



Paratime

By
Michael McCollum

In the last two chapters we have been speaking of time travel. In Chapter 9 we looked into those portions of modern physics that suggest time travel may actually be possible. Then in Chapter 10, we explored the various kinds of stories that make up the time travel sub-genre. And though it may not have seemed like it at the time, all of these musings have been fairly conventional in one respect: we have limited ourselves to the idea that temporal travel involves one of two directions: futureward and *pastward*. But what other directions are there? Funny you should ask. We now take up another variety of time travel, one in which our intrepid explorers move neither forward or backward in time. Instead, they go sideways!

Since the days of Herbert George Wells, men and women of greater-than-average intellect (and less-than-average social skills) have been thinking about the paradoxes involved in the concept of time travel. They've explored the subject from every angle, delved into each potential problem and come up with a wide range of possible scenarios. They have been strongly motivated during this quest for knowledge, often working long into the night to resolve seemingly minor inconsistencies in their theories. They have concentrated on the problem longer and with more dedication than even the doctor-professors who inhabit our prestigious research universities. These pioneers, underpaid science fiction writers all, were driven to explore the paradoxes of time travel by that most basic of all human motivations, the need to put bread on the table to feed their families.

The one thing at which science fiction writers excel is their ability to wring all the possibilities from a scenario. Is it any wonder then that science fiction's model of time travel is multifaceted? This is less due to the intellect of these philosophers-of-the-printed-page than it is to their persistence. If a large number of people commit their creative energies to thinking about a subject for more than a century, there is no telling what they will come up with. And so it is with the study of time travel in science fiction. Who decreed that "forward" and "backward" are the only two directions you can go?

Time is one of four dimensions in the space-time continuum. The other three are the space dimensions, usually labeled "length," "breadth," and "width." But as we also learned in Chapter 9, the latest Grand Unified Theory of Everything is called "Superstring Theory, or just String Theory" so named because the basic equation of the universe takes the same form as the equation for a vibrating string. We don't know why the universe "vibrates" like a string, we just know that it does – or at least, we *think* that we know it does. Nor is it necessary at our current level of knowledge for us to truly

understand the underlying principle of the great void around us. Merely knowing the equation is sufficient ... for now.

After all, the chemists who first laid out the Periodic Table of the Elements didn't know why lead is different from gold. They just knew that the two were not the same, and were sufficiently familiar with the properties of each to place the two elements in their proper place in the table. And even though they had no inkling of atomic theory, they recognized that some of the elements had yet to be discovered (oxygen, for one), and left room for them on the chart. We are like those early chemists when it comes to string theory. As one scientist has stated, "String theory is a twenty first century science discovered by twentieth century physicists through a fortuitous accident." Not knowing *why* the universe is the way it is doesn't stop us from putting our rudimentary knowledge to use.

Assuming that string theory is correct, the universe must have at least ten dimensions. This is because the string equation has a several terms raised to the $n-10$ power, where n is the number of dimensions in the universe. If that particular exponent doesn't calculate out to zero, then the equation will be much too messy to differentiate (a term from calculus involving the manipulation of exponential equations). And one thing we have learned after doing science for half a millenium is that the really important equations always turn out to be deceptively simple. Don't believe me? Then consider $F=MA$ and $E=MC^2$. Even my wife knows those two. You can't get much simpler.

But if the universe has ten dimensions, *where the hell are the other six?* That is the question that every cosmologist has been asking for the past 20 years. The answer to that question is at least as important as Einstein's Theory of Relativity, and out of it may flow the technology of time travel — forward, backward, and sideways!

Let us move to the topic of this chapter, which is the sub-genre of science fiction known as the "paratime" story. Paratime is (I suppose) a contraction for "parallel time," which in turn evokes specters of universes coexisting side-by-side, each different from its siblings (either slightly or greatly), and each inhabited by beings more or less like us. What if time, rather than being a one dimensional "line," is actually a two dimensional "plane" or even a three dimensional "volume?" If that is the case, then our fictional time

