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Maelstrom

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MAELSTROM

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Chaos Honors Seminar

Professors Cole, Crawley, Turner, Wight

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Creation came out of chaos, is surrounded
by chaos, and will end in chaos.

Anonymous

"There are more things in heaven and earth,
Horatio, than are dreamt of in your philosophy."

Hamlet

ONE

CAPTAIN'S LOG: STARDATE 2402.09: The *Enterprise* has been ordered into Sector Three of the Kae Frontier. Our mission is to investigate an anomaly dubbed The Dragon's Maelstrom, or the Dragon, for short. Long range scanners first picked up the Dragon, and its strange energy pattern, over one year ago. We will be the first Federation ship to investigate.

No doubt, many would have been nervous looking into the roiling throat of the Dragon's Maelstrom. Captain Jean-Luc Picard, master of the *Enterprise*, however, sat calmly in his command chair, sipping a cup of tea. For a brief moment, he closed his eyes, letting the warm, dusty taste of the Earl Gray blend take his mind to far away days when tea was transported by caravan over blistering deserts, instead of by some errant transporter beam. Back to reality, Jean-Luc, he thought, and opened his eyes.

Once again Picard looked at the screen, filled with the eerie blues and greens of the Dragon. Clouds of energy on the border of the anomaly burst forth like tendrils, branching in ceaseless combinations. Picard turned to the ship's counselor, Deanna Troi, and smiled. She had likened the tendrils to hands, reaching out to devour any and all comers. Certainly the Dragon looked fierce enough.

"Have the sensors been able to pick up anything new, Mr. Data?" Picard was shaken from his reverie by the voice his first officer, Will Riker.

Lieutenant Commander Data did not look up from his operations console. "The energy boundary of the maelstrom is still partially deflecting our sensors, Commander. I am attempting to compensate." Data turned to look at his senior officers, his android eyes flashing gold. "However. I do not believe that entering the maelstrom will pose any danger."

Picard felt the eyes of the bridge turning to him. They all held the same question: should we go in, or not? "Mr. Data, are the radiation levels within the ship's tolerance."

"Yes, Captain."

Picard felt the blue turbulence of the Dragon calling him. There was no indication of danger, and entering the maelstrom was well within mission parameters. After all, what were mere energy particles? Another sip of tea, and the captain made his decision. "Ahead on full impulse, helmsman." The young ensign's fingers danced over her controls, and the Dragon slowly grew in the screen.

Mr. Data spoke, answering the unspoken question that hung in the air of the bridge. "We will be at the maelstrom's perimeter in thirteen minutes."

"Very good, Mr. Data." Picard settled back into his chair, alternating between calm and curiosity. What was behind those clouds?

To anyone but Data, what happened when the *Enterprise* entered the Dragon might have seemed simultaneous. Data, with

his positronic brain that could slow down his perception of time, knew that they were in fact three separate events, but they came far too close together to be totally unconnected.

When the *Enterprise* slowly pierced the Dragon's outer boundary, the clouds gave way to an insistent current of blues. The ship was bathed with light, and its presence caused eddies and swirls of high energy particles to form around the hull. In the seconds given to the crew Data noticed them, but no one else did.

Data also noticed the sensors pick up an energy spike growing from the heart of the maelstrom. He began opening his mouth to inform the Captain, but there was no time. The sensor's spike had turned into a very real energy wave. At the speed of light the wave washed through the *Enterprise* smoothly and silently. There was no turbulence, and no after shock.

Suddenly the ship began to slew to the left. Inertial dampers could not correct quickly enough, and Data was thrown from his chain. Effortlessly he arose and got back into his chair. Quickly his fingers flipped over the pads before him as he tried to sift through the growing mountain of information. He kept waiting for orders, but the bridge was strangely silent. Data turned around.

No one on the bridge was conscious. Picard was sprawled in his chair, Troi leaning against him. Riker and the young helmsman lay on the floor, caught in the throes of some

seizure. The rest of the bridge crew were in similar conditions.

