



---

## *Foundation and Dune* or, Hari Seldon and the Golden Path

**Neil A. Ottenstein and Phillip Menzies**

### **Introduction**

The idea of there being a similarity between the *Dune* novels by Frank Herbert and *Foundation* series by Isaac Asimov became apparent during one of the Mythgard Academy classes on *Dune* led by Corey Olsen. During this class we examined in great detail what Paul Atreides was experiencing when his ability to see the future started to surface in his consciousness. In describing the mechanics of Paul's view of the future it became clear that Paul was not "seeing" the future in any kind of mystical way. This view of seeing the future reminded some participants in the class of Psychohistory as put forward by Hari Seldon in the *Foundation* series. In this series Psychohistory was entirely based upon science and mathematics once again totally unrelated to mysticism or magic in any way. This paper will look at these two methods of foretelling or predicting the future by describing and comparing what was experienced by Paul and the Psychohistorians. It will also examine the mechanics of "seeing" the future. We are able to do this because these abilities were rational based on science, mathematics, observation and extrapolation and totally explainable unlike magic or metaphysical forces. Both novels also described limitations to seeing the future by showing that some things were not able to be seen and anticipated. We will examine this by venturing into the sequel *Foundation and Empire*. Finally, we will look at how the protagonists responded when faced with a catastrophic future and how they chose to act on the information they obtained from prescience and psychohistory by looking at the sequels *Dune Messiah*, *Children of Dune* and *God Emperor of Dune* and by examining one of the most daring acts in science fiction, the establishment of The Foundation.



## Psychohistory and Prescience

Both stories put forward the ability to predict or "see" the future, but what was experienced by Paul and the Psychohistorians? The experiences were described as being quite different.

Paul's revelations of the future began as dreams. He "always remembered dreams that were predictions." He dreamt of a scene that takes place later in the book when he and his mother are in a Fremen sietch. Later in the same chapter he mentions that he dreamt of the Reverend Mother once - we don't know the context. After his test with the gom jabbar he tells the Reverend Mother about his dreams - "I can remember every dream, but some are worth remembering and some aren't. .... I just know it." It is in that first dream that we learn that he dreamed of Chani in the cavern, telling her of what was to happen the very next day with the Reverend Mother before it actually happened. When asked "do you often have dreams of things that happen afterward exactly as you dreamed them?" he replied "Yes. And I've dreamed about that girl before." "I will know her." He relates that she calls him Usul which happens without him initiating anything despite his foresight. Before leaving for Arrakis Paul remembered "a dream of thirst" - a vision of his future on the planet. Knowing how dry Arrakis is, this is not a surprising dream.

On the night when seeing the future became a conscious experience we get a description of his experience. For Paul it was a visceral, emotional and visual experience like his dreams in the form of visions but with much more.

"He saw people.

He felt the heat and cold of uncounted probabilities.

He knew names and places, experienced emotions without number, reviewed data of innumerable unexplored crannies. There was time to probe and test and taste, but no time to shape.

The thing was a spectrum of possibilities from the most remote past to the remote future - from the most probable to the most improbable. He saw his own death in countless ways. He saw new planets, new cultures.

People.

People"

The experience was so much like real life for Paul that in *Dune Messiah* when he lost his eyesight he used the visions in place of sight much to the amazement and confusion of others who thought that Paul could not see.

On the other hand the psychohistorians had a purely cerebral experience as one does with high order mathematics with an accompanying interpretation. In Part 3 of *Foundation* there is a scene where a recording of Hari Seldon played 80 years after the establishment of the Foundation and long after his death spoke very generally about the crisis they have just resolved saying "You

must pardon me, by the way, for speaking in this vague way. The terms I use are at best approximations”. It is clear that psychohistory does not predict individuals so no names of people, places or institutions are known, only the broad actions and attitudes of the populations are known in a statistical way. This does not mean that the psychohistorians are without passion. They feel so strongly that their science is accurate that they stake their future on it by gambling that the empire will give them a planet at the outer edge of the galaxy which becomes the birthplace of the Foundation.