Yearning for the Past through the Ages

We are able to move "forward" in time quite easily, and in fact, do so every second of every day. What is a second except a measurement of the "distance" we've traveled along the time axis of our "four dimensional" universe? But what of our dream of moving "backward" in time, of returning to the past to correct mistakes once made, or merely to live out our lives in a less stressful era? This seems to be one of those universal longings to which human beings are vulnerable. And since everyone seems to have the same desire (regardless of the age in which they live), I suspect that there was never any such thing as a "quieter time." Consider that idyllic era spanning a decade on each side of the beginning of the twentieth century. Was it truly the paradise most of us believe? True, technology and information didn't move as quickly as they do now, but those years planted the seeds that would one day blossom into World War I. How "quiet" do you suppose life was for the immigrants crammed into New York's Lower East Side? No, that universal longing for the past is an artifact of selective memory. Life in the past, as Thomas Hobbes, the 18th century English philosopher, observed, was liable to be "Nasty, brutish, and short."

travelers have a number of directions from which to choose when they power up their machines. They can travel future/past, right-time/left-time, or uptime/downtime. (Actually the terms “uptime” and “downtime” have been appropriated by Poul Anderson in his *Time Patrol* series to denote future and past, so we’ll have to name our “vertical time” directions something else.)

There is a certain elegance to the idea that the universe has three space dimensions and three time dimensions, leaving us with a deficit of four dimensions rather than our current six. Yet, although it’s easy enough to talk about parallel universes and traveling sideways in time, what, exactly, do we mean when we say such things? That’s one of the problems. We science fiction writers each mean different things when we use those words. There are a variety of theories of parallel universes or paratime, all of which are driven more by the dictates of commercial fiction than by true science. Still, in our attempt to make a semi-honest dollar (or pound, mark, yen), we science fiction types may have lurched into some degree of universal truth.

Parallel Universes (Simple Model)

The simplest of models for parallel universe stories is one in which the universes are ... well, parallel. What if there are an infinite number of Earths out there, each coexisting side-by-side in some two or three dimensional time matrix? Think of each universe as being imprinted on a long strip of movie film. The time dimension is the length of the film and all three space dimensions are crammed into the film’s 70-mm width. Thus, as time passes, we mere mortals move from frame to frame along the strip of film, living out our lives in blissful ignorance of the fact that we are merely moving through the Universal Movie Projector.

Then imagine that there is a second film strip on which a different set of characters live out their lives, and that second film strip is touching our film strip’s flat surface such that their frames are in perfect register with ours. Then imagine a third, a fourth, and a fifth filmstrip, each lying on its edge and pressed tightly against the filmstrips on either side. Eventually, you have a vast celluloid plain carpeted with strips of movie film lying on their edges and stretching out infinitely from east to west.

Now imagine that you are one of the beings who inhabit a single filmstrip, moving from frame to frame as the days pass. You are tinkering in your basement one-day and invent a machine that allows you to jump from your frame to the same frame in the adjacent filmstrip. There you discover the picture is nearly identical to the picture you just left, with the exception that one small dot of color in the corner of the frame is orange, when you remember it as being red. Exhilarated by your discovery, you jump again, this time ending up two filmstrips over from your home. There the dot of color isn’t so small any longer, and it has turned yellow. While the scene in each frame is only slightly different from the scene in the identical frame of the adjacent film strip, as you move across the strips, the scene becomes more and more transformed, until by the time you’ve traveled a kilometer “across the strips,” you don’t even recognize the scene any longer.

That then is the basic concept of moving “sideways in time.” It is a journey across the “film strips,” where adjacent universes are so close to one another that it is

difficult to tell the difference between them, but the further you travel from your home “strip,” the weirder things become.

This concept is not new with me, nor is the example of using movie film as an analogy for parallel universes. There is a very famous vignette in science fiction (by Fritz Leiber, I believe) where the author imagines that he has cut across the film strips and then spliced all of the adjacent frames together in order to run an “across the strips” movie. The vignette focuses on a stoop-shouldered farmer, who is slowly transformed into a lizard, and then into a ravaging beast, and finally into a stoop-shouldered farmer (but one with blue skin and obviously not human) laboring under a red star.

The Branching History Model of Parallel Universes

What if when the alarm clock rang this morning, instead of getting up and going to work, you merely turned it off and went back to sleep? “Then I would have gotten fired,” you say. True, and had you gotten fired, the universe would not be the same place that it is today. In other words, sometime around six o’clock this morning, you had a decision to make, and the universe changed based on the choice you made.

But what if you didn’t choose? What if all the universes created by all our alternatives actually exist somewhere, like the infinitely branching limbs of a tree, or possibly the switch yard of a train depot. What appears to you to be free will, is merely your random following of whichever “train track” contains the choice you actually made. You are switching from track to track based on your decisions. Had you chosen differently, then you would now be on a different track. Does that make you a “free person?” Is a locomotive free? No matter what choice the engineer makes, the train still has to follow the tracks.