Data considered the problem for half a second, then decided on a course of action. His first priority was the ship. Quickly Data began tapping on the ops panel, putting all ships functions at his finger-tips.

Before doing anything else, Data raised the *Enterprise*'s shields. It might not do any good against an energy field, but it was better than nothing. Next came the matter of the ship's drift. Data tripped the stations-keeping menu, and began working down the list. The Dragon, Data discovered, was made up of strong energy currents. Stationary thrusters would not hold against the current, not would augmented thrusters. It was not until Data fed the warp engines' power into the system that the *Enterprise* stopped its drift. Data figured power consumption: at present levels, the ship could stay in this spot relative to the maelstrom's center for ten days.

Next came the crew. Data tapped the pin at his chest, linking himself with the ship's communication network. "Dr. Crusher to the bridge," he said as he began checking vital signs. All the crew on the bridge were alive. Commander Riker and the other seizure victim had stilled. There were still no signs of consciousness.

With the immediate danger out of the way, Data began a check of the rest of the ship. Strange, he thought, that no stations had listed a damage report. Even engineering,

usually efficient under his friend Geordi LaForge's promptings, was silent. It was of no importance. According to sensor scans, all mechanical functions of the *Enterprise* were working perfectly.

Strange, too, that Dr. Crusher had not arrived. Data tried his communicator again, but there was not response from sickbay. If Data had been human, he would have experienced a sinking feeling in his stomach. Data quickly checked the vital signs of the crew to test his suspicions, and then double checked to be sure. He was right. Of the entire crew of the *Enterprise*, not one was conscious.

TWO

"In short, I don't know what happened," Dr. Beverly Crusher said several hours later. To the assembled senior officers, her auburn hair formed a welcome contrast to the electric blue that blazed outside the conference room windows. "I haven't had time to fully integrate all the information. What I am sure of it that there is some connection between the energy wave and whatever happened."

But what kind of connection, she wondered tiredly. She had spent the past three hours trying to connect an energy wave with mass unconsciousness, quite a few seizures approximating epilepsy (now *there's* something I haven't seen in a while, she thought) and several heart attacks. Fortunately, everyone made it through okay, although the heart attack victims were still under observation.

"Very good," Picard was saying. Calmly. Even though he knew his crew, especially the six senior officers gathered around the table, he also knew that there was never a time to show a crew fear in the face of the unknown. The only place for that was in your own heart, and then only when there was no other option. And there were always options. "Mr. LaForge?"

Geordi LaForge, chief engineer of the *Enterprise*, collected his thoughts to make his report. For a second he looked out the window into the maelstrom. Instead of blue,

the VISOR bypassing his blind eyes imaged an irregular sweep of energy. It verged on being calming to him, but there was no use trying to convince his shipmates of that. Then it was back to matters at hand.

"As far as I can tell, all ship's systems are on line," LaForge said, deciding to condense his work of the past hours. "The *Enterprise* will do anything you want it to, except leave the Dragon. Data?"

The android picked up where LaForge left off. "While the bridge crew was incapacitated, I attempted to maneuver the *Enterprise* out of the maelstrom. All of my attempts caused the ship to loose ground against the flow of the maelstrom. When I launched a class five probe with warp drive to determine the power needed to escape the energy flow, the resulting power drain overloaded its engines. Analysis showed that any attempt on the part of the *Enterprise* to do anything more than hold its position would result in the same engine overload. At that point I decided to cease my efforts."

Riker let out a low breath. "Good idea, Data. Have you been able to determine anything about the wave you described, or about the Dragon?"

Data turned to face Riker. "Unfortunately, Commander, what I have discovered is of little use. As near as I can determine, the wave is a byproduct of the energy system of the maelstrom. There is a very good chance that it will be repeated."

"How soon, Mr. Data?" Picard asked.

"I have not as yet been able to calculate that, Captain."

"What have you figured out about the maelstrom itself?"

"The energy sweep is somehow related to a gravitic anomaly at the center of the maelstrom. I have been unable to determine the nature of this gravity center. The maelstrom area of space is unlike normal space, and as such the sensors are subject to false readings."

