The science salon podcast I'm your host Michael Shermer as you all know. We do this once a week on the Tuesdays that books are released. This week's book and author is my longtime friend Christoph Koch his new book is *the feeling of life itself why consciousness is widespread but can't be computed* so you can see where that's going. I've known Christof since the early 90s so probably almost a quarter century now. He's one of the most interesting people I’ve ever met, super delightful guy very smart very witty and has a real lust for life and he's now left Caltech and has been at the Allen Brain Institute for I don't know must be at least a decade now and so we talked a little bit about that the research and work that they do there what are they doing when they're trying to find the neural correlates of consciousness, we get into the hard problem of consciousness and what that means, the integrated information theory of consciousness versus the global work space theory of consciousness and we talked about comas and vegetative states and, you know, is there anybody there, how do we know. They need to find these things, the nature of the self and identity if you have a split brain there's really two minds, so if you have two minds is that two persons two selves. You know what does that all mean. So we explore some of that and pretty much cover most of the major philosophical issues related to the mind-body problem, how consciousness arises from a physical system, why he thinks that no computer will ever be conscious, what they're designed to do and the underlying architecture, the structure of computers that as currently configured will never ever be conscious and he makes pretty good argument I think not that it can't be done it's just that it's not going to be done the way we're doing it now. I think he's probably right in the sense that you know it's a much harder problem than anybody ever realized when we're talking about creating conscious computers back in the 90s and still hasn't happened. I think it's just way more difficult than anybody realized and anyway it's a great book it's really you know short, straight to the point, he's a clear writer, clear thinker. And, it's in the title itself, what is consciousness, is the feeling of life itself, or as he says even more succinctly it's experience. Consciousness is experience, so ahh, consciousness is lived reality, it is the feeling of life itself, it is the only bit of eternity to which I am entitled, without experience I would be a zombie, a nothing to myself. Anyway, great book. If you appreciate the podcast as usual, we appreciate your support. Thank you, I give you Christof Koch.

Christof Koch, is that Francis Crick behind you there?

Yes, it's a painting he gave me. It's a photograph of him in a wicker chair. He gave that to me half a year before he passed away, and it says for Christof Francis keeping an eye on you.

So you have it there in your office watching over you at all times.

Okay looking over my shoulders at all times, yes.

I am speaking to you at the Allen Brain Institute in Seattle Washington where you were wooed away from Caltech amazingly enough.

That's right.

So before we dive into your book just again to introduce everybody, just remind you why you're here, your new book.

Oh! You have it! I haven’t seen it!

You haven’t seen your book?

No!

Yeah *The feeling of life itself Why Consciousness is widespread but can’t be computed.* Okay well yeah some people are gonna dispute that but that’s it. Before we get into that, just kind of catch us up you know, you're famous for having worked with Francis Crick when you were at Caltech and you had kind of the traditional academic career just grinding along, doing your thing and then, all of a sudden you're now in Seattle running the Allen Brain Institute. What is it you're doing there and why did you do that transition.

So we have thirty scientists focus on a few very large projects in the brain sciences. So for instance we have a big nature paper coming out next week where we look at human brain material either from dead brain or from neurosurgical excised brain tissue, and 20 minutes later after the neurosurgeon takes it out of the brain of a patient it sits in our in our lab and then we can do what's called single-cell transcriptomics so we can read out all the genes that are expressed in the different neurons to get a view of how many types of different brain cells there are in a human compared to the different types of brain cells in a mouse.

How many are there in humans versus a mouse's?

