistical science’ that deals with the reactions of human conglomerates to fixed social and economic stimuli” (Touponce 76). In short, this science predicts the
future by treating humanity as one massive series of mathematical equations. However, the one drawback of psychohistory is that this science does not account for individual, random variables. Hari Seldon uses the science of psychohistory to predict the fall of the massive Galactic Empire. By using complex mathematical equations, Seldon is able to mathematically prove that the downfall of the Galactic Empire is eminent. In addition, psychohistory also adds a sense of determination and predestination to Foundation. The main characters in each book of the novel are aware that when a Seldon crisis occurs, they will manage to make the correct decisions leading to the inevitable outcome. Seldon's prophesies "are revealed only after the fact, and even the solutions that he or others say are obvious are obvious only in retrospect, as in all good histories" (Gunn 41). This is first shown in "The Psychohistorians" when Salvor Hardin makes the decision that he must take over the management of the Foundation. This decision is logical in retrospect, but it causes Hardin much agonizing over the probable results of his actions before he does them. The dilemma experienced by Asimov's characters is how to achieve the predetermined outcome concocted by Seldon. The hero of the first Foundation, Salvor Hardin, decides to wait until the crisis limits his choices to only one course of action. He argues:
...the future isn't nebulous. It's been calculated out by Seldon and charted. Each successive crisis in our history is mapped out and each depends in a measure on the successful conclusion of the ones previous...At each crisis our freedom of actions would become circumscribed with possibly to the point where only one course of action was possible...As long as more than one course of action is possible, the crisis has not been reached. We must let things drift so long as we possibly can. (Asimov 119)

This cause of action lets the character "simply follow the logic of Seldon's plan; he will do 'one hundred percent of nothing'"(Elkins 102). However, the reader is left in suspense until the crisis has reached its intended and predicted conclusion.

Psychohistory is one of the most interesting concepts to arise out of fiction. Princeton economist, Dr. Paul Krugman, states in Newsweek that:

One significant aspect of the series [The Foundation Trilogy] is Asimov's invention of psychohistory with its implications for determinism and free will. Psychohistory was put together out of psychology, sociology, and history -- not hard sciences, which Campbell had a reputation for preferring, but at best soft sciences: a behavioral science, a social science, and a discipline that has difficulty deciding whether to define itself as a social science or a humanity... Psychohistory is the art of prediction
projected as a science; later it might have been called 'futurology' or 'futuristics.' (10)

Though the concept of psychohistory is totally fictitious, it has spawned a host of debates over its possible usage. It has led to the birth of the Institute of Psychohistory with its headquarters in New York. It has influenced many people including Nobel-winning economist, Krugman, who said in an interview with Jim Lehrer that he became an economist because economics is the closest thing to psychohistory. According to Tom Siegfried, psychohistory is no longer wholly fictional but exists:

in a loose confederation of research enterprises seeking equations that capture patterns in human behavior. These enterprises go by different names and treat different aspects of the issue. But they all share a goal of better understanding the present in order to foresee the future, and possibly help shape it. (n.pag.)

A better understanding of the present, in order to foresee the future, and possibly help in reshaping it is a common goal of these research enterprises. Areas of analyses which were once the province of sociologists, political scientists, economists or philosophers are now routinely analysed by physicists and mathematicians. At the same time, we are learning more from psychologists and anthropologists about what goes on in the brain
when humans interact, and how economic activity influences behaviour in
different cultures. "...Put it all together, and Asimov's idea for a predictive
science of human history no longer seems unthinkable. It may be inevitable" (ibid). Researchers in Indiana University also agree with this:

Much as meteorologists predict the path and intensity of hurricanes,
Indiana University's Alessandro Vespignani believes we will one day
predict with unprecedented foresight, specificity and scale such things as
the economic and social effects of billions of new Internet users in China
and India, or the exact location and number of airline flights to cancel
around the world in order to halt the spread of a pandemic...(n.pag.)

Universities and institutions around the world have seized versions of
Asimov's vision for new research themes. At the Santa Fe Institute in New
Mexico, a new behavioural sciences program focuses on economic
behaviour and cultural evolution. The National Science Foundation has
identified "human and social dynamics" as a new funding priority area. At
various schools, collaborators from diverse departments are creating new
hybrid disciplines, with names like econophysics, socionomics, evolutionary
economics, social cognitive neuroscience and experimental economic
anthropology. Among the newest of the enterprises, and closest to the spirit
of Asimov's psychohistory, is a discipline called sociophysics. The name has
been around for decades, but only in the 21st century has it become more science than slogan. Like Asimov's psychohistory, sociophysics is rooted in statistical mechanics, the math used by physicists to describe the big picture when lacking data about the details. For instance it is not possible to track the trillion molecules of air floating around in a room but statistical mechanics can tell how an air conditioner will affect the overall temperature. In a similar way, science cannot describe how any given individual will behave but put enough people together and as Asimov's psychohistorian Hari Seldon reasoned, the laws of human interaction will produce predictable patterns — just as the way molecules move and interact determines the temperature and pressure of a gas.