Riker looked puzzled. "What is this about not-normal space? What could be different about space?" he asked.

"I am not certain, Commander. The closest I have come to describing the effect is that the maelstrom is somehow both the cause and effect of a difference in the structure of space. As to what that difference is, I do not know."

Picard sensed it was time to move the meeting along. "Thank you, Mr. Data. Is there anything else?" Troi merely shook her head and shrugged. Worf, the Security Chief and weapons operator, growled a Klingon oath under his breath. There was nothing to fight here. "If that is all, you are dismissed. Meet back here in seven hours with answers." The senior officers all heard the iron sound in Picard's voice. "I want this solved."

Dr. Crusher sat in her office, pouring over journal abstracts. Surely, in over five hundred years of references, she thought, someone would have made a connection between

energy waves and higher brain and body functions. Already two more energy waves had run through the ship without any warning. More people had remained conscious, but more people had had seizures and heart attacks. Still, there was no connection.

For what seemed like the hundredth time, the doctor cleared her search parameters and started again. But with what? "Time to start at the beginning," she said aloud. "Computer, search *all* journals for articles with these references: epileptic seizures, heart attacks, and EEG patterns." Now we'll get something, she thought. I hope.

Riker, Data, and LaForge all hunched over the command console dominating the engineering section. LaForge had torn the wave down to its component parts, trying to develop some defense. Data and Riker analyzed the maelstrom itself, looking for something; they did not know for what.

LaForge had almost isolated a shielding pattern that would exclude the energy wave when he felt a discrete tapping on his shoulder. "Yes, ensign?" he said when he saw the worried face of an engineering crewman.

"I think you had better take a look at shield energy consumption levels, sir," the ensign replied.

LaForge looked over at the panel in question and blanched. Shield power was down to seventy percent. Early estimations said the shields could last for days if necessary.

In fact, LaForge's solution to the energy waves was counting on it.

In front of the shield control station, the chief engineer began searching for answers. What he found did not make sense. As LaForge sorted through the information, he felt Riker and Data walk up behind him. "What's up, Geordi?"

"We're loosing power to the shields, Commander. The computer keeps telling me that the shields are abrading away."

"What!?"

"You heard me, Commander. At this rate I'll have to reinforce the shields with energy from the warp engines pretty soon."

Riker was not pleased with this new development, but kept it under wraps. "All right, Geordi, take what you need. I have a feeling that between the shields and station-keeping thrusters, energy's going to get sparse real quick."

Data, meanwhile, was cross-referencing information about the maelstrom with the shield deterioration. For the second time in one day, Data should have had a stomach-sinking feeling. It did not take long to confirm his belief. He turned to Riker and LaForge. "I know why the shields are deteriorating," he said.

THREE

Ensign Xiti Liberator had a small problem, and didn't even know it. Under normal conditions, he would have lived his entire life without finding out about this problem. That would not be unusual. His father, grandfather, and even further on back, had lived without finding out, and they too had the same problem. That small problem came in the form of a genetic predisposition for a mental disorder rarely seen in the Twenty-fifth Century. That rare disorder was schizophrenia.

While most people on board the *Enterprise* recovered well from the energy waves that bombarded the ship on almost-patterns, Ensign Liberator got almost blinding headaches. When his coworkers in the environmental department counseled him to see Dr. Crusher, he merely shrugged it off. There was no need to see the doctor over a headache.

Even so, the tenth energy wave slipped through the ship and slammed like a hammer in Liberator's brain. That's all it took to push him over the edge. First Liberator's speech grew erratic, as if he could not focus his attention. Soon his coworkers saw Liberator talking to thin air, as if some invisible person was with him. It was not until Ensign Liberator became catatonic that they contacted Counselor Troi.

When exactly seven hours had passed, Captain Jean-Luc Picard walked back into the briefing room. The six senior officers had already assembled. None of them looked at all happy. Inwardly, Picard sighed. In all likelihood, the answers he sought would only be followed by more questions. Best to start with Dr. Crusher first, he thought. "Doctor, do you have anything to report."

