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Julian Barbour | The End of Time

Konec času – Julian Barbour

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My comment and comments are in red, translated by Google Transformer

00:00

(01)- [Music] time for me does not exist **as anything like** a line on which you can arrange things. * I already have the first objection: Time is a physical quantity, the phenomenon of Being and is presented by "dimensions", which are certain "lines" of the 3 + 3D yarn, which is called space-time space-time. In each lecture by a physicist-cosmologist-astrophysicist who uses examples from space-time to interpret, he draws them "as lines, as a network of time-space" "http://www.hypothesis-of-universe.com/docs/c/c_032.jpg ; http://www.hypothesis-of-universe.com/docs/c/c_039.jpg I would say **that time ism the** expression is emergent what for me **really** exists is myself and you and thinks the chair I'm sitting on those are for me all **real** or at least behind them there is something which is **real** * for Barbour, "time" is not "like a line", but is like an expression, time is "**an expression**" for him but I don't think there is any time like **a substance like any fluid** or anything like that if you were to take as you are doing now making * Time really is not a "substance", it is a dimension (which is not visible to the eye) on which we move through the universe and cut intervals on that dimension, and we then perceive them as a flow-flow of time. It is not a "substance" just as a substance is not a length dimension (if there is three it is a space), we cannot touch it, it is not visible. a film of me you could cut that up into stills of the movie and then you could put them together at a certain distance apart to make it just exactly as happens with the movie so that it runs smoothly and it **seems** to make sense **and I think time is is an illusion** which **emerges really** out **of the law** that governs the whole universe * Although the laws do govern the universe, an artifact called "time" cannot "emerge" from the law, and what will affect "time" is "emerging" from the law. This interpretation is not physical, it is spiritualistic, philosophical. How can an "illusion" emerge ??, and "from the law" ??? The law is neither an artifact, nor a thing, nor a dimension, neither space-time, nor matter, nor mathematics... for the spiritualist, the "law" is the cave from which they smoke... and "mysterious forces" emerge from it as a damn real illusion which puts things together. * Second, there is no single law that governs the entire universe. And certainly that one law "doesn't" put together "things" (as Barbour says), this is an unscientific description of "something." - And again, it seems to me that it is useless to continue with the commentary of the scientist Barbour I called them now puts things together in that way to create that impression that there is an all-powerful thing moving us forward and this is sort of a line of timeline **or something like that** but I think that's **all an illusion** ultimately * Mr. Barbour, if the devil stinks of sulfur, what kind of ilieue is that? or that **stinking stench?** but you and I are real don't worry about that what was it that made you move away from seeing time as being else **we cut upon a line** * Mr. Barbour: how does the line "cut" ??? You said lines don't exist and you suddenly cut them?, By what?, And where? to seeing as emergent how did you come **to realise that time was an illusion** well it it was a just reading one single sentence by a great British physicist Paul Dirac so I was 26 I wanted to

