



Dichronauts

Greg Egan

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Seth is a surveyor, along with his friend Theo, a leech-like creature running through his skull who tells Seth what lies to his left and right. Theo, in turn, relies on Seth for mobility, and for ordinary vision looking forwards and backwards. Like everyone else in their world, they are symbionts, depending on each other to survive.

In the universe containing Seth's world, light cannot travel in all directions: there is a "dark cone" to the north and south. Seth can only face to the east (or the west, if he tips his head backwards). If he starts to turn to the north or south, his body stretches out across the landscape, and to rotate as far as north-north-east is every bit as impossible as accelerating to the speed of light.

Every living thing in Seth's world is in a state of perpetual migration as they follow the sun's shifting orbit and the narrow habitable zone it creates. Cities are being constantly disassembled at one edge and rebuilt at the other, with surveyors mapping safe routes ahead.

But when Seth and Theo join an expedition to the edge of the habitable zone, they discover a terrifying threat: a fissure in the surface of the world, so deep and wide that no one can perceive its limits. As the habitable zone continues to move, the migration will soon be blocked by this unbridgeable void, and the expedition has only one option to save its city from annihilation: descend into the unknown.

Dichronauts Details

Date :

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From Reader Review Dichronauts for online ebook

Gendou says

[In this fictional universe there are two dimensions of time. I know this sounds a lot like Egan's orthogonal trilogy, but it's very different. This creates some

Shhhhhh Ahhhhhh says

I have mixed feelings about this book. It's a striking, novel concept. Describing the physics of a novel universe where tipping over means stretching out into infinity and dissolution, is necessarily novel. Wrapping my mind around the story happening in that strange space was a new and interesting sensation while reading. It definitely raised the difficulty level for me. Nevertheless, I found the basic, and archetypal, story to be fairly entertaining. In fact, the elements of their world, while necessitated by the constraint of the physics, by themselves would have made for a fascinating story. Kind of want to know how it would have ended.

Liviu says

finally finished this one and after a great beginning which was very intriguing and another maybe 100 pages that kept me really interested, the book became sort of a slog as the difficulty of reconciling the strangeness of the Dichronauts universe and beings with a sort of human-like behavior started showing more and more and the book became "it sounded a cool idea at the time but it cannot sustain itself beyond an initial introduction" as on the world building side things got stranger and occasionally quite cool, but on the characters side they devolved into a mixture of banality and impossibility of sustaining suspension of disbelief (regarding actions and thought processes of these really strange beings translated into human terms for us)

(first thoughts on getting the book) read a few pages and it's excellent (G. Egan is one of the few truly mind boggling sf authors of today) so far - really worth checking the author's page about it and thinking a little about the implications of the universe metric

<http://www.gregegan.net/DICHRONAUTS/D...>

Gary says

The world of Greg Egan's Dichronauts contains two spatial dimensions and two temporal ones. The people of this world are symbiotes, each comprised of a "walker" and a "sider" – siders are parasites who leech nourishment from their walkers; walkers can only see one side of the world on their own and need their siders to see the other.

The sun revolves around the earth in this world, so its people are constantly migrating to stay within its habitable zones. The walker Seth and his sider, Theo, are surveyors who scout the migration paths for their home city. Together, they make a discovery, and embark on a journey, that quite literally turns their world upside down.

That journey is not lacking for interesting turns and revelations, though these are only stimulating to the intellect, and to the base desire of the sci-fi reader to explore and map out new frontiers. The physical properties of this world are explored in detail, but its society has no real culture to speak of; they seem to exist only to rationalize their environment, which seems to be all the author is concerned with as well.

Characters and relationships are crudely fashioned and bear no emotional fruit to engage the reader.

In other words, if you love geometry as much as Greg Egan does, *Dichronauts* is your kind of novel. I can't make a higher recommendation without a more complete experience.

Thanks to Netgalley and the publisher for providing me with this ARC.

Tomislav says

I read Greg Egan's new hard-sf novel "*Dichronauts*" in kindle format. I have previously read and liked a half dozen of his novels, and so I was well prepared that this would be a challenging read.