The “branching history” model of parallel universes assumes that every decision ever made was made both ways, and that two different universes were created at that moment. Each of these universes is virtually identical, except for the differences resulting from the decision that created the “branching” in the first place. In one universe you are grumpily toiling away at your job, while in the other, you are still at home, asleep in bed. Save for that one difference, it is impossible to see any variance between the two. Of course, this minor difference doesn’t stay minor for long. When you awake this afternoon, you will find a message from your boss informing you that your services are no longer required. In a few days, your savings will be gone and you won’t be able to buy food. Eventually, you will die of exposure on the same cold winter street where you have been living in a cardboard box ever since your unemployment insurance ran out. At that point in time the portly “you” who decided to get up and who continued eating is nothing like the emaciated “you” who is now a corpse on skid row. The two universes that were formerly a single universe have diverged dramatically.

But what’s so special about you? What about the decisions I make? Aren’t they universe changing, too? Yes, they are. In fact, everyone’s decisions cause branching. Suddenly the tree is sprouting branches faster than Medusa could sprout snakes. Billions of universes are formed every few microseconds as all of the people on Earth make their individual, moment-by-moment decisions. And why limit the power to create new universes to people? What about the animals? Don’t their decisions cause the universes to branch, too? Or how about the wind? Any variation in the direction or intensity of the

wind will cause wind-borne seeds to be deposited somewhere other than their former sites, resulting in mighty oak trees growing where (in another universe) there are none. If you have the same tree growing in two different spots, don't you have two different, parallel universes?

As you can see, the concept of branching universes gets complicated in a hurry. Still, if there are an infinite number of such universes, then all variations are not only possible, but also required!

Branching universe stories are also a sub-genre of the time travel story. The Time Patrol exists in these stories not to prevent history from being changed (since all possibilities exist, how can history change?), but rather to help the protagonists negotiate the proper series of branches to end up in the proper universe.

Anyone dizzy, yet?

Larry Niven explored the branching universe story in his classic *All The Myriad Ways*. Sideways time travel has been recently invented in this short story, and suddenly, people are committing suicide for no obvious reason. The policeman-protagonist is called to the death scene of the inventor of the temporal transport. This worthy, after playing an all night game of poker, walked out to his penthouse balcony to watch the sunrise, and jumped to his death. In exploring the suicide, the policeman suddenly realizes these people are committing suicide because they realize that it doesn't matter. *Every decision gets made both ways!* In other words, for every person who decides *not* to commit suicide, there is an alter ego that decides to do so. The ending of the story is a perfect comment on the complexities of the Branching Universe Story:

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Casual murder, casual suicide, casual crime. Well why not? If alternate universes are a reality, then cause and effect are an illusion. The law of averages is a fraud. You can do anything and one of you will, or did.¹

Gene Trimble looked at the clean and loaded gun on his desk. Well, why not?

And he ran out of the office shouting "Bentley, listen! I've got the answer..."

And he stood up slowly and left the office shaking his head. This was the answer, and it wasn't any good. The suicides, murders, casual crimes would continue. ...

And he suddenly laughed and stood up. Ridiculous! Nobody dies for a philosophical point! ...

And he reached for the intercom and told the man who answered to bring him a sandwich and some coffee. ...

And picked the gun off the newspapers, looked at it for a long moment, then dropped it in the drawer. His hands began to shake. On a world line very close to this one...

And he picked the gun off the newspapers, put it to his head and

fired. The hammer fell on an empty chamber.

fired. The gun jerked up and blasted a hole in the ceiling.

fired. The bullet tore a furrow in his scalp.

took off the top of his head.

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The Spaghetti Theory of Parallel Universes

My own minor contribution to the genre was to ask the simple question, “Why do parallel universes have to be parallel?” In 1978, I wrote a parallel universe story called “Beer Run.” In this I postulated that the different timelines are all mixed up, resembling nothing so much as a tangled ball of string or a bowl of spaghetti. Is there any advantage to this seemingly needless complication in an already complicated mental model? Only this. If the universes are parallel, then time is synchronized across the timelines. A day in one is a day in all.

With the spaghetti theory, the various timelines loop around, encounter each other erratically. Time may pass at a different rate in each universe, or even seem to run in reverse in one universe when viewed from the perspective of another. If this concept seems very complicated, it is. However, I was able to mine quite a lot of story potential from it.

