Chaos Theory in Michael Crichton's *Jurassic Park*

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Abstract

In the Web Application Development lab at the Center for Advanced Research and Technology (CART), teams of students were tasked with creating a website for a *Jurassic Park* themed amusement park. To prepare for the project, students read Michael Crichton's 1990 novel in their English class, *Jurassic Park* and focused on the character, Ian Malcolm, who argues that science shows Jurassic Park as a business will fail due to the playout of chaos theory. On the other hand, John Hammond, the man who came up with Jurassic Park, had faith in his creation to go far and feed his love for money. Furthermore, learning life lessons through the chaos in *Jurassic Park* are explored as well as a discussion of how these lessons can be applied to one's everyday life. These lessons include knowing how the butterfly effect works, maintaining a good respect for nature, and to expect the unexpected. Crichton does a good job at representing chaos theory in *Jurassic Park*, and how incredibly powerful it can be.

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Introduction

In Michael Crichton's Jurassic Park, businessman John Hammond tries to earn a lot of money and become world famous. To achieve this goal, Hammond uses his company InGen to create a zoo-like "amusement park" to show off his genetically modified dinosaurs. He hires a chaos theory mathematician named Ian Malcolm, but he is quick to warn others and attempts to prove that the park will fail. As a chaos theory mathematician, he believes that chaos theory will eventually begin to overpower the control of those running the park. Readers of Jurassic Park can learn from the unintended consequences of the chaos Hammond finds himself in. Understanding chaos theory through the world of Jurassic Park and the actions of the characters can teach readers of the dangers of chaos theory, and can teach good lessons about the butterfly effect, nature, and unpredictability.

Scientific and Literary Origins of Chaos Theory/Butterfly Effect

Chaos theory at its simplest is the study of random behavior in the natural world, in everything around us. In the book Jurassic Park itself, chaos theory is explained as life being unpredictable, and that nothing can be done to change that. Ian Malcolm says "Chaos theory throws it [predictability] right out the window. It says that you can never predict certain phenomena at all . . . there are great categories of phenomena that are inherently unpredictable." (Crichton, 1990, p. 158). Real life scientists such as Edward Lorenz from MIT and Benoit Mandelbrot were notable people who contributed to the study of chaos theory. Lorenz was even the first person to discover chaos theory and define it as an actual term in science. This happened due to him attempting to predict weather in the early 1960's through equations, leading him to

find out that even the slightest change in the way he rounded his numbers would completely change the end result of his weather simulations. This led to further findings about chaos theory and the rise of terms like the "butterfly effect", meaning that a tiny difference in something can alter the outcome of something large, as shown by Lorenz's weather simulations. Jurassic Park makes good use of chaos theory in its story to help teach it to readers.

Other works besides Jurassic Park also make use of chaos theory. In A Sound of Thunder, Ray Bradbury tells a story of a group of people who went back in time. Eckels, a man in this group, accidentally steps on a butterfly as he and the others are back in time killing a dinosaur that's about to die. This butterfly that he stepped on gets discovered as they go back to the present, where everything is different from what things were like previously. Taken somewhat literally, this butterfly Eckels killed affected the outcome of the whole future dramatically - representing the butterfly effect and showing how much things can change because of it. In the story, "it fell to the floor, an exquisite thing, a small thing that could upset balances and knock down a line of small dominoes and then big dominoes and then gigantic dominoes, all down the years across Time." (Bradbury, 1952, p.) As well as Bradbury's work, The Time Traveler's Wife by Audrey Niffenegger also is based on chaos theory concepts. The character Henry uncontrollably travels through time and experiences his life in a non-linear way, with no way of knowing where or when he will end up. Nonlinearity is a very important part of what chaos theory is, and The Time Traveler's Wife does well at making a non-linear thing into something that can be easily understood.

Chaos Theory at Play in Jurassic Park

Ian Malcolm is the mathematician working at Jurassic Park for John Hammond, and specializes in chaos theory. On many occasions he speaks about chaos theory, and makes it clear that chaos theory is a concept important to understand in order to maintain a place like Jurassic Park. Malcolm uses his knowledge of chaos theory to predict that Jurassic Park is going to fail one day: "'And Hammond's project,' Malcolm said, 'is another apparently simple system - animals within a zoo environment - that will eventually show unpredictable behavior.' . . . 'There is a problem with that island. It is an accident waiting to happen.'" (Crichton, 1990, p. 75). Meanwhile, John Hammond still has faith in his work up until almost the end. Malcolm goes as far as outright saying this to his face, "Science has always said that it may not know everything now but it will know, eventually. But now we see that isn't true. It is an idle boast. As foolish, and as misguided, as the child who jumps off a building because he believes he can fly." (Crichton, 1990, p. 313). The author wants to show how differently these people think, and how differently they are motivated. Malcolm and Hammond understand chaos theory very differently.