Dichronauts physics - <http://gregegan.net/DICHRONAUTS/00/DP...>

Dichronauts world - <http://gregegan.net/DICHRONAUTS/01/Wo...>

The setting is the outstanding feature in this work, and it is described as a world in a universe with 2 dimensions of space and 2 dimensions of time, rather than the 3 and 1 of our familiar space-time universe. It turns out that is not really an accurate description, as the geometry is not 2-dimensional in the way of *Flatland: A Romance of Many Dimensions*. And the characters do not live in 2-dimensional field of time, but along a single linear time line. I think it would be more accurate to say the third spatial dimension is time-like, and able to combine with our regular dimension of time at an arbitrary angle. This leads to all kinds of non-intuitive and weird consequences – such as the surface of a world being hyperboloid rather than spherical. All readers should be aware that there is an Afterword in the book, that gives a brief overview of the physics of the *Dichronauts* universe and the resultant geometry of their world. But the information at the two links above is much better and includes dynamic illustrations. There is more yet at Greg Egan's website, but I found these two the most useful, and referred to them repeatedly during my reading of the novel.

The narrative never stops to explain the geometry of the *Dichronaut* world, but it is exposed through events, as the characters travel about, exploring. You see, there is a problem in this world. The hyperboloid world is revolving off axis with regard to the rotation of its hyperboloid sun (see the dynamic illustrations). The areas near and beyond the curve of intersection are uninhabitable, and the observable advance of that curve is driving civilization continually across the world towards a crisis of geometry. The main characters are the symbiotic pair Seth and Theo, who have become surveyors for their city, sent out to search for routes of future migration. The symbiosis is another logical consequence of the world's geometry, as Seth can only see in one orthogonal direction and Theo senses the other (see the explanation of light cones). During a mission of "conventional" exploration, in which the strange and wonderful surface of the world of the *Dichronauts* is exposed, the small team of Seth/Theo and a few others discover a flaw of geological scale in their world. The second half of the book then steps the reader up to an even more extreme level of imagination, about which I will not say more here.

The challenge, of course, is understanding the setting. It is a world I had never imagined before reading this novel, but it seems to be entirely a thought experiment. Egan glosses over the physical consequences on

particle physics – describing the world and the beings as if they were solid objects, when they would really be arrays of coordinated and intersecting probability fields (yikes!). And I feel there may be dynamic consequences not fully integrated into the way of life of the characters – such as taking advantage of extremely fast travel in diagonal surface directions.

Beyond understanding the setting, it would have been easy to populate the world of Dichronauts with stick-figure characters (metaphorically). There is some of that, as it is not really possible to empathize with beings so alien. But they do have feelings, some of them easily understood, and some of them speculative. After a while, when the characters get beyond the world regions of their own understanding, the adventure takes on a sense of fun reminiscent of Journey to the Center of the Earth.

It would be possible to read this without understanding the setting, just as an adventure in a crazy unpredictable world – but that would miss out on the premise that it is a predictable world. It is an accomplishment just to describe and write a coherent story in this world, and I enjoyed the ride. But it takes work, and that is not for everyone.

Cathy (cathepsut) says

Symbionts on a planet with a different set of dimensions and shaped as an hyperboloid.

A somewhat human body and a leech-like creature, cohabiting and sharing their life. How do you decide the direction of your life, how do you choose your profession, your partners.... who gives in, who takes precedence, what happens in case of irreconcilable differences? Fascinating.

The book is split in several parts, each part of the book dealing with a distinct section of plot. Part One did a nice job of explaining the tensions between the cities competing for resources and the possible societal conflicts, caused by the symbiotic relationships of its inhabitants. And the next parts... well, you'll have to find out for yourself.

The tricky part in this book is the planet and its physics. Because of the way it's shaped, nothing works as you would expect. I really struggled to picture this world and its inhabitants. I am not sure if it's me lacking imagination or if the author did a poor job of explaining it. Or did he do a deliberate job of leaving blanks, to challenge the readers to figure it out by themselves?

It took me over half of the book to even realize that the walkers do not have symmetrical bodies (I think?). I understood that they were shaped differently, with restricted options of movement and a different visual system, but I could not for the life of me picture them for most of the book. Not sure I have the right visual even now, after finishing.