become an astrophysicist I started working on a PhD in astrophysics and I happened to read a newspaper article in Germany where I was studying about the great Paul Dirac's efforts to unify quantum gravity mechanics and Einstein's theory of relativity and he had come to the conclusion that there might be something wrong with the most fundamental thing that Einstein is famous for that there's no definition of simultaneity the you may probably heard of the block universe or space-time in which there's no given simultaneity you can cut up space-time in all sorts of different ways like that and Dirac had found evidence within the dynamical structure of Einstein's great theory of gravity that that might be wrong and he had he just said one sentence he said this result inclines me to believe that four-dimensional symmetry * ?? I don't understand: what is "four-dimensional symmetry" ?? is not a fundamental feature of the physical world he said this in in an article in published an article in 1958 with this and I read an article in a newspaper about that and it made me start thinking about time and I'd never really seriously thought what is time before and then I realized we would never have the idea that time is passing unless we saw motion * Attention !! We humans perceive the "flow-flow of time" even in a situation where we do not see movement around us (movement of ourselves towards another substance-body). The passage of time "runs" even without (mutual) movement of bodies. By motion we mean the "shift" of the object-subject by longitudinal dimensions. The flow-time flow analogically to this is the "shift of the object-subject" along the time dimension. Time flows to the "one" who moves along the time dimension and by that shift-movement "through the dimension" cuts the time intervals. Statement: Time does not pass to us, but we flow to him (along its dimension). unless we were aware of change * The universe exists due to "changes in the states" of anything, that is, matter, and fields, and time, and space, even changes in the sequence of laws... so ever since then I've been convinced that the primary thing is change * O.K. This change is shift = "cutting intervals" on both the time dimension and the length dimension. The shift "by dimensions" (time and length) is PRIMARNI, but..., but we can even say the retrograde opposite: The object "stands" in space-time and it "expands" its curved-twisted-collapsed dimensions and thus (!) Is displayed the illusion that the "intervals" stretch themselves as if the object itself did so if it moved "along the dimension". - - or if you like even difference and that what we are feeling of time and that it passes all emerges out of differences out of out of the fact that we in the first place we experience change we would never have the idea that there is something that we call time passing * O.K. If I was born on a rocket flying through space (and lived to be wise with reason) and if I did not notice around me that "things are changing", then I would not even know that there was no "time", ie the passage of time around me... _if we weren't aware of things changing so what's the difference if we move to naming it as change rather than time * If I fly alone in a rocket through the desolate Universe and some material things change in others and others do not, even this knowledge will not "train me" that time is running "somewhere" around me... (?) Is that so? I don't even get the knowledge that I'm "flying" (evenly in a straight line), that is, that I move along the longitudinal dimension and... and that therefore "I with the rocket" cut the intervals on that dimension because it leads you to think about how the universe by what law might be governing the universe the way things how differences arise within the universe and at the moment I'm very interested in how structure http://www.hypothesis-of-universe.com/docs/eng/eng_009.pdf arises in the universe we know that near the Big Bang the universe was was very homogeneous uniform * and was the entropy damn low ?? what's the point of "structuring structures" ?? there were sort * not "some" waves, but waves of space-time itself, its dimensions of waves coming backwards and forwards if you like but it was all very uniform and here am I talking to you pretty ordered * After the Big Bang, the state of space-time was a "dense foam of crooked dimensions," an inhomogeneous foam, because immediately after the big bang came the "law of alternating symmetries with asymmetries." and still reasonably competent can talks moderately good

sense how on earth does that come into existence how how what is governing the universe that makes that possible and this huge change from the conditions near the Big Bang - now these these are fascinating issues and for me they all come out of asking what is time and saying actually time must be about differences if I had my progress book that my mother so conscientiously kept with pictures of me when I was one and two and you know and look at me now it's still the same person more or less but huge differences and that's that's how you can tell I've got older and there was a young little boy and now there's a man in his early eighties so that's what that's the evidence that leads people to think this time but I say let's let's just look at what really is and say no let's only construct our theory with what we can be reasonably confident confident does exist and does this what is left then of the Einsteins of space-time continuum it it emerges the the way I think about it you could my hands are almost the same so I can put my 1 my left hand on top of my right hand like that and then I can so that's sort of putting it in in spatial where it is one on top of each other and then if it's slightly different I'll put a certain distance between them now that's not