To clarify what I am saying, let’s look at an example. Think of “timelines” as being like strands of spaghetti in a big mixing bowl. Two timelines may touch one another at two different places along their individual lengths just as two strands of string may cross one another repeatedly when they are in a tangle. Along one spaghetti strand, the distance between points of contact is only a few centimeters, but along the other, more than a kilometer separates the two points where the strands touch. What this means is that it is possible for the people on the “long strand” to effectively “jump” that kilometer of distance by transferring to the short strand, then moving that few centimeters along its length before returning to their home strand at the next point where the two touch. But when they reenter their own timeline, they find they are a kilometer farther along than when they left.

Translating this concept into terms of time, one day the travelers jump from their own timeline to another, they camp out there for thirty days, then return to their own line when the two timelines again touch one another. Except when they return home, they discover that a century has passed. And what if the “long” timeline is moving opposite the direction the “short” timeline is moving. Perhaps when they return home they will find that it is a century *earlier* than when they left.

You can see that the concept lends itself to any number of fictional situations. The conflict between characters becomes a game of hide and seek in the tangled skein of timelines, with victory to the side that understands the multidimensional geometry of time, and death to the side that doesn’t.

However, as you probably noticed from my attempts to explain the ramifications of the theory, it takes a hardy soul to venture into that thicket. Explanations are complex, and it is easy to lose the reader as to what is going on. Perhaps I have lost you already. If so, take heart. We are about to return to familiar territory.

Examples of Parallel Universe Stories

Sliders

One of my favorite shows on television over the last few years has been *Sliders*, on the Fox Network in the US. *Sliders* is the story of Quinn Mallory, a young scientist

who has found a way to cross the barrier between parallel Earths. In the first story, he and his friends take a journey to a parallel world, have to jump again before it's time to do so, and end up lost among the universes, searching for a way home.

(Actually, the first two seasons of *Sliders* were very well done, but during the third season, it devolved into a mindless, silly chase program. As a result, it was given a merciful death. Obviously, the expensive writers who made the show successful had gone on to write for some other series, leaving the program in the hands of those who knew nothing of either science fiction or the conventions of the parallel universe story. I urge you to catch it in reruns as it was once an excellent example of the parallel universe story.)

What was good about *Sliders* (when it was good) was that the writers established their situations and then took them to their logical conclusions. In one episode, the four adventurers (three males, one female) find themselves on a wharf in an alternate version of San Francisco. One of the men notes that there are a lot of beautiful women about. They then discover that all of the clothes and toys in the shop windows are devoted to females. They are contemplating this oddity when the police – female! — show up and arrest the three men, charging them with escaping from the local breeding center.

This alternate universe, the travelers discover, has suffered a plague unleashed by Iraq in an alternate Gulf War. The plague attacks the Y-chromosome and nearly wipes out the male population of the planet, leaving only the female survivors and a few males who are naturally immune. The three male travelers are taken to the breeding camp where they are expected to do their “patriotic duty” a dozen times a day with the most beautiful women that can be found. It turns out that there is a cold war going on between the United States and Australia, with each side attempting to replenish their populations by any means possible.

Yet, despite being in a situation that is the fantasy of every teenage boy, the male travelers find that being used for breeding stock is both demeaning and demoralizing. They escape and try to find their female companion before it is time to slide to a new parallel universe. They are discovered hiding in a house by the police when one of the officers notes that the toilet seat has been left in the “up” position (poetic justice from a female viewpoint).

What made the program for me was the different motivation of the various characters. In a situation where men vastly outnumber women, the men would naturally fight over the women because of their native sexual appetites. In this *Sliders* episode, the women fought over the men not because they wanted sex, but because they wanted *babies!* It is subtleties like that which make good science fiction.

Lord Kalvan of Otherwhen

No discussion of parallel universe stories would be complete without acknowledging the accomplishments of the master of the art, H. Beam Piper. Mr. Piper was at the height of his powers in 1964 when he killed himself in a fit of despondency. His last work was, in my opinion at least, the best parallel universe story ever written: *Lord Kalvan of Otherwhen*.

In this story, Calvin Morrison, a Pennsylvania State Trooper, is stalking a suspect when he stumbles into a dome of light. The dome is a time machine being operated by an

agent from an advanced civilization that inhabits a timeline where human progress has proceeded at maximum. This civilization travels across the timelines, trading in secret and retrieving the resources of many parallel Earths.