Very, very imaginative and pretty much a mystery to me. Without the book blurb I would have been lost in the beginning. Minor degrees in physics, math, astronomy and mechanical engineering might have helped. At one point I started reading up on orbital planes, torque and Euler's theorem of rotation. And I looked up Egan's explanations as well: <http://www.gregegan.net/DICHRONAUTS/0...> He also explains the physics at the end of this book.

I got so occupied with trying to understand the physics of this world, that the plot took a backseat until the last few chapters.

Explain this to me... I know it's a play on words and letters, but I can't figure it out:

Theo said, „Flerdibyll graznisniff?“

*Seth responded effortlessly:
„Mulpeneresh, sockulee!“*

Translation into plain English, please!?

This book was hard work! Fascinating stuff and deeply weird. I am docking one star for the sheer incomprehensibility (is that a word?).

I received this free e-copy from the publisher/author via NetGalley, in exchange for an honest review, thank you! Sorry it took me so long....

Pavel Lishin says

Gonna have to brush up on my Dichronaut cosmology, and re-read this one, I think. I'm still pretty unclear how Walkers' hands and fingers work.

There's some interesting parallels here with Peter Watts' *Blindsight*: The Gang's accusation of what 20th century psychiatry was up to, and Thanton.

Bradley says

For fans of multiple world-time-lines and especially for fans of Christopher Priest's *The Inverted World*, welcome to *Dichronauts*.

Walking one way brings you to the future, the other, to the past. But space is still space and time is still time. Thanks to the little creature attached to the people here, we've got a cultural/exploratory thing going on that is the spiritual godchild of Priest's classic novel. Just look at the cover to get an idea. That's a picture of the Earth. As in, the Earth, to these people, is shaped like an hourglass. That makes EVERYTHING pretty messed up. :)

So let's explore! And the characters barely know anything more than us, so we're introduced to many theories that may sound absurd, but the Earth is ALREADY absurd... because time and alternate worldlines are as easily traversed as walking across a field.

As a LITERAL worldbuilding novel, almost all the fun is in exploring and visualizing the world they inhabit.

The rest... well... as okay. Not overly special. The chasm was pretty cool. Bits and pieces elsewhere. But overall, I was not overly invested in any character.

Win some, lose some. The cool aspects are VERY cool, however. :)

David Swanson says

Fascinating but a bit too clever

As with most novels by Egan, I'm very glad I took the time to read it, and equally as glad that I never have to read it again.

Egan has a knack for introducing us to genuinely alien worlds and viewpoints, and this novel is no different. Introducing exactly how things differ from our viewpoint is possibly a spoiler, but suffice to say that the afterword explains things extremely clearly... if you can grasp the mathematics.

The downside to all this is that the plotting is rather elastic, with no consistent sense of pace, and I couldn't really connect with any of the characters.

I feel almost bad rating this at three stars, but it's not a book I can recommend to everyone. In this case, a three star rating means you should pick it up if hard but abstract sci-fi is your thing, or possibly if any of the above has made you curious. Otherwise, I think you'll find it a hard book to enjoy.

Manuel Antão says

If you're into stuff like this, you can read the full review.

Eigen-stuff Applied to Buridan's Ass: "Dichronauts" by Greg Egan

When I read an Egan's book I cannot tackle it on a purely literary level. Egan's fiction makes me think about things I didn't know I wanted to think about. This is another one of those novels with a mind-boggling universe.

Egan's world has far consequences:

The space won't be isotropic any more. Thus, things would behave differently if you rotate them around the zz-axis and any linear combination of xx and yy. The laws of the physics would behave differently in the different (space) directions.

On the Noether theorem, the symmetries of the Universe have a deep connection to its conservation laws. The isotropy of the space results in the conservation of angular momentum. In a non-isotropic Universe, the angular momentum isn't a conserved quantity any more. Any effect will be instant around any direction, for which $dx^2+dy^2-dz^2=0$ $dx^2+dy^2-dz^2=0$. It would effectively mean, that moving any point-like particle on such an axis, you get the same system. This would be a new symmetry, which would result in a new conservation law, which doesn't exist in our Universe. To calculate, which conservation law is it, is complex but it doesn't require much more math/physics skills as in high school.