"Yes, Captain, but I would like to let Deanna go first. Then what I have to say will make more sense."

Picard was surprised, but managed to cover it. "All right. Counselor Troi?"

"Thank you, Captain. After the past several energy waves, I have had quite a number of people sent to my office. All of them are showing signs of advanced schizophrenia, an almost obscure mental condition. I checked all of their records, and none of them have shown any of the early signs of the syndrome. I finally decided that so many previoiusly undiagnosed cases so soon would be beyond chance. At that point I went to see Dr. Crusher."

Dr. Crusher walked over to a computer screen and called up a medical program. On the screen a set of EEG's appeared. They were out of synch, but even Captain Picard could tell they were from the same person. "The EEG on the top is a file record of a crewman taken during his last physical. The bottom one was taken during an energy wave pass. Watch."

The doctor pressed a button, and immediately the bottom EEG normalized, its peaks coming in a predictable pattern. After a moment the EEG began slowly normalizing itself. Dr. Crusher turned to face her audience. "This is what happens to each of our brains when an energy wave passes through the ship. Now look at this."

A new set of EEG's appeared on the screen. The first EEG was another file copy. The second was taken from the same person, but in place of the normal random pattern, there was a strong almost-pattern evident. Suddenly the bottom line became totally predictable as it showed a wave passing through the ship. It did not change back. "This was taken from a crewman who has the schizophrenic syndrome. The continued even pattern seen in the bottom EEG is a fairly reliable indicator of the syndrome."

Dr. Crusher sat down, pausing for a moment to collect her thoughts. "I finally figured out what to look for when I found a journal article from 1995 O.D., the year before the Eugenics Wars started. Its focus was on some sort of mathematics, but it mentioned how a predictable pattern in EEG readings indicated schizophrenia, with the same being true for other biological patterns, like those found in the heart."

"What does this all mean?" Picard asked.

Dr. Crusher sighed. "It means that the energy waves are forcing an ordered pattern on our bodies, however briefly. The first time the shock was enough to cause unconsciousness,

epileptic seizures, and a few heart attacks. As the waves continue, the ordered patterns take longer and longer to dissapear from the brain, and from the whole body, as far as I know. If we continue to be hit by the waves, it's very likely we will all be schizophrenic." She smiled a little smile. "Except for Data."

Data spoke up. "The doctor is correct, Captain. Since my positronic brain runs on an ordered system, I am relatively unaffected by the energy waves. The same can be said of the *Enterprise* as a whole."

Picard thought for a moment. "So you are telling me that you will be able to command the ship far longer than any of the rest of us."

"Unfortunately, that is incorrect."

Riker sat up. "Explain yourself, Mr. Data."

Data looked at the second-in-command passively. "If the current situation continues, the *Enterprise* will no longer be here for me to command."

LaForge broke in. "That's the real bad news, Captain. You see, the unique energy flow in the Dragon's Maelstrom causes other energy particles to want to flow with it. As the flow passes by the *Enterprise*, it takes a little bit of our shields along with it. I can only augment the shields so long, and then it will take power we need to keep our position."

"And if the shields fail?" Picard prompted.

"Then the energy flow will start taking the ship apart one atom at a time."

FOUR

Humans, like most other beings in the universe, are habitual record keepers. The only other thing humans like more than information is having it instantly available. That being the case, *Enterprise* carried in its computer banks more information than even an especially long-lived being could go through in a life time. Information was cheap in the Twenty-fifth Century, cheap and readily available. The trick was in separating that one bit of information you wanted from the immense pile you didn't want.

Data was well aware of this fact as he sat in his cabin facing the computer console. When Data needed information quickly he let the computer run on twenty different voice channels at one time. Even though it did allow Data to go through an increasingly copious amount of information rather quickly, Data used his cabin because other crewmembers found the effect disconcerting. The effect was doubled when the computer was going at over one-hundred words per second per channel, as it was now. Still, there was so much information, and so little time.