### **The scientific workings of foresight**

As stated both methods of predicting the future are scientific and the books have detailed descriptions of how they work. The suspension of disbelief is that in *Dune* the mind of Paul is highly trained to an ability that is currently beyond the capacity of humanity and in *Foundation* it is based in high level mathematics, sociology and statistics also far beyond current human ability. Despite their differences the similarity between the two is in this, both rely on careful and minute observations of present conditions coupled with knowledge of human behaviour to extrapolate possible and probable futures free from any form of unexplained mysticism.

Paul was trained from a young age by his mother in the Prana-Bindu practices of the Bene Gesserit and by Thufir Hawat a mentat who served the Atreides family for three generations, giving him extreme control over both mind and body. Paul was informed by his father before they left their home planet of Caladan that he may have mentat capabilities himself. A mentat is a person highly trained in logic, in effect a human computer. After House Atreides moved to Arrakis Paul was continually exposed to the geriatric spice Melange in food and in the air they breathed. The spice is used by Guild navigators to “see” safe routes through space and also probably used by the Bene Gesserit (although this is shrouded in mystery) in the process of a woman becoming a Reverend Mother and in their truth trances. The addition of spice to Paul’s developing mind saw him develop into something more than a mentat. It began the night the Harkonnen, their sworn enemy invaded and is described in the final chapter of Book 1.

“Something had happened to his awareness this night – he saw with sharpened clarity every circumstance and occurrence around him. He felt unable to stop the inflow of data or the cold precision with which each new item was added to his knowledge and the computation was centred in his awareness. It was mentat power and more.”

Up to this point Paul had been the student, but then he quickly outstripped his mother by making leaps in deductive reasoning that made Jessica look like an imbecile in comparison. Paul recognised that Duncan Idaho was piloting the ornithopter before it landed, he saw the unfolding of the Harkonnen plot more clearly, understood that the Fremen were the real power in the desert

and that they are the reason behind the Guild ban on weather satellites. He was able to identify his mother’s pregnancy as well as see the genetic markers that pointed to Jessica and himself as being Harkonnen. He began with the now and slowly moved onto the future. Continually through all of this was his observation of the minutiae and input of data that fed his sight.

“Paul’s mind had gone on in its chilling precision. He saw the avenues ahead of them on this hostile planet. Without even the safety valve of dreaming, he focused his prescient awareness, seeing it as a computation of most probable futures, but with something more, an edge of mystery – as though his mind dipped into some timeless stratum and sampled the winds of the future.”

This edge of mystery was still something that could be explained scientifically as the genetic memory passed on by his countless ancestors giving him in effect the wisdom of all his elders. The visions were at first of the immediate future and contained great detail. Despite this detail there were some things that were unseen and we shall examine this further when we look at the limitations of foresight. The avenues radiated outwards from his present. Some possible futures were dismissed immediately as untenable such as a life as a Guild Navigator or becoming chummy with his grandfather Baron Harkonnen and the perversions that went hand in hand with that scenario.

The best description of how his prescience worked is in the following passage:

“He remembered once seeing a gauze kerchief blowing in the wind and now he sensed the future as though it twisted across some surface as undulant as that of the windblown kerchief.” And “The awareness conveyed both reassurance and alarm – so many places on that other kind of terrain dipped or turned out of his sight.”

Paul was in effect a freak with extraordinary abilities who happened to be in the right place at the right time with the right environmental factors whereas Psychohistory was a science, a mixture of history, sociology and mathematics and to make use of it one had to be one of the select few adept, followers of Hari Seldon the father of Psychohistory.

The one time in *Foundation* we are shown psychohistory in action is in Chapter 4 of Part 1. Hari Seldon demonstrated to Gaal Dornick, newly arrived on Trantor to join psychohistory project, the workings of psychohistory upon the capital of the Empire, the planet Trantor. He started by establishing the present conditions in detail being a mathematical representation of the Empire and then combined it with a number of factors such as “the known probability of Imperial assassination, viceregal revolt, the contemporary recurrence of periods of economic depression, the declining rate of planetary explorations”. As these and other factors were added to the mix a

mathematical representation was produced of the predicted state of the capital in three centuries, which was interpreted into non mathematical concepts the opposite way that the initial conditions were input. He showed that within 300 years the planet would be totally destroyed. The final calculation was of the percentage chance of this outcome which Gaal estimated to be 85% but Seldon confirmed as actually being 92.5%.