NB: Ah! It feels good to be back at reviewing books...

If you're into hard-core SF and reviews, read on.

Anna says

The book was definitely an interesting read, from the point of "actual hard science fiction" instead of "a mix

of romance and humans fighting each other in an unusual setting". If you are into the first type (which not necessarily means completely disdaining the second :D), and willing to invest some mental efforts into imagining the world based on different geometry rules than our own due to having two space-like and two time-like coordinates, and therefore different constraints and consequences from that, consider giving this book a try. And if you get weary of straining your geometrical imagination, there is still an option of getting along with the story relying on the description of impact which the story's events made on the protagonist :)

Some visuals on the author's site were immensely helpful for me to understand what he was trying to describe: <http://www.gregegan.net/DICHRONAUTS/0...> - might be useful to look at that before reading the book itself. The author tries very hard to be true to his model up to the tiniest detail, though sometimes his narration goes a bit too schematic, as if the characters are living within some elaborate computer game where they have to progress from one level to another.

Also, there is an interesting take on close symbiosis of two different sentient forms and the impact it could have on the ordinary lives and the society in general, including musings of "what could possibly go wrong there".

I wish the author would put a bit more thought into describing how the inhabitants of that world actually look (he gives hints, but not too many), because that's one of the reasons they look so sketchy: they differ from each other only by their names. (But that's where the other type of science fiction does a better job ;-))

Claudia says

This was one tough book to comprehend. I read all I could find on Greg Egan's site and some more about differential geometry and I still did not understand how the world imagined by the author works.

Because this is not an action or character driven story, but one in which geometry makes the rules and the reader tries to visualize how this world is constructed. Instead of a 3-dimensional space and 1 dimension of time, we have 2 of each.

After playing with this simulation here, I could imagine a bit how one can move into this two-dimensional space, but I'm very far in imagining exactly how or how the inhabitants look like. They are east or west facers, have axial fingers, northern and southern ones, the east facers can move and see only east and when moving backwards to west they tip their heads backwards to see where they are moving, to north and south they can only slide and rely on their symbiont companion's echolocation system to 'see' north and south, as they cannot rotate.

Sounds insane, doesn't it? It really does. And is. It is a mind-bending book, not resembling anything else I read so far, the exact definition for sci-fi of ideas. Unfortunately, by not having enough background in math, I can't say I enjoyed it to the fullest. However, I liked the idea, the relationship between the symbionts, their system of values, the way world is constructed. It's not the author's fault that my neurons didn't live up to the challenge.

But I would recommend this book to all those who welcome a challenge and are open minded, because it is a one of a kind experience.

Note: before you start it, take a look at the material related to this story on Greg Egan's site:

<http://www.gregegan.net/DICHRONAUTS/D...>

And engrave this image into your brain, because this is the world of the dichronauts:

*ARC received via NetGalley thanks to *Skyhorse Publishing*

Ryan Lackey says

Greg Egan might be my favorite sci-fi author (top-5 for sure), but this is both his worst book to date and a bad book overall. It is built around some completely novel physical geometry and universe dimensionality, poorly explained in the book (to have any hope of understanding, you'll need a guide on Egan's website), but that's fine. The problem is that is really the only positive part of the book; the rest is a stupid/weird morality story about different groups and coexistence (4000/800 had a simplified form of this as well; I hope Egan hasn't gone full SJW) -- the characters themselves are really shallow and unremarkable.

There is a moderate amount of focus required to understand the geometry of the world, but there is no payoff. Skip.

Craig says

This review was originally published at Book Learning.

Who knew geometry could be so confusing?

According to the biography on the inside cover, Greg Egan is a computer programmer. For those who are familiar with his work, if not his biography, that won't come as a great surprise. Egan writes *hard* sci-fi, the sort of hard sci-fi that doesn't take any prisoners and doesn't bother to go slowly to let stragglers keep up. There is a certain clockwork logic to all his books that makes them feel almost digital in a strange sort of way, with plots that roll along with mathematical precision as if guided by some sort of literary computer program.