(02)- I thing that's in my mind to try and make sense of how how *... The interpretation of philosophy and abstract poetics is further... my left hand can be placed relative to my right and how much difference there is between them so if I have lots of hands or lots of movies stills of a movie I can stack them I call that horizontal stacking and then vertical stacking and in in all cases the real thing is it's my hands but then I stack them one after another both this way and that way using only what is the structure in the hands and out of that I can construct space-time and this is not the way people normally think about it but when you look at it that way things are different and I say we must philosophize about these things differently so that that's the difference there so in a way time is an illusion my hands are not an illusion but saying that they're stacked like that is is something that I've put into it to understand the difference between my left hand and my right hand so how would you then understand why we feel like we experience time the temple nature of reality that is the real the big problem where does how does consciousness come into this so I start off with the great insight that the geologists had in in the late 18th century they got very interested in studying the earth and they discovered what is called deep time they realized that if they were to understand that the structure that the earth has now and by the way that structure has hardly changed since they started thinking about these things that well over 200 years ago they supposed that the earth was a physical object that had been changing in accordance with definite laws of nature over a very long period and this led them to the idea of deep time and it's all encoded in you could see that the rocks and the fossils are in some sense is you could see them as records which you could interpret and say this is how the past unfolded and there's a wonderful statement Lamarque who had ideas about evolution before Darwin they turned out to be wrong but Lamarck has a wonderful sentence he said the surface of the earth is its own historian it always encoded in the surface of the earth you look around you here it really is behind me is is the history of the earth a geologist can deduce all sorts of things from that and I call that a time capsule now I would say that in my mind there's something like a time capsule like that that there's lots of memories and they're all they're all consistent really in a way there's a wonderful moment at the end of the midsummer night's dream when Hippolyta says no it must be real what these lovers went through because they they tell their story in it it hangs together it's a consistent story and she says it grows to a thing of great consistency so this is why I believe I am a person and was that little boy Julian many years ago and I think actually the experience of you of me seeing my hands moving and you seeing them is because actually in your brain all at once are quite a lot of images of my hand and somehow rather when the brain the brain tells a story it presents us with a narrative and I think what is happening is that it has a whole lot of pictures all at once and presents them as as movement like that but it's not

it's really in a whole lot of snapshots there and the most the last book that Oliver Sacks wrote called the river of consciousness he talks about the insights that neuroscience is developing and it does really seem to be that the the brain processes information and presents first of all several snapshots and then we see them as as as movement so I don't think there is movement out in the world it's something that the brain it's a narrative that some source comes to us through this at a miracle of consciousness how that nobody knows how consciousness works anybody who says they do that that's just nonsense to pretend that you know that so I would say the only evidence for the past and that there is something that we really could call the past is the consistency of our records consistency of our memory and the fact that we actually see movement I think that's all it is you as I move my hand like that you see my hands both there and there and you see the movement but I suspect that's that's a narrative that the brain is presenting so that's that's my explanation of why time itself is an illusion and even motion is an illusion but the fact that I can put my hands like this in different positions that not an illusion that's real so do we have to have sort of trust in our own memory or the consistency of our own memory to feel like the past is real or going or is that just an illusion that do we have to give up I would say that's the ultimate tragedy in life when your brain has deteriorated

(03)- I know this very acutely because my poor wife developed Alzheimer's over a very long period and as she died just under two years ago so I mean three years ago look how I'm getting that wrong and that's that's the saddest thing but she still was getting some sense of her identity until tilted til the end but but that that's when the connections in the brain no longer hold together as they fall apart things fall apart within the brain and of course that is that is a sad end of life and and I'm at my age I'm beginning to struggle with people's names and things like that but I'm still at least can talk about I remember a line or two from Shakespeare's Midsummer Night's Dream so how's it for you personally your own theory of time affected how you sort of experience like feelings * **the theory of time has not yet been built by physical science... a scientist does not know much more about time than a cleaning lady knows about it** of sort of like regret which may people like a consigned to the past or hopes for the future well there's plenty of things that I regret about the past and some of the more stupid and unpleasant things they do they make me wince when I recall them but I think that's actually as something to stop me doing it again I think that's probably a healthy thing but the main thing I have from this is enjoy the moment carpe diem make the most of every moment of your life as best you can so that's sort of the philosophy I've developed and I put this in the epilogue of the book that I wrote about this called the end of time which came out it's nearly twenty years ago it was published so that's there you see I'm using conventional terms but I could put that all in my language of time capsules and shapes of the universe and so on in terms of the ramifications for physics does this have a influence in quantum physics and the gap between classical and quantum physics it might I'm very cautious about saying that we're onto the right track at the moment actually I'm with my three collaborators that we think we're making real progress in just within classical physics understanding why the past is so different from the present and the future because this is the great mystery of the growth of entropy which came with the discovery of the laws of thermodynamics in a in the 1850s so all the known laws of nature work equally well in the two directions of time then why are all the processes we observe in the universe all going in the same direction we are all getting older in the same direction you just like me and all the stars are we never meet anyone getting younger where is this colossal asymmetry in time come from if it's not in the fundamental laws so seven years ago to make a concession to time I an idea occurred to me which actually I happen to know about a rather important result in discovered in Newton's theory of gravity in 1772 this led me to the idea that the Big Bang so if we pretend there is a timeline of the universe which by which I mean just each individual now what it's like like the sills the moon