Well, in any one cortical area turns out it's roughly the same roughly 100 and that's the same number in human and mouse, and it's sort of similar the number of genes, when people first in the late 80s’ identified 20,000 genes in the mouse genome they said ‘Wow humans are clearly vastly more complex, so they're going to have hundred thousand or two hundred thousand’. No, they have roughly the same number of genes, we have roughly the same number of types of different neurons, probably across entire brain on the order of a thousand two thousand five thousand. Although, there are many many differences and those difference matter. So particularly if you, here for example, if you are into making drugs to help people with schizophrenia or autism and for example you're after serotonin receptors and you make a drug based on some animal, particularly mouse experiment. Well the same serotonin receptor may be distributed, looks like it's on different types of cells so therefore what you've find in the mouse doesn't really generalize to what you find in human. So while the principles are similar the details really differ greatly, which explains why so much drug research there was, you know, started in the mouse, you can cure mice but you can’t cure human with that.

And is that because just the combinatorial complexity of, you know, when you just start grinding along on the numbers of combinations and they just don't extrapolate from one species to the other.

Yeah you gotta remember if you trace us back down the evolutionary tree, the last common ancestor lived at the time of the dinosaurs, 65 million years ago and since then we've diverged. Your brains are built along similar principle but all the details have changed over the last 65 million years. So you really gotta work with human brain tissue which of course it's much more challenging.

What year did Francis died?

In 2004.

2004, so it's 15 years. What have we discovered since then that he would be surprised about or pleased

to see solved or still mystified.

Well so first of all I was recently rereading there's a very one of his better known articles, which was written in 1979, in 1979! So that's basically you know, that's 40 years ago when he just made the transition from molecular biology to neurobiology, and when he also made the transition from Cambridge England to La Jolla here in California, and he wrote a very forward-looking article about brain sciences and some of the things that should be invented. He predicted, wouldn't it be great if we have tools that light up neurons with, you know, with flashes of light when they discharge electrical activity, wouldn't be cool if we can turn neurons selectively on and off. These are all tools that people developed over the last decade. So those things he would have been comfortable with. What he probably would continue to be surprised at, it's the vast complexity of the brain, you know, when he and I worked together 15 or 20 years ago we thought there were going to be simpler molecular codes that express which cells living in which bits, which specific part of the brain, and all of that turned out to be much much more complicated than we had imagined. And some of the possibility to manipulate the human brain again he might have been surprised. On the other hand he was very fast-thinking so I'm not sure whether he really would have been surprised by many of the current developments.

I was trying to find that famous quote for his book *the astonishing hypothesis*. Your joys and your sorrows your memories and your ambitions your sense of personal identity and free will and let me see what's the rest of that quote, I mean it's still kind of true, are in fact no more than the behavior of a vast assembly of nerve cells and their associated molecules. Of course that's so broad, it's kind of true by definition, but why was that astonishing at the time.

It wasn't, I mean it was a book titled that he later regretted. It was suggested to him by his publisher, that would be catchy. No this is what most brain scientists believed at the time and believed to do. Truly that ultimately who you are is a part of your neurons, also and this is important it's not the same as your neurons, so my experience my love that I have for my wife or for my children it's not the same as the neurons that are involved in that action. Those are really two different things, one is necessary for the other, right? It's sort of the physical substrate of the other, it's not my heart as ancient believe it's not my liver that give rise to my feelings, it is the brain. But the brain is different from the feelings that that the brain gives rise to.