Statistical mechanics math is nowadays routinely used for problems far removed from its standard uses with gases or chemical reactions or magnetic materials. Everything from the flow of funds in the stock market to the flow of traffic on interstate highways has been the subject of statistical-physics study. And more and more, that math is used to describe people as though they were molecules, by physicists who are, in effect, taking the temperature of society.

As mentioned, Asimov's concept of psychohistory is a predictive science for large masses only:
Psycho-history dealt not with man, but with man-masses. It was the science of mobs; mobs in their billions. It could forecast reactions to stimuli with something of the accuracy that a lesser science could bring to the forecast of a rebound of a billiard ball. The reaction of one man could be forecast by no known mathematics; the reaction of a billion is something else again. (Seigfried, n.pag.)

The irony of it is that it can be influenced by little events or actions and inactions of an individual or groups of individuals such as Salvor Hardin and the agents of the Second Foundation. There is a new paper which examines the idea of “contagion”-- the spread of anything through a population, whether infectious disease or ideas, fads, technological innovations, or social unrest. As it turns out, fads need not always spread the same way as a disease, as different scenarios may guide the course of different contagions. Peter Dodds and Duncan Watts of Columbia University published a paper in Physical Review Letters stating:

In some cases, a small starting "seed" (a literal virus, perhaps, or just a new idea) can eventually grow into an epidemic; in other cases a seed infects too few people and the disease or idea dies out. What happens can depend on how much more likely a second exposure is to infect an individual than a first exposure. (n.pag.)
The findings suggest that the spread of diseases or ideas depends less on "super spreaders" or opinion leaders than on how susceptible people are — how resistant to disease or how adamant about their current opinion. Such results imply that the best way to hamper or advance contagion would be strategies that increase or reduce the odds of infection. Better health procedures, for instance, or financial incentives to change voting preferences, could tip the future one way or another. “Our results suggest that relatively minor manipulations ... can have a dramatic impact on the ability of a small initial seed to trigger a global contagion event (ibid).” In real life, of course, people don't necessarily transmit opinions or viruses in the simple ways that such analyses assume. So some experts question how useful the statistical mechanics approach to society will ultimately be. Cornell University mathematician, Steven Strogatz says:

I think in some limited domains it might be pretty powerful...It really is the right language for discussing enormous systems ... But I worry that a lot of these physicist-style models of social dynamics are based on a real dopey view of human psychology.(qtd. in Asimov’s ‘Foundation’ Theories)

So to succeed, statistical-physics math may have to meet face to face with social cognitive neuroscience, a booming research field that is all about
understanding face-to-face interactions between real people. Brain scans and experiments with brain-damaged patients reveal how people respond to or empathize with others they encounter, providing insights about behaviours people choose in different social situations.

Further help may come from neuroscientists who study the brain activity underlying economic choices, in the new field of neuroeconomics. An offshoot, neuromarketing, may use brain activity-analyses to plan advertising for political campaigns that enlist brain-based strategies for maneuvering the future in one direction or another.

All these approaches still generate but a shadow of Asimov's full-scale psychohistory. Everybody knows there's much more work to be done to match the predictive power achieved by Hari Seldon. Ironically, some of that new work may come from scientists who are unwittingly following in the footsteps of Seldon himself. In later prequels to the Foundation Trilogy, written decades after the original stories, Asimov described how Seldon gathered the data needed to perfect psychohistory — by visiting different cultures spread across the planet Trantor. By observing a variety of societies, Seldon discovered the common features of human social behaviour needed to make sound predictions. Much as Seldon travelled around Trantor, anthropologists have travelled around the Earth in the last few years, playing
economic games in small-scale societies. Human nature as gauged by the games varies considerably from culture to culture — data that must be incorporated into any effort to forecast the social future.

Asimov’s greatest criticism of society is that it doesn’t change but seems to follow a predictive path. Asimov believes that society or humanity remains unchanged as people will always be greedy, selfish, envious and a slave to a hosts of negative attitudes. More precisely, he does not believe that scientific advances will entail any changes in men’s mutual relationships: “Hate, love, fear, suspicion, passion, hunger, lust ... these will not change while mankind remains;” history repeats itself (in large outline at least) “with surprising specificity” (Asimov, 277). As people remain the same and are therefore predictable, this makes his concept of psychohistory a possible science, and can be viewed as a criticism of human nature and society. The ‘progress’ in science or civilization doesn’t seem to affect these basic human instincts. Asimov calls for a better understanding of human behaviour and interaction in order to affect a positive change in humanity. As mentioned, Asimov’s concern is never only for a particular society or a particular time or a particular class. His social consciousness rises above these particulars and engages and encompasses all of humankind. Rita Colwell, former director of the National Science Foundation, echoes the
concerns of Asimov in stating that, “It's become pretty obvious from 9/11, from terrorism, that we need to understand human behaviour better...Not only for prediction, but also for prevention.” (qtd. in Seigfried, n.pag) This illustrates the need for today's psychohistoric collaborations to grapple with real people in the real world to find true laws governing human behaviour. Rather than depending exclusively on quantitative analysis, the method relies on a "theory of mind" -- defined by cognitive scientists as humans' innate ability, evolved over millions of years, to judge others' changing ways of thinking, their understandings, their intentions, their pretences. It is a judgment faculty, quite different from our quantitative faculties. Robert Boyd, an anthropologist from UCLA, also urges the need for collaboration to find the true laws that govern human behaviour and feels that it is not acceptable that “the economists are happy with their world and the sociologists are happy with their world, and that this persists in an institution which is supposed to be about getting at the truth.”