So the workings of Psychohistory were purely mathematical resulting in a probability of a particular outcome with the larger the statistical sample size the greater the accuracy. Hence the inability to predict events for an individual. Hari Seldon did not see the end of his predictions as he lived for 81 standard years and passed the legacy and responsibility on to his successors for them to continue the work of psychohistory. Interestingly the Foundation while containing representatives of all streams of science had no psychologists. Part of Hari Seldon's plan was to keep the understanding of psychohistory from the members of the Foundation. It is evident that any psychological experiment works better when the subjects are unaware of their true involvement. In fact Hari Seldon left the true workings of psychohistory to the Second Foundation to act as steersmen to fine tune the Foundation's development and to respond to any deviations from the ordained path.

### **The limitations of prescience and psychohistory**

In both *Dune* and *Foundation* there were limitations to foreknowledge, things that for some reason were not able to be seen. This left the protagonists susceptible to failure, in Paul's case as he became more reliant upon prescient visions, surprises were unwelcome and left him with uncertainty. For *Foundation* this inability to see almost resulted in the derailing of the entire Foundation project.

In the description of the gauze kerchief blowing in the wind we see the dangers to Paul in that there were some things hidden from his sight in the valleys or troughs of the terrain. Not all is clear: "The immediate future - say, a year- I can see some of that ... a read as broad as our Central Avenue ... Some places I don't see .... shadowed places ... as though it went behind a hill .. and there are branchings ..."

We get a description of entering one of these shadowed places when Paul and Jessica were fleeing the Harkonnens. They received help from Duncan Idaho and Liet Kynes. This part Paul knew from his visions, but there were a variety of outcomes, in some Duncan accompanied them, but in the reality, Duncan was killed defending them. Kynes directed them down a secret passage towards an ornithopter to escape in. When they were preparing to depart Paul hesitated:

"Paul nodded, fighting an abrupt reluctance to move. He knew its cause, but found no help in the knowledge. Somewhere this night he had passed a decision-

nexus into the deep unknown. He knew the time-area surrounding them, but the here-and-now existed as a place of mystery. It was as though he had seen himself from a distance go out of sight down into a valley. Of the countless paths up out of the valley, some might carry a Paul Atreides back into sight, but many would not.” Then, “He joined her in the ornithopter, still wrestling with the thought that this was blind ground, unseen in any prescient vision. And he realised with an abrupt sense of shock that he had been giving more and more reliance to prescient memory and it had weakened him for this particular emergency.”

This blind ground was the storm that they rode the top of the safety. This action was extremely dangerous relying on his skills and judgement as a pilot with continual minute decisions, any one of which could end in their death.

The reason that these areas were hidden from Paul in a form of prescient blindness is because they were pivotal moments where a multiple outcomes were possible through a multitude of minute actions and reactions such as hand to hand combat or the ornithopter flight through the storm, but the turmoil around the moment made the details impossible to see. A point of this nature was called a nexus, a pivotal turning point for Paul. He experienced this again leading into the fight with Jamis.

“And what he saw was a time nexus within this cave, a boiling of possibilities focussed here, wherein the most minute action - the wink of an eye, a careless word, a misplaced grain of sand - moved a gigantic lever across the known universe. He saw violence with the outcome subject to so many variables that his slightest movement created vast shiftings in the pattern. The vision made him want to freeze into immobility, but this, too, was action with its consequences.

The countless consequences - lines fanned out from this cave, and along most of these consequences lines he saw his own dead body with blood flowing from a gaping knife wound.” The most crucial lack of foresight was in Book 3 when Gurney Halleck threatened his mother believing her to be the traitor who had betrayed the Atreides to the Harkonnens. This was a delicate situation where the slightest word, tone, hesitation or movement could result in Gurney’s knife entering her back and piercing a vital organ in less than a heartbeat.