Yeah so there you're identifying the hard

problem of consciousness what it what it

feels like to be something or to

experience something yeah I mean yes

you're right so the hard poem is trying

to understand how one relates to the

other in a scientific empirical and

useful manner and of course some

philosophers claim this can never be

done me I don't know you know

philosophers have claimed many things

thought they hated said can't be done so

one has to be a little bit skeptical it

is indeed challenging it is difficult

there's no question about it yes so well

but the question is is it a conceptual

problem that is a problem with our

concepts or is it a scientific problem

that is is there any experiment you can

run and say there that explains exactly

why I experienced something well so it's

a we need an entire theory there's no

single experiment that will ever

convince anybody but it's the same in

physics if you look at quantum mechanics

you know as you well know Michael

quantum mechanics make some very weird

predictions right and so cook but

collectively we believe scientists

believe quantum mechanics is the best

description we have of the universe at

the micro scale and so ultimately we

need a theory of consciousness that

explains your consciousness and how it

arises in your brain and what happens

when you might get a stroke and what

happens in babies what happens in

animals what happens when you go to

sleep what happens when you have you

know various mental diseases and then we

have to see what are some of the

implications of such a theory for

instance for computers or for other

systems that we might not currently

think of as as being conscious well so

the title of your book the feeling of

life itself that is your definition of

consciousness ultimately yeah it's a

quite common one ultimately

consciousness is any experience any

feeling you have yeah you say

consciousness is experience yes yes as

in equals yes that's what yes

it's any experience that you have the

this subjective aspect it feels like

something you know to be angry to be

upset to know that you're gonna die one

day to be happy to be in love you know

to have a toothache to look at you to

hear me those are all different

experiences that's what consciousness is

yeah so but let's say you and I are both

looking at a red dot or whatever and in

back in our visual cortex at the same

spot is lighting up in an fMRI we would

say that's the neural correlates of that

conscious experience of seeing something

red but that's but where's the red our

mutual friend Deepak Chopra would say

where's the red well in this case the

experience is a consequence of the or

it's not a consequence no is it's really

the

you have a physical substrate let's see

some neurons being you know

interconnected in a particular way and

they are associated with this feeling

it's not that that first set is a

physical action and then there is a

feeling because that sort of dualism and

in scientists you know sort of tend to

reject that no you have the physical

constituency you have your brain or part

of it and then that sort of is

coextensive with a particular experience

whatever the expense will be seeing

rather being angry right it seems to me

this is this gets us to an answer to the

question of you know the problem of

other minds or how do I know you're

you're you're not a zombie and I'm the

only human that's actually sentient

because your brain is wired the same as

mine or very similar that the Copernican

principle says I'm not special so the

chances that you know you're completely

different on an experiential level than

I am even though we have the same wire

and is very low therefore the inference

to the best explanation is we're all

sentient perfect that's exactly I would

like I couldn't have better I could have

put it better myself now I don't really

know that but it's an inference as you

said it's an influence of the best

explanation yes right so well so that

gets to yeah well anyway just sort of

we're getting slightly ahead of

ourselves but you you know you you right

here consciousness has lived reality it

is the feeling of life itself is the

only bit of eternity to which I am

entitled without experience I would be a

zombie ain't nothing to myself so

there's there is all the neural activity

then there's this other layer of I don't

know what you want to call it I've sort

of a metaphysical layer or no it's not

yeah yeah that's my reality remember the

only thing I know off I said I have

feelings even anything else right but by

this definition that I would assume my

dog you have a dog I have a chocolate

lab I assume he's he experiences things

he there he has experiences similar to

mine therefore he is conscious yes

there's no question about it I don't

know by the way a single dog owner or

cat owner that would deny that that

their companion animals also have

feelings now they're not as complex as

yours or mine

my

my dog doesn't know he's gonna die one

day my dogs don't have that capacity I'm

not sure how much my dog you know thinks

about himself you know I like you think

about myself and I project myself in the

future I think about the past my dog

lives you know it's much more like a bit

like a Buddhist he lives in Bahia now

yeah he's very mindful in that in that

way most of us are not but yes he has

conscious experience no question about