Morrison, who already had his gun out when he entered the dome, beats the time agent to the draw and rolls back through the wall of light surrounding the time machine. He ends up in a Pennsylvania forest, but on a timeline far from his own. Where his home timeline is part of the Europeo-American sector, his brief sojourn in the time machine was long enough to transport him to one of the timelines of the Aryan-Transpacific sector. On this sector, the Caucasians migrated east out of India rather than west. The result is that the North American continent is crawling with blond-haired people at a sixteenth century technological level.

Morrison soon finds himself in league with Prince Ptosphes and his beautiful daughter Rylla, who are having an argument with Styphon's House, an evil religious sect that is the power behind the throne all through the "Seven Kingdoms." What makes Styphon's House so powerful is that they alone know the secret of how to make gunpowder, and they use this monopoly to make and break kings.

Into this explosive mixture (pun intended) drops Calvin Morrison, who among other things, knows the formula for gunpowder. He convinces Prince Ptosphes to set up a competing gunpowder business, and the War of Explosive Reformation is on.

Lord Kalvan of Otherwhen is largely an historical romance set in a history that never happened, and a rollicking good adventure yarn. It's a shame that H. Beam Piper didn't live to produce any more works. I would have liked to read the sequel. (A few years ago, another writer undertook to write that sequel. All I can say about the effort is "the less said, the better.")

Conclusions

Like the time travel story, the parallel universe story engages the reader by exploring events that never happened in either exotic locales or familiar settings. Don't like the way the Civil War turned out? Then change it! Harry Turtledove did just that in *Guns of the South*. The Confederacy is losing the war until the moment when time traveling Afrikaners show up and begin handing out AK-47s in wholesale lots. It's amazing what a losing army can do when equipped with fully automatic weapons!

Do you think America would have been better off under British rule? No problem. Somewhere nearby there is probably a parallel universe where that happened. In fact, if the theory of parallel universes is correct, then there must be a parallel universe where *everything* happened.

Remember:

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And he picked the gun off the newspapers, put it to his head and fired. The hammer fell on an empty chamber.
fired. The gun jerked up and blasted a hole in the ceiling.
fired. The bullet tore a furrow in his scalp.
took off the top of his head.

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Somewhere, somewhen, that is happening to you at this very moment. Perhaps you should be happy that you've made the choices that brought you to *this* particular timeline. You might not like it on some other.

The End

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Three hundred years after humanity made its deal with the Life Probe to search out the secret of faster-than-light travel, the descendants of the original expedition return to Earth in a starship. They find a world that has forgotten the ancient contract. No matter. The colonists have overcome far greater obstacles in their single-minded drive to redeem a promise made before any of them were born...

3. Antares Dawn - US\$5.00

When the super giant star Antares exploded in 2512, the human colony on Alta found their pathway to the stars gone, isolating them from the rest of human space for more than a century. Then one day, a powerful warship materialized in the system without warning. Alarmed by the sudden appearance of such a behemoth, the commanders of the Altan Space Navy dispatched one of their most powerful ships to investigate. What ASNS Discovery finds when they finally catch the intruder is a battered hulk manned by a dead crew.

That is disturbing news for the Altans. For the dead battleship could easily have defeated the whole of the Altan navy. If it could find Alta, then so could whomever it was that beat it. Something must be done...

4. Antares Passage - US\$5.00

After more than a century of isolation, the paths between stars are again open and the people of Alta in contact with their sister colony on Sandar. The opening of the foldlines has not been the unmixed blessing the Altans had supposed, however.

For the reestablishment of interstellar travel has brought with it news of the Ryall, an alien race whose goal is the extermination of humanity. If they are to avoid defeat at the hands of the aliens, Alta must seek out the military might of Earth. However, to reach Earth requires them to dive into the heart of a supernova.

5. Antares Victory – First Time in Print – US\$7.00

After a century of warfare, humanity finally discovered the Achilles heel of the Ryall, their xenophobic reptilian foe. Spica – Alpha Virginis – is the key star system in enemy space. It is the hub through which all Ryall starships must pass, and if humanity can only capture and hold it, they will strangle the Ryall war machine and end their threat to humankind forever.

It all seemed so simple in the computer simulations: Advance by stealth, attack without warning, strike swiftly with overwhelming power. Unfortunately, conquering the Ryall proves the easy part. With the key to victory in hand, Richard and Bethany Drake discover that they must also conquer human nature if they are to bring down the alien foe ...