“The decision had come to Paul while he faced the tension of danger to his mother. No line of the future he had ever seen carried that moment of peril from Gurney Halleck. The future - the grey-cloud-future - with its feeling that the entire universe rolled towards a boiling nexus hung around him like a phantom world. I must see it, he thought.”

It was this incident that made Paul decide to take the Water of Life (the poisonous spice essence from a drowned juvenile worm) so that he could be rid of the unknowns of prescience. The need for the vision outweighed his own personal danger in taking the Water of Life. Previously only women had done this without dying.

Finally leading up to the climax to the book despite taking the Water of Life the inability to see the nexus clearly was related to his own efforts to thwart the visions.

“The imperfect vision plagued him. The more he resisted his terrible purpose and fought against the coming of the jihad, the greater the turmoil that wove through his prescience. His entire future was becoming like a river hurtling toward a chasm--the violent nexus beyond which all was fog and clouds.”

Paul realised at this point that he was not the only blind one. “The future’s becoming muddled for the Guild as it is for me. The lines of vision are narrowing. Everything focuses here where the spice is ... where they’ve dared not intervene before ... because to interfere was to lose what they must have. But now they’re desperate. all paths lead into darkness.” The Guild and the Bene Gesserit who were also accustomed to some kind of “sight” were likewise unable to pierce the fog of this nexus, in this case centred on the hand to hand combat with Feyd-Rautha Harkonnen.

“And he sampled the time-winds, sensing the turmoil, the storm nexus that now focused on this moment place. Even the faint gaps were closed now.”

“This is the climax, Paul thought. From here, the future will open, the clouds part on to a kind of glory. And if I die here, they’ll say I sacrificed myself that my spirit might lead them. and if I live, they’ll say nothing can oppose Muad’Dib.”

Paul came through the nexus victorious and the fog cleared for all on a future where Paul was Emperor with total control over the spice.

In addition to the nexus there were also some things were just unknown to Paul such as details in his visions and even people. When going to ride the Maker as a right of passage that all Fremmen do, he was astounded by the size. It was by far the largest worm he had ever seen. He thought “This is nothing I have seen by vision or in life”.

An incredibly significant person was also hidden from Paul’s sight: Count Fenring who was the closest friend to the Padishah Emperor Shaddam IV. He was a member of the Imperial Court that moved to Arrakis during the spice crisis and when the members of the court were escorted to their audience with Paul and his entourage, Paul had to ask who this person was.

“He looked beyond Feyd-Rautha then, attracted by a movement, seeing there a narrow, weaselish face he’d never before encountered - not in time or out of it. It was a face he felt he should know and the feeling carried with it a marker of fear.” He questions “Have I been denied a glimpse of this man because he is the one who kills me?”. Count Fenring very nearly decided to kill Paul but relented as the two felt something akin to brotherhood. The reason Fenring was unseen was that “Fenring was one of the might-have-beens, an almost Kwisatz Haderach, crippled by a flaw in the genetic pattern - a eunuch, his talent concentrated into furtiveness and inner seclusion.”

It also becomes clear in the sequel *Dune Messiah* that prescience cannot see others who have prescience, thus those involved in the plot against Paul are shielded from his prescience by their proximity to Edric the Guild Steersman.

In the *Foundation* series the hidden things were again people and of course psychohistory is limited by the statistical nature of the science being most accurate with large sample sizes and is unable to predict for individuals with reliable accuracy. But the place where the Foundation project nearly comes undone is with the introduction of a mutant who does not follow the ordained route of the Psychohistorians.

The Mule was a wild factor that was not predicted by Hari Seldon. He had a power to manipulate the emotions of other people, bend their wills, direct their thoughts and create followers in this way. After the appearance of the Mule, Foundation followers believed that this was the next crisis, but when they went to the Time Vault, Hari Seldon’s message told them nothing about it.