Even with all that, Data still could afford to let his mind wander a bit. At least, he reflected, Geordi had managed to get his modified shield working. The energy waves were no longer able to penetrate into the ship, and thus the crew was safe, for a time. However, if a way to get out of the Dragon

was not found, the shield would eventually fail from power loss, and then the ship would disintegrate.

This line of thought is counter-productive, Data thought. He switched his mind over the problem of the energy flow found within the maelstrom.

For once, Data did not know what to make of a problem. Energy seemed to flow in loops around the maelstrom, but there was no predictable pattern, as one would expect in most energy systems. It was too random, never going through exactly the same loop twice. Data began looking in his own data banks. Surely, somewhere, was the answer. But how could a linear model be so random? Only if...

"Computer, stop." Abruptly the room was still and silent. Data cocked his head as he listened to a newly found journal article reel off in his positronic brain, a bibliographical article on pre-Federation sciences. There was a passing reference to a physics sub-discipline in nonlinear behavior. "Computer, search all pre-Federation journals for keyword 'non-linear'."

The computer was silent for a minute, then two, and then three. Then it began to speak, reciting abstracts. Data picked one, and listened to the entire article. Quickly he referenced the article's bibliography. Soon Data was reading an article a minute, and listening to two. Faster and faster he took in the information, oblivious to the rest of the world.

Once Data finished all the articles, he went to the science station on the bridge. "Computer, display a line graph of the maelstrom energy flow." Obediently, a display began showing a wavy line; sometimes up, sometimes down, sometimes in a tantalizing almost-pattern. Sometimes it would become totally random, the line dancing all over the screen. Data studied it for a moment, but it was still incomprehensible.

"Computer, plot the energy flow as a dynamic system, with each second represented as a point." The screen changed to a two dimensional graph, and still the pattern was incomprehensible. Data still had one more card to play.

"Computer, plot the system in a phase space." The screen changed again, and a line representing the energy flow began to loop crazily around, quickly becoming an knotted mass. But Data was not looking at where the line was, he was looking for where the line was not.

One particular section of the graph was never crossed by the line of the energy flow. Even so, the line continually circled that one point, never following the same orbit twice, but never leaving the general area. It was like some crazy planet circling a sun, sometimes trying to escape, sometimes trying to fall into, but never quite able to do either. "The strange attractor," Data said softly.

"Computer, overlay the phase space with a map of the Dragon Maelstrom." The computer complied. The strange attractor was dead set in the middle.

"Let me get this straight," Picard said. "You are saying the Dragon Maelstrom is an example of a similar, yet different type of space?"

"I believe so, yes, Captain," Data said. "That is why the sensors regarded this area as different, but not well enough to determine what the difference is."

"Then how can you be sure?" Riker asked.

"There is no way to be sure, Commander, but all the evidence points in this direction. Edward Lorenz, a pioneer of nonlinear studies, postulated that Earth's ice ages could be the result of the Earth's climate simply changing for a time, being cold instead of temperate. Finding a strange attractor where none should be lead me to the hypothesize that the maelstrom is much the same thing; an area of the universe where space is different in ways we are not able to quantify."

Crusher leaned forward, interested. "Could this be some type of bridge with another dimension of space."

"I think not, Doctor," Data said. "If my hypothesis is correct, space would be, in this case, an almost-intrasensitive system. If this true, then every so often, or perhaps never, a piece of space will suddenly change from the

type of space we know, into the type of space found in the maelstrom.

"The singular characteristic of this space is an attractor point, in this case the gravitic anomaly at the center of the maelstrom. All of the energy particles that fall into the maelstrom get trapped in a nonlinear cycle around this anomaly. The combined effects of their own unique energy in this type of space and the gravity of the anomaly join to form the random sweeps. A byproduct is the energy wave we have been experiencing."

"That's all well and good, but how do we get out of here?" Riker asked.

LaForge broke into the discussion. "I don't pretend to understand all of what Data's been talking about. But, if he's right, a gravitic mine detonated at the center of the anomaly should do the trick. That will momentarily increase the totally gravity potential of this attractor, overcoming the inherent energy of the particles, drawing them into the center. There'll be one hell of a bang as all of the particles collapse, but we should be able to pull out."