it

your dog is enlightened in some sense

yes he's more enlightened because I'm

always obsessed about the future all

about the past most people are right

right because me think what would happen

then you replay the last dialogue the

last fight you had with your girlfriend

or whatever my dog doesn't do that my

dog is much more in the present yeah

yeah but so by this definition then it's

really just a scalable spectrum of like

instead of the lights coming on and off

like a switch of consciousness it's more

like a rheostat that you know you just

kind of turn it up it's very dim or it's

a little brighter and brighter and

brighter based on what the number of not

just a number of neurons but how they're

wired and in the complexity of the

neural networks and so on again you

you're putting it very well now that's

probably to pose at the level of

individual over your lifetime as well as

the cost species in other words when you

think back when were your first

conscious when when did you actually

first have an experience was it you know

when your your mom and your dad got

together and they you know the sperm

fertilized the egg was it at the stage

of blastocyte when you were 16 cells was

it at the end of your first term when

you had a brain you know after ten weeks

you have already a brain right and then

that goes is it when you when you exit

from your mom's womb into the world when

you finally have to breathe oxygen and

you scream and there's light and sound

and all of that or the or does it occur

June you know in the first two three

years of life when you get when you

would when you start speaking and even

as a teenager there's certain things

that you still have no experiences of

like like like the experience of being

in love or sex or wine of drugs all of

those right so you expand your conscious

experiences and then of course at the

end of life you know maybe there's

dementia

maybe you know you'll have a stroke or

something you know so so it waxes and

Wayne as it does during the day right

when you go to sleep your consciousness

is off and the same thing as you said

will change across different species

somehow scaling with the complexity of

their brain do you distinguish between

consciousness and sentience no I don't

awareness consciousness subjectivity

those are just different names but it's

all the basic same phenomena it feels

like something right you experience

pleasures pains suffering whatever yes

yeah that's why I always like Jeremy

Bentham's famous quote about it sort of

the grounding of animal rights not can

they thinking can they talk but can they

suffer yes yes ultimately I think that's

that's that's a key inside the suffering

the ability to suffer or not I mean

we're way ahead on this is you at the

end of your book on animal rights but

that's kind of where it begins and if

you really believe that then I don't

know how in the animal sentient beings

we kill every year it's like a trillion

a year if you count every chicken and

fish and so on I mean this is like worse

than the Holocaust every year so I

thought recently a quote in a restaurant

Germany and they said for for animals

its Treblinka every day

yeah and so I mean one reason I'm the

main reason I'm a vegetarian since many

many years because I don't want to do

that anymore you know certainly advanced

so I had this I had this epiphany the

night my beloved German Shepherd I was

fifteen years ago the black German

Shepherd know that she died in my arms I

was distraught and was crying and then I

thought well at the same time I loved

the the flesh of pigs and lambs and

their brain is roughly the same

complexity is that of my dog right so

they so I that night I promised my I

promised my nosey in her honor I would

never eat the flesh of another conscious

creature again and you did it and I

haven't what was her name nosy nosy nosy

she was intensely curious knows my black

gem shall I see nosy yes okay got it

black German Shepherd yeah German

Shepherds are they're really great dog

I've had two of those yeah well I mean

this is one of those things you think

like I wrote that book the moral arc and

people then ask well you know what's the

next stage well it's got to be animal

rights you know and it's one of these

things like if we were chronically

frozen and came back five hundred years

from now how would people then look back

at 20th century 21st century what what

we think about now you know they would

probably accuse us of being you know

like the equivalent of slave owners or

genocide 'el you know maniacs I think

there was an excellent point I mean we

today of course we believe we're morally

superior to every other previous culture

because you know we we have less races

and we have less misogyny but you know

but you're right they're horrible other

things that people simply don't think

about it when you talk to them about

about suffering some people would say

yeah you probably arrived but it tastes

too good

most people don't even think about it at

all

yeah just like presumably it it you know

when the Greeks were around nobody

really thought much about slaves I mean

I was total and Plato Socrates for sure

they didn't write really about it they

didn't even consider it a real issue

right not even noticeable

no yeah Dawkins wrote an essay

republished in his book the soul of