The characters in Jurassic Park all have different levels of how much they understand chaos theory. Ian Malcolm, the chaos theory mathematician obviously knows his stuff when it comes to it, but others not so much. John Hammond is a great example of someone in the book who does not grasp the importance of chaos theory when it comes to his park. Malcolm even said it himself: "I gave all this information to Hammond long before he broke ground on this place. You're going to engineer a bunch of prehistoric animals and set them on an island? Fine. A lovely dream. Charming. But it won't go as planned. It is inherently unpredictable, just as the weather is." (Crichton, 1990, p. 159). Hammond's indifference to understanding chaos theory ultimately resulted in the failure of the park and the death of multiple people, all in the pursuit of some money. It's unfortunate that things turned out the way they did in Jurassic Park - if

Hammond had listened to Malcolm when he predicted the park's failure, Jurassic Park may not have been as bad of an idea.

Consequences of Chaos Theory

Jurassic Park had its fair share of chaos thanks to chaos theory. People like Dennis Nedry and John Hammond were large contributors to all that went down in Jurassic Park. Nedry, the park's computer scientist and programmer, was the one in charge of the security systems and all things electronic. Although he may seem harmless, Nedry turned out to be a thief for a company called Biosyn, who wanted him to steal dinosaur embryos from InGen inside Jurassic Park. In order to do so, Nedry turned off the security system for the entire island to "sneakily" get away with the heist - "Dennis Nedry pushed open the door marked FERTILIZATION. With the perimeter power out, all the security-card locks were disarmed." (Crichton, 1990, p. 175). Not only did the doors shut down, but the dinosaur gates and fences also powered off. This resulted in multiple dinosaurs, including T-Rexes and Velociraptors, getting out and multiple people dying. John Hammond also made some interesting decisions that contributed to the chaos that went on in Jurassic Park. Even just trying to make a park out of dinosaurs isn't really a great idea, since most popular ones are carnivorous and predators. Hammond was also clearly not paying his employees enough, which resulted in Nedry taking the offer from Biosyn, which made him turn off the security to get through, which snowballed all the way into everything that went wrong in the park. Most of these incidents were unintentional too, with Nedry wanting to return and act like nothing happened, and Hammond was simply in it for the money for himself. This goes to show how unexpected chaos theory can make things.

The behavior of the dinosaurs at Jurassic Park also was affected by chaos theory. In this case it was Dennis Nedry's doing. When Nedry shut off the security and took the embryos, it also turned off the security for the dinosaur gates and the electric fences. Not only that, but the tour cars that drove around Jurassic Park also were shut off, with people inside of them. Usually the dinosaurs would be kept calm and away from the electric fences, when they're on and protected, but this was the one time it wouldn't happen. It got so bad that some people even died because of the actions of the dinosaurs: "'No question what happened,' Muldoon was saying. 'The T-rex got him.'" (Crichton, 1990, p. 222). These events were unpredicted by most at the park, and it was the simple action of a single employee taking an extra job to take a few embryos from the fertilization room. The same can be said about the velociraptors going after the children of the group. These velociraptors, who are not only very physically capable, but also intelligent, were able to easily get out of their enclosure and hunt down the kids, and then everyone as a group. Lastly, absolutely nobody expected these dinosaurs to reproduce, as they believed that only creating female dinosaurs would prevent this, let alone the fact they were artificial. Lots of things were overlooked, and lots of things should have been done to take precautions before establishing a place like Jurassic Park.

Lessons Learned from Chaos Theory

There are many lessons to be learned from a story like Jurassic Park. Chaos theory is a big part of this book, and it's important to be aware of its capabilities - this includes everything within the umbrella term, for example, to be specific, the butterfly effect. Every action has an impact, and that impact can snowball into something larger than most can even imagine. The typical example of the butterfly effect is a butterfly flapping its wings on one part of the world,

and those wing flaps cause an entire storm on the other side of the Earth. This logic can also be applied to real life situations. For example, the assassination of Franz Ferdinand that caused World War 1. He was killed in a car from a distance by 19 year old Gavrilo Princip, all because of a wrong turn his driver made.“This wrong turn took them right to where 19-year-old Gavrilo Princip had stationed himself along the originally published route for the motorcade, under the awning of a general store.” (Pruitt, 2023, para. 20). Additionally, it is crucial to respect nature and not meddle with power that shouldn’t be in the hands of a human, which Jurassic Park portrays extremely well. According to chaos theory, too many things could happen, and too many things can go terribly wrong. However, not all is bad about chaos theory. It can lead to good just as easily as it can to bad. A couple minutes spent cleaning up around the environment or taking care of a garden might sound like small, seemingly insignificant actions, but in reality, anything could happen. Who knows what could happen, just like the wrong turn that started WWI. Chaos theory is a confusing, yet beneficial and amazing part of science today.

Conclusion

Jurassic Park is an amazing story with lots of ups and downs, and conveys the concept of chaos theory really well. The smallest actions led to the biggest discoveries and tragedies throughout the book. Even though Jurassic Park is a fictional story, its messages can be learned from and used in real life. Chaos theory is a strong force in what happens in this world every day, without it, nothing would be different or interesting whatsoever. The butterfly effect, nature, the crazy amount of unpredictability that this world has to offer, all of these are things that Jurassic Park gives meaning to and are things that are super important to understanding how everything works the way it does.

References

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