( Chapter 18) “For the first three centuries the percentage probability of non deviation is 94.2” He told of a crisis that was not happening and his Foundation was mystified as to what he had been predicting. The Mule has changed things. Seldon predicted a civil war. Ebling Mis asks, “Were your Traders ever planning civil war?” Randu responded, “We planned one, yes. We called it off in the face of the Mule.” “Then the Mule is an added feature, unprepared for in Seldon’s psychohistory.”

Because the Mule was a psychic mutant, he was able to coerce others directly and did not allow people to act freely. In effect this was one person imposing their will on statistically large populations. Psychohistory could not predict this mutant ability and therefore failed to predict his large sphere of influence which sent the Foundation plan into an unforeseen deviation. But Hari Seldon had a Second Foundation in place to help restore his plan. They effectively removed the

Mule from being able to influence others and restored the direction of the path to close to what had been originally planned.

### **The responsibility of foresight or the Golden Path**

Knowledge of the future comes with great responsibility. We find that our two main characters Hari Seldon and Paul Atreides are fundamentally moral people. Both individuals were faced with knowledge of an abhorrent future full of hardship, barbarism, cruelty and the loss of billions of lives. The final part of this paper examines the responses they had to this foreknowledge. For Paul, on the horizon of all his most probable futures was a bloody jihad led by Fremen warriors in his name across the known universe, a “terrible purpose” that was the way the race consciousness chose to mingle genes and bring further stability to humanity but at a huge price. Similarly, in *Foundation* the dire future is the end of the 12,000 year old Galactic Empire and a descent into barbarism lasting thirty thousand years before the emergence of a new and stable empire. The question posed here is: what responsibility does a person have to avert those events that have not yet come to pass but if left to themselves will?

Paul was aware of the jihad from that first night of conscious prescience. He also saw his part in it and eventually knew it would happen whether he lived or died.

“I’m a seed.

He suddenly saw how fertile was the ground into which he had fallen, and with this realisation, the terrible purpose filled him, creeping through the empty place within, threatening to choke him with grief.”

When Jamis’ water was added to the lake at the wind trap Paul remembered seeing this lake in one of his dreams which leads to a prescient realisation.

“But he could feel the demanding race consciousness within him, his own terrible purpose, and he knew that no small thing could deflect the juggernaut. It was gathering weight and momentum. If he died this instant, the thing would go on through his mother and his unborn sister. Nothing less than the deaths of all the troop gathered here and now - himself and his mother included - could stop the thing.”

Paul’s ability to exert influence on his own future appeared to be quite limited. After winning the fight he tried a subtle change and asked his name to be Paul Muad’Dib, instead of just Muad’Dib. This encouraged him and he said that “That was in no vision of mine. I did a different thing.” When he tried to resist the ultimate future of the jihad, this only muddied the waters and his ability to see with clarity decreased significantly. It was as if he was walking a

tightrope with little choice. As a moral person he wished to avoid the atrocities that will be committed in his name. This limitation is described here:

“seeing time stretch out in its weird dimension, delicately balanced yet whirling, narrow yet spread like a net gathering countless worlds and forces, a tightwire that he must walk, yet a teeter-totter on which he balanced. ... On one side he could see the Imperium, a Harkonnen called Feyd-Rautha who flashed toward him like a deadly blade, the Saudaukar ....., the Guild ..., the Bene Gesserit ... The lay massed like a thunderhead on his horizon, held back by no more than the Fremmen and their Muad'Dib, the sleeping giant Fremmen poised for their wild crusade across the universe.”

Paul was in effect limited by his visions. The only time he was able to make any kind of choice was at a nexus and because of the multiple outcomes possible at these times it was more likely to be an instinctive action or reaction that propelled him into a new timeline. At the end Paul accepted the inevitability of the Jihad and ceased fighting it. With this outcome we need to ask ourselves, was Paul in fact a good, moral character? We shall not discuss this here, but it would I think make an excellent topic for a future paper. *Dune Messiah* highlighted Paul's dilemma to a greater extent by showing how Paul became trapped by his visions being unable or unwilling to shape them. As stated before, when he lost his eyes the visions substituted for his sight and he became locked into one course of action unable to deviate at all. At the end when his visions failed and left him truly blind he relied on the vision of his son Leto who had just been born (and was also pre born) to kill the face dancer Scytale. When Paul's view of the future failed, it came to another to take up the challenge and bend the visions to his own will by shaping a future for all humanity rather than just riding the wave. Leto shaped the Golden Path, and rather than leaving the legacy to his heirs he oversaw it himself for over 3,500 years due to the physical changes brought about by his transformation into the *God Emperor of Dune*.