we suppose you have a long infinite timeline of the universe and I would say that the Big Bang is if you like in the middle and we are on one side and our time is going that way and then there's another universe or the other half of the whole timeline where time is going that way now people who were on that side would find that time is going forward in exactly the same way as we find it on this side it's all very chaotic at the Big Bang there's no structure there so we can't see through the Big Bang to the other side and they can't see through to us but that restores the overall symmetry so the overall symmetry of the whole universe reflects the underlying law which is symmetric in both ways but on the two sides the direction of experienced time is opposite so that's quite ***(*) this requires a separate interpretation... of which I have already "committed" a lot in 20 years.** a simple neat thing so I call this the Janice point or Janus point that the Big Bang are of course after the Roman god who looks in two opposite directions of time at once and I'm writing a book about this with the title is the Janus point and a new theory of times arrows and the Big Bang I hope I will get it finished I'm working away ah fairly recently had my 82nd birthday so I better get it finished I'm constant now fairly recently back in February actually but it's a nice simple idea and several quite interesting things fit into this idea quite nicely so and what is the main the main challenges with this what what do you see or foresee is the main challenges that you'll have to tackle and well first of all first of all to show that this is this model is based on Newton's theory of gravity and quite a big challenge is to show that it will also work with Einstein's theory of gravity now we've made it my collaborators made a first step in that and they've showed that in some senses there are conditions in which you can go through the Big Bang in general relativity and not only in the the comparable such in Newton's theory then there would be more detailed work

(04)- to be done but the real challenge would be to make this quantum mechanical to unify quantum mechanics with this and we've got ideas about this but people have been trying for 60-70 years to unify corner mechanics with Einstein's theory of gravity and they to be frankly haven't got terribly far or despite them the claims that made them like might like to make so that's it there but one thing we do think is that we concentrate on what we say the shape of the universe in any instant so if you have a triangle it has a shape and a size but I think you'll agree that the **shape is much more important than the size** * O.K. This is an essential fundamental view if the "shape" means ""the curvature of spatio-temporal dimensions"" ... we cannot do anything about "size"! !, but about the shape (geometry, topology) yes because if I hold up a an equilateral triangle in front of your eyes and move it backwards and forwards the shape doesn't change but the size does so you would say there's a question mark over the size whether it's fundamental now if you can if that triangle is the whole universe you'd need a ruler outside that triangle to measure its size but if the universe is everything **that doesn't make sense so we've developed something we call shape dynamics to describe the whole universe** * and we think that it might be possible in that framework to unify quantum mechanics with gravity with Einstein's theory of gravity * O.K. Dimensional curvature is the basic essence of "state changes", transitions from Euclidean flatness to certain dimensional curvatures - curves, such as the "parabola" for gravity to high dimensional curvatures in quantum mechanics, where curvatures approach the "symmetric chaos" of curved = foamed dimensions, whereby this foam of higher and higher curvatures "returns" to the smoothness of space-time, which was before Třesk... and this is probably still repeated... because it's taking away something that shouldn't be there and in fact all of the so far really all of the existing approaches to quantum gravity in some way or other are bringing in an external scale which I don't think should be there or at least as a there's a question mark over it and possibly a big one so that's our hope but it's better to be getting on with in the meanwhile for more debates

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