Asimov is pointing out in his works that society does not really improve with the so-called ‘progress’ in science and culture. In fact, he believes that at a certain point in civilization, stagnation and complacency occurs. This eventually leads to the downfall of a civilization. Without the improvements in the quality of human thought and relations, all other
progressions come to a halt after reaching a certain level. In *Foundation*, we see an example of this belief when Lord Dorwin, the Chancellor of the Empire came to Terminus to inspect the Foundation and deal with the problems it is facing with the aggressive neighbouring planet, Anachreon. Lord Dorwin, a noble and a highly ranked scholar and academician, is also an archaeologist researching the origin of the human race. In this fictional, futuristic world, man has occupied millions of planets and the fact that he used to occupy just one planet, earth, has been forgotten. In an interesting conversation between Salvor Hardin and the Chancellor on the subject of the “Owigin Question” (the Chancellor speaks in overprecise statements leaving out all the r’s), Asimov’s critique of contemporary academia and academic language is quite apparent:

[Dorwin] The “Owigin Question”. The place of owigin of the human species, y’know. Suahly you must know that it is thought that owiginally the human wace occupied only one planetawy system.

[Hardin] And what does Lameth say?

[Dorwin] Well, he goes off along a new twail completely. He twies to show that ahcheological wemains on the thuhd planet of the Ahchutuwian System show that humanity existed theah befoah theah , wah any indication of space twavel.

[Hardin] And that means it was humanity’s home planet?
[Dorwin] Phaps. I must wead it closely and wigh the evidence befoah I can say foah cuhtain. One must see how weliable his obsuhvations ah.

(65)

The book referred to, was written by Lameth eight hundred years earlier, and was in turn based on an even earlier book by Gleen:

[Hardin] Then why rely on him? Why not go to Arcturus and study the remains for yourself?

[Dorwin] Why? Whatevah foah my deah fellow?

[Hardin] To get the information firsthand, of course.

[Dorwin] But wheah's the necessity? It seems an uncommonly wound about hopelessly wigmawolish-method of getting anyweahs. Look heah now. I've got the wohks of all the old mastahs-the gweat ahcheologist of the past. I wighthem against each othah-balance the disagweements-analyse the conflict statements-decide which is pwobably cowwect-and come to a conclusion. That is the scientific method. (66)

Hardin, unimpressed, mutters inaudibly to himself, “Scientific method, hell! No wonder the Galaxy was going to pot” (ibid). These are the kind of pseudo-scientific beliefs and stagnation of thought and growth that Asimov rages against both in his life and his work.

In the end, better-informed public policy is what human science should be about according to Asimov. It's an old dream, predating Asimov's psychohistory by centuries. Many philosophers have envisioned laws of
human behaviour analogous to Isaac Newton's laws of motion. Early sociologists discovered mathematical regularities in birth and death rates and height and weight and even in crime rates. Past efforts have been far from perfect but science today has much more to work with — the mathematics of statistical physics, economic game theory and networks merged with modern neurobiology, brain scanning and anthropological experiments. All these tools and the new scientific fields built with them suggest that the efforts of earlier centuries were not misguided, just premature. Tom Siegfried, science editor for The Dallas Morning News, writes in Jewish World Review that:

It's becoming clear that Asimov's psychohistory reflects an undoubtable truth that all the world's different social networks interact in multiple ways to generate a single future. From people to corporations, cities to governments, all the pieces of society must mesh. What appears to be the madness of crowds must ultimately have a method, a method that science can discover. (n.pag)

Siegfried’s comment is an appropriate summation of the importance of Asimov’s psychohistory in the present world. Like many others, he too is acutely aware of the need for a better understanding of social interactions so as to prevent a decay that is predicted by Asimov in the *Foundation Trilogy*. By underlining the possible usage of the fictional mathematical concept of psychohistory, he is also validating Asimov’s criticism of the present day
society and its lack of awareness of itself. The preoccupation of contemporary society with only the material or physical qualities of life and terming it as “progress” is a major issue of concern with Asimov. The Foundation Trilogy is an assertion for the need to also progress internally so as to have a better insight into the “madness” that is the modern world.

Chapter III: The Foundation Series and Marxist ‘Historical Materialism’

The basis of the fictional science of psychohistory and its possible usage stems from the theory that history moves in cycles. This is by no means a new or unique concept that has been theorized and developed by Asimov. Ancient civilizations like the Aztecs and the Egyptians also believed that time moves in cycles, an idea of time and history which has influenced poets like Arnold Toynbee and W. B. Yeats. The concept basically states that history has certain natural laws in which it moves in a predictive cycle where civilizations are born and then decay after reaching a certain point. The end of one civilization gives birth to a new one which grows and matures to a certain period, dies out again, thus following the