Picard raised an eyebrow. "Should be?"

LaForge hedged a bit. "If the shields are strong enough, and if we warp out of the area at just the right time, we should be all right." LaForge looked straight at Picard. "There are no guarantees," he said.

"However, there is one catch," the chief engineer continued. "The *Enterprise* is going to have to be pretty close to the center of the maelstrom to drop the mine. Otherwise, I can't be certain that the mine will actually make it to the anomaly. The pull of the energy flow is to strong to shoot it in from here, and might be too strong for the *Enterprise* to make it any further in without breaking up, like Data's probes."

"I know how to get us to the center," a voice said. No one was more surprised than Worf to hear himself speak those words.

FIVE

To Worf, there was no such thing as being "good enough." As such, he always made a practice of learning something new, physically or mentally, that would enable him to be a better security chief and weapons officer. Currently, he was studying ancient Earth treatises on tactics and warfare, specifically the ancient Chinese classic, Sun Tzu's *The Art of War*.

Since the *Enterprise* had entered the Dragon Maelstrom, Worf had felt like a proverbial fifth wheel. He had no special technical expertise to add, and if Data's strange mathematics were incomprehensible to the Chief Engineer, then Worf would not stand a chance.

So, instead, Worf contemplated the portions of Sun Tzu he had memorized. One particular section, his favorite, kept coming to mind. "Military tactics," the passage went," are like unto water; for water in its natural course runs away from high places and hastens downward. So in war, the way is to avoid what is strong and to strike at what is weak." Worf had applied this to various simulated situations, testing this idea for weaknesses. It seemed sound, and very Klingon.

In the briefing room, this passage still rang in his head. Going straight to the center of the maelstrom, that is the path of most resistance, the Klingon though. That would

not be the natural course for water. What is needed is the path of least resistance, and that could only be....

"We're as ready as we'll ever be, Captain," LaForge said. "I've figured out how close we need to be to the center of the maelstrom to insure that the gravitic mine will fall into it. Now all we have to do is let the energy flow get us there."

Data turned to face the Picard from his post at the ops panel. "You do realize, Captain," he said, "that once we are carried into the energy flow, as Lieutenant Worf suggested, we will not be able to escape if Commander LaForge's plan does not work."

"I am aware of the risks," Picard said. He glanced around the bridge. Everyone was in their place, awaiting he word. "Mr. Data, turn off the station-keeping thrusters."

Data touched the panel before him, turning off power to the thrusters. The *Enterprise* shuddered as it tumbled into the energy flow. For a moment the ship shook in the turbulence, and then the evened out. "We are now caught in the maelstrom's energy flow," Data said.

"What's our speed, Mr. Data?" Picard asked.

The android paused to check the readout. "We are currently travelling at ninety-five percent of light speed, with no engines." There was a hush on the bridge as this sank in. Data again broke the silence. "As I predicted, we are now unable to escape the flow and pull of the attractor."

That statement brought everyone back to the crisis at hand. "Mr. Worf, is the gravitic mine ready?"

"Yes, Captain," the weapons officer replied. The gravitic mine had been placed in a special photon torpedo casing, set to detonate when it reached the attractor's area of strongest gravity. The only problem was, the mine had to be fired directly at the heart of the Dragon, to escape the pull of the energy flow.

Picard looked at the blue swirls on the screen. "Tactical display," he said. Two grids overlaid the image on the screen; one a targeting grid, the other a spherical grid represented the maelstrom. The circular grid was ever changing as the *Enterprise* looped around the attractor. Every so often, the circular bull's eye representing the center of the maelstrom would sweep over the screen. "Arm torpedo bay two," Picard said.

"Bay two armed and ready, Captain."

Picard shut out the rest of the bridge, focusing exclusively on the tactical display before him. Several times the center target almost lined up with the targeting grid, but the energy flow kept the *Enterprise* out of the correct spot. Picard forced himself to look away to clear his head, feeling the tension on the bridge.