6. Thunderstrike! - US\$6.00

The new comet found near Jupiter was an incredible treasure trove of water ice and rock. Immediately, the water-starved Luna Republic and the Sierra Corporation, a leader in asteroid mining, were squabbling over rights to the new resource. However, all thoughts of profit and fame were abandoned when a scientific expedition discovered that the comet's trajectory placed it on a collision course with Earth!

As scientists struggled to find a way to alter the comet's course, world leaders tried desperately to restrain mass panic, and two lovers quarreled over the direction the comet was to take, all Earth waited to see if humanity had any future at all...

7. The Clouds of Saturn - US\$5.00

When the sun flared out of control and boiled Earth's oceans, humanity took refuge in a place that few would have predicted. In the greatest migration in history, the entire human race took up residence among the towering clouds and deep clear-air canyons of Saturn's upper atmosphere. Having survived the traitor star, they returned to the all-too-human tradition of internecine strife. The new city-states of Saturn began to resemble those of ancient Greece, with one group of cities taking on the role of militaristic Sparta...

8. The Sails of Tau Ceti – US\$5.00

Starhopper was humanity's first interstellar probe. It was designed to search for intelligent life beyond the solar system. Before it could be launched, however, intelligent life found Earth. The discovery of an alien light sail inbound at the edge of the solar system generated considerable excitement in scientific circles. With the interstellar probe nearing completion, it gave scientists the opportunity to launch an expedition to meet the aliens while they were still in space. The second surprise came when *Starhopper's* crew boarded the alien craft. They found beings that, despite their alien physiques, were surprisingly compatible with humans. That two species so similar could have evolved a mere twelve light years from one another seemed too coincidental to be true.

One human being soon discovered that coincidence had nothing to do with it...

9. Gibraltar Earth – First Time in Print — \$6.00

It is the 24th Century and humanity is just gaining a toehold out among the stars. Stellar Survey Starship *Magellan* is exploring the New Eden system when they encounter two alien spacecraft. When the encounter is over, the score is one human scout ship and one alien aggressor destroyed. In exploring the wreck of the second alien ship, spacers discover a survivor with a fantastic story.

The alien comes from a million-star Galactic Empire ruled over by a mysterious race known as the Broa. These overlords are the masters of this region of the galaxy and they allow no competitors. This news presents Earth's rulers with a problem. As yet, the Broa are ignorant of humanity's existence. Does the human race retreat to its one small world, quaking in fear that the Broa will eventually discover Earth? Or do they take a more aggressive approach?

Whatever they do, they must do it quickly! Time is running out for the human race...

10. Gibraltar Sun – First Time in Print — \$7.00

The expedition to the Crab Nebula has returned to Earth and the news is not good. Out among the stars, a million systems have fallen under Broan domination, the fate awaiting Earth should the Broa ever learn of its existence. The problem would seem to allow but three responses: submit meekly to slavery, fight and risk extermination, or hide and pray the Broa remain ignorant of humankind for at least a few more generations. Are the hairless apes of Sol III finally faced with a problem for which there is no acceptable solution?

While politicians argue, Mark Rykand and Lisa Arden risk everything to spy on the all-powerful enemy that is beginning to wonder at the appearance of mysterious bipeds in their midst...

11. Gridlock and Other Stories - US\$5.00

Where would you visit if you invented a time machine, but could not steer it? What if you went out for a six-pack of beer and never came back? If you think nuclear power is dangerous, you should try black holes as an energy source — or even scarier, solar energy! Visit the many worlds of Michael McCollum. I guarantee that you will be surprised!

Non-Fiction Books

12. The Art of Writing, Volume I - US\$10.00

Have you missed any of the articles in the Art of Writing Series? No problem. The first sixteen articles (October, 1996-December, 1997) have been collected into a book-length work of more than 72,000 words. Now you can learn about character, conflict, plot, pacing, dialogue, and the business of writing, all in one document.

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This collection covers the *Art of Science Fiction* articles published during 1998. The book is 67,000 words in length and builds on the foundation of knowledge provided by Volume I of this popular series.

16. The Astrogator's Handbook – Expanded Edition and Deluxe Editions

The Astrogator's Handbook has been very popular on Sci Fi – Arizona. The handbook has star maps that show science fiction writers where the stars are located in space rather than where they are located in Earth's sky. Because of the popularity, we are expanding the handbook to show nine times as much space and more than ten times as many stars. The expanded handbook includes the positions of 3500 stars as viewed from Polaris on 63 maps. This handbook is a useful resource for every science fiction writer and will appeal to anyone with an interest in astronomy.