The Golden Path was the way that Leto chose to shape humanity rather than leaving it to the chaotic will of the race consciousness. The Golden Path was cruel and repressive and he exerted control over whole populations. Through his own selective breeding program he succeeded in breeding a race of humans who could not be seen by prescience and forced humanity to break out of the constrictions of reliance upon spice. In the end he brought about his own demise but ensured diversity, initiative and freedom from the constrictions of a monopoly on space flight which led to a golden age of exploration and renewal for humanity.

For Hari Seldon, even though he would be long dead, due to his own moral compass, 30,000 years of barbarism was something he could not accept. The good thing about psychohistory is that it was not just for diagnosis and prediction, it was also a tool. If one could change the initial conditions with a large enough population, then it would be possible to change the future. Hari

Seldon did not accept the inevitability of his own predictions, but set about a huge undertaking. He calculated how the initial conditions might be changed to bring about a reduction to the length of time that chaos and barbarism would reign. In the end he created the favourable result of a mere 1,000 years before a new empire would arise, one of his own making through the seed of The Foundation.

During his trial in chapter 6 Hari Seldon states, “Trantor need not be ruined, if a great many people decide to act so that it will not.” “That is right.” The hundred thousand people he has gathered have a purpose, “to minimize the effects of that destruction” “The dark ages to come will endure not twelve, but thirty thousand years ... we must fight that.”

“It is not yet too late to shorten the interregnum which will follow. It is possible ... to reduce the duration of anarchy to a single millennium, if my group is allowed to act now. We are at a delicate moment in history. The huge, onrushing mass of events must be deflected just a little ... but it may be enough to remove twenty-nine thousand years of misery from human history.”

The Foundation then had one course to follow which would allow it to become the beginning of a new empire in 1,000 years time. “From now on, and into the centuries, the path you must take is inevitable. You will be faced with a series of crises ... you will be forced along one and only one, path. It is that path which our psychology has worked out - and for a reason.”

## Conclusion

These two masterpieces of speculative fiction, *Dune* and *Foundation* deal with similar issues: seeing the future and what we do with that knowledge, but treat them in very different ways. The experiences of prescience and psychohistory were quite different with Paul’s experience being what could be described as “true sight” and the psychohistorians being pure academics treating the experience as would a theoretical physicist, but were influential and so well organised as to be able to set up the Foundation as a fledgeling settlement on the edge of the galaxy.

We saw that both methods of future sight had limitations. For Paul it was the boiling nexus where the smallest action could have huge ramifications, or be in the shape of a person such as Count Fenring, a potentially deadly threat similar to Paul and thus invisible to him. For the psychohistorian the statistical nature of their science saw the Mule create a huge deviation to the plan because he acted outside of the rules that psychohistory was based upon. These limitations were deadly threats that could have resulted in the ultimate failure for the protagonists.

Because these methods of seeing the future are rooted in our own universe subject to our current physical laws both authors chose to treat their subjects in a scientific way free from unexplainable mysticism, magic or superstition. We therefore get an alignment of ideas being: the way to see the future is twofold. We observe the present fully and in minute detail. Then with our knowledge of human behaviour we are able to predict possible and probable futures.

The traditional view of telling the future is actually the exact opposite of this. Great credence is given to those who can predict the future with no information and to have knowledge of a person or use knowledge of human behaviour is labeled as charlatanism. So whether we call Paul Atreides and his heir Leto or Hari Seldon and his successors charlatans is a moot point. They were in fact visionaries who saw the future for what it was, used this knowledge to overcome adversaries to ensure survival for themselves or for their vision. In the cases of Hari and Leto II they both found their Golden Paths which were to lead to greater success for humanity, long and prosperous empires greater than the ones preceding them and futures free

---