Again the Captain looked up, trying to get a feel for the flow. Suddenly, as if a light had been turned on, it was if he was in the flow, able to tell where the ship would be at

any given instant. So it was that when the center matched the targeting grid for just one moment, Picard was able to say "Fire!" Worf did not think about the order, he simply pushed a button. A red streamer of fire shot its way from the ship like a lance into the heart of the Dragon.

Nothing happened. Picard looked over at LaForge, who was intent on the screen. "Give it a moment, Captain," he said.

Suddenly, a small explosion detonated at the center of the maelstrom. For another moment nothing happened. Then the Dragon turned fiery as energy particles red-shifted in their new journey to the gravitic center. "The gravity pull of the attractor has increased by over one-hundred percent, Captain," Data said calmly.

"Maintain this position. Helmsman, lay in a course for the shortest route out of the maelstrom. Warp six at my command." The *Enterprise* shuddered as its engines strained to bring it to a stop, fighting both the deteriorating energy flow and the increasing gravity of the attractor. Already on the edge of the screen the bridge crew could see faint signs of normal space.

"The maelstrom's center is approaching a mass sufficient for detonation," Data said.

Picard understood the implication. "Helmsman, engage at warp six." The *Enterprise* surged like a horse pulling a sledge, slowly overcoming the effects of the gravity and flow. All at once, the ship broke free, slamming everyone into their

seats from the sudden acceleration. The screen filled with the cold black of normal space.

"Screen back," Picard ordered. The scene shifted to the maelstrom, now a rapidly coalescing ball of red and white light. The collapsing energy particles accelerated the process, and soon a ball of glowing white hung in space.

"The maelstrom will reach critical mass in fifteen seconds," Data said.

"Helmsman, increase speed to warp eight," Picard said. "All hands, secure for impact."

The white mass that was the Dragon Maelstrom continued to shrink. Then, without warning, it exploded in a blinding flash of light. The crew could see a wall of speeding energy particles racing toward them. For a moment, it seemed to ride on the *Enterprise*, but then was gone, the wave dissipated, the energy lost to the void.

Picard breathed a small sigh of relief. "Helmsman, all stop and turn about." Slowly the *Enterprise* powered down, turning to face the Dragon. There was nothing to see. The maelstrom, and its attractor, had vanished.

SIX

Once again the senior officers of the *Enterprise* sat in the briefing room. Data was explaining something. "It was Dr. Crusher's discovery that led me to believe that the mathematics needed to escape the maelstrom had, in theory, been worked out," he said. "It was simply a matter of going back far enough."

Riker still looked curious. "But if this study of nonlinear behavior is so important, why haven't we ever heard of it?"

"I think I can answer that, Commander," LaForge said. "The study of nonlinear behavior was in vogue just before the Eugenics Wars at the end of the Twentieth Century. A lot of new science was lost for a time after the wars. I think that that, combined with Zephram Cochrane's work in warp drive development, probably put nonlinear behavior on a back burner. There has been so many new developments since then that we haven't had time to come back to it."

Picard smiled at that. "Well, I believe the Federation can spare the time now."

It was not long after than the *Enterprise* warped out of the Kae Frontier in a rainbow of escaping energy. If they had stayed, they might have seen those escaping energy particles

suddenly blue shift and begin rolling and looping about some imaginary point. Their path was never the same twice.

April 13, 1992

AFTERWORD

In fulfilling the course requirements for the Honors Seminar on Chaos, I decided to produce a work of fiction that explored what I felt to be some interesting applications of correct speculations on chaos. The universe of Star Trek: The Next Generation was chosen for several reasons to be the fictional medium of these applications. First, I had no desire to invent a universe out of whole-cloth. Second, I felt my purposes would be better served if I had some pre-set limits to work with, which Star Trek provided. Third, I just wanted to see if I could do it. The fact that I produced a work of fiction at all, instead of trying to find chaos in the real world (which, admittedly, this isn't) is consistent with information listed in article four of the course syllabus.