What I like about Egan though is that between all of the maths and physics, he occasionally manages to slip a punch under your guard and hit you right in the feels. Yes, *The Safe Deposit Box*, I'm looking at you. Over the years, his work has become more and more esoteric, detailing universes with entirely different physics to our own and looking at the ramifications of what those changes would mean for those living there. *Dichronauts* is the latest in this sequence, positing a world that's even more bizarre than that portrayed in his "Orthogonal" series.

You see, in this universe, light can only travel in two dimensions, and the cosmic topology makes the act of rotation seemingly impossible, leaving the intelligent 'Walkers' locked into only being able to look east or west, the job of sensing to the north and the sound being taken by the 'Pingers', symbiotic creatures who live in the skulls of the Walkers and use a sonar-like ability to determine what lies outside of the light cone. The mathematics of it are, as far as my limited ability can go, impeccable enough, although I have a few problems with the plausibility of the scenario. How life, let alone complex intelligent life, could evolve in such a restrictive environment baffles me. The structure of space in this universe seems to offer no advantage, but imposes a whole lot of limitations on the characters that make even simple tasks an ordeal.

The book takes some time in world-building before it gets to the main "problem," a seemingly impassable

chasm in the path of the protagonists' migrating city that will block their progress and lead to certain disaster for their society. From there the main characters engage on a Vernean journey to explore the abyss in the hopes of finding a way around or through it. The specifics of the story aren't as important as Egan's exploration of how the world's geometry impacts on the characters though, and there are significant passages of infodump where the protagonists discuss the mathematics of their situation to one another.

So is it a good book? On balance, yes it is, but it's not Egan's best work. Part of the issue is that it's pretty difficult to get your head around how to visualise the story, and this is not helped by Egan's decision to use cardinal compass points to refer to dimensions in space and time that bear little relation to our own universe. I'm not sure how I would have written this, but using plain old "north" and "south" gives the impression of a relatively simple three-dimensional Cartesian space that just happens to be 'dark' in one of those dimensions, an understanding that breaks down completely after events in the second half of the book.

Egan also passes up some interesting opportunities to explore the biology and societal ramifications of the walker/pinger symbiosis. Early on in the book Egan teases what sounds like a fascinating story involving the Elena/Irina pair, and then completely abandons this plot line. For the most part when Egan starts a thread he eventually weaves it into the end, but I was particularly disappointed that we don't find out anything about how that particular plotline ends.

Those whinges out of the way, Egan has managed to construct yet another strange yet mostly plausible universe and set a story in it that doesn't sacrifice things like 'plot' or 'story' in favour of mathematics and world building. This doesn't rise to the heights of *Diaspora*, but it's yet another solid entry in Egan's impressive body of work.

Tim Hicks says

If this is your first Greg Egan, just put it down slowly and back away quietly. No one needs to get hurt here. Go find an earlier work as an introduction.

This is hard SF to make Hannu Rajaniemi blush. This is hard SF made of adamantium, or impossibilium. I'm guessing there aren't 200 people in the world who could read this and smile and say, oh, yes, haha, of COURSE it would be like that, wouldn't it?" and maybe ten who could say "ahem, a little error there on page 212 with the rotational forces out of balance with the shear forces, heh heh."

The plot is negligible, and not terribly important. The characters are barely sketched, and the setting less so. There is a Quest, because how else we we get a tour of the world? There's a river that runs uphill, unless you want to go down, in which case look just over there for one that runs the other way.

If I understood it right, which I probably didn't, our heroes are exploring their bowl-shaped part of the world when they find a hole that goes through to the hyperboloid side. The effect of this is intriguing, because it leaves our heroes and the reader equally confused.

The book that this one makes you anticipate is this world's equivalent of Darwin's *The Origin of Species*. Here, you take the physics and produce a creature that could *possibly* cope in such a setting. Could it evolve from something else? How? Can we imagine that millions of generations of primitive creatures died off except for those that learned not to try to turn around? How did the Siders start out?

I certainly can't fault Egan for not including any of that here.

I didn't enjoy this book, but I'm glad I read it. Someone has to go to the edge of "hey, fellas, what if ..." and by golly, Egan hasn't just gone to the edge here -- he's moved the edge.