On the following pages I have included an annotated synopsis of *Maelstrom*, outlining what I believe to be the key concepts of chaos in the story. Following that is a list of references that explore the ideas used in *Maelstrom*. This synopsis will be used as the class handout. The reason I did not give every participant in the seminar a copy of the story. is that I didn't have enough paper. The story, however, is available to anyone who wishes to read it.

MAELSTROM

An Annotated Synopsis

One

The *Enterprise* has been sent to investigate an astronomical anomaly called the Dragon's Maelstrom. Once inside the maelstrom, the *Enterprise* is caught in the flow of energy particles that constitute the maelstrom. Concurrent with this, a mysterious energy wave renders the crew, except for the android Data, unconscious, giving some few seizures or heart attacks.

Here are several interesting points worth mentioning. The main example of chaos here is in biological systems. Research has shown that the brain and heart usually run in random, or chaotic patterns, instead of completely predictable ones. The question here is, what if someone one were to superimpose order on these systems, say, with an energy wave of some sort? My conclusion is that a human would probably pass out from shock, at least the first time. Heart attacks and epileptic seizures, which are often preceded by ordered patterns, are not out of the question. This would make quite a weapon, if there would be some practical way of building one.

Two

The crew of the *Enterprise* is unable to figure out why the energy waves, which are occurring at random intervals, continue to effect the crew. Data shows that escape from the maelstrom is impossible. The energy waves remain a mystery, while the maelstrom shows itself to be a different type of space. Geordi and Data discover that the energy flow is leaching energy from the shields. If the shields fail, the flow will start tearing apart the atoms of the ship's hull.

Three

Crew members begin to succumb to schizophrenia, yet Dr. Crusher is able to point to the cause.

This is also relies on the idea that the brains of schizophrenics show steady, rather than random, patterns. In the story, the continued effects of the energy waves starts to overwrite the normal brain patterns of the crew. In time, everyone would become schizophrenic. Those first affected are those with a genetic predisposition. In any case, the

normalizing of brain waves could be used in real life as an early indicator of the onset of schizophrenia.

Four

Data realizes the mass of information to be found in the Twenty-fifth century. A chance reference to nonlinearity in a bibliographic article leads Data to Lorenz and others. Using their information, Data figures out the gravitic center of the maelstrom is a strange attractor, causing the energy particles to behavior in an overtly non-linear manner. Data also hypothesizes that this area of space is in reality an almost-intrasensitive system.

There are two points here I wish to acknowledge here. The first is a problem that any researcher is apt to find; that of too much information. Even in this age, there is far more information than we could ever hope to sift through to find what we want. Just how much worse can it get in the future?

The second is the idea of an almost-intrasensitive system. When I read Lorenz's theories about Earth's ice ages, I wondered if there might not be more systems like that. The Dragon Maelstrom is what I came up with.

Five

The *Enterprise* uses a gravitic mine to increase the pull of the attractor. This causes the particles of the energy flow to group to it, allowing the ship to go free. In the process, the maelstrom is dissipated.

This seemed like the only reasonable solution to the problem.

Six

Reasons are given for the decline in nonlinear studies. As the *Enterprise* leaves, the maelstrom begins to rebuild itself.

Again, here are two points of discussion. The first deals with creative liberties. I realized that, in all likelihood, if chaos research continues at its current pace, by the Twenty-fifth century people will be able to recognize a nonlinear system a mile (or a light-year, in this case) away. So, I let the Star Trek universe take away the study of

nonlinearity. Without going into details, I thought it was a rather handy solution.

The second item is the rebuilding of the maelstrom. It seems to me that many nonlinear systems, when disrupted, only stay disrupted over the short term. In the long term, they always return to their old ways. Hummm, do I see another story in here?

Right now, I wish to tender my apologies for the delicate sensibilities of the scientifically minded who might take offense at my liberties. I meant no offense, really. But, sometimes you have to take a few steps away from reality to tell a story (good or otherwise). I would encourage you to take this story in the spirit in which it was given, and not judge it too critically.

References

Here are a few references for the ideas on which some of *Maelstrom* was based.

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