science I think about wanting to be a

vegetarian and he kind of went through

Peter singers famous arguments about the

expanding moral circle yeah well that

and he basically at the end he says I

know he's right and I know I shouldn't

do it but I go to a restaurant and I

can't help myself

you know it could be we need you know

everyone needs to change you know know

you need more than the arguments and you

need some kind of cultural momentum yes

and I mean that's why I took in my case

you know the in the death of my beloved

pet because you know I the taste of meat

is deep ingrained in our culture yeah so

it's just like with many of the other

isms we need to change our entire

culture why bring up children with all

this flesh all right here's your current

here's your current dog ah from your

from your perspective did you draw that

I know I had an artist oh yes because I

think movie

dog what's what's her name Ruby Ruby

yeah like the jewel yeah yeah right

anyway well I mean that's you know it's

one of those issues that I think

culturally will get there I think it's

going to take longer simply because

because we all have to eat and meat is

such a big factor you know it was easier

I think to give up slaves because not

that many people actually own slaves

everybody eats and everybody eats every

day and most people eat meat I think

it's just a harder moral revolution to

bring about I agree but there are some

promising development is impossible

impossible food there's your meat it's

getting more expensive and you know with

8 billion people it's not clear within

50 years from now we can still support

this mass ok culture given you know the

Associated environmental cost so maybe

things will will change I've been I've

been having the the impossible burger at

a local islands chain here in Santa

Barbara it's pretty good and I mean it's

a little expanding its 15 bucks or

something like that but the cost will

come down in time the council will come

down and apparently the impossible but

are they off it now at Burger King I

think it's the impossible West English

is I think they're calling the

impossible whopper yes and people can't

tell it apart so that's encouraging

yeah all right so this is the your

previous book was the about of romantic

what did you call yourself a romantic

consciousness a confession of a romantic

reduction projection a romantic

reductionist yeah yeah you've always

kind of flirted around with with not

being strictly reductionistic well and

yes

so that's entirely too very good and of

course in consciousness you have to take

a holistic perspective because

consciousness ultimately it's about a

whole you know w w o al e the whole here

and and because we you know my conscious

experience is holistic it's one it's not

many I don't experience many things at

any given point in time and so therefore

you have to ask what is a whole in in

your brain or anywhere else and and and

each whole concept

a conscious being a conscious thing a

conscious entity that has some

experiences yes yeah in the book you go

through these surgeries where they take

out different parts of the brain and

consciousness still is still retained

walk us through some of that research

and the search for where it's located

and why it's impossible to find it in

any one place well so so yeah so we do

know enough from new no clinical

neuroscience the last 150 years to know

there isn't any one place where sort of

it all comes together you know all my

conscious experience of me and not in

any one place they of course places in

the brain way if you have a stroke you

become unconscious but particularly in

the brainstem right so your brainstem as

like this to this pipe roughly two inch

a one inch thick to into the cause here

that connects the spinal cord with my

brain popper if you have a lesion there

you're typically in bad shape

right you may be in coma or or in a

persistent vegetative state but those

are just enabling factors just like you

need your heart to beat if your heart

doesn't beat within seven to ten seconds

you faint so that's one of the necessary

background condition same thing your

brainstem needs to all those neurons in

there need to be active in order to vote

for your for your really your cortex

it's really context the at the outermost

shell at least in as humans and in other

mammals that gives rise to anyone

conscious sensation and there we know

from people like Oliver Sacks you know

they're the neurologists yeah that

specific part of this cortical sheet

it's really like a pizza in assets like

a pizza

it's a fourteen inch diameter two to

three millimeter thick and you've got

two of them and they're highly convolve

dand you know you know put into your

into your skull and different parts of

that mediate different aspects of

feeling feeling of self feeling of

seeing motion seeing of color of hearing

and we know this from people who have

strokes or lesion they miss they miss

entire entire categories of experience

they don't seem color anymore they they

feel everybody else is has it sort of

has been at a place they the loss of

feeling or familiarity and so so

clinical natural experiments like that

we know their specific parts of the but

of context that are really essential for

different classes of conscious

experiences yeah I was liked about

Oliver's books is you know basically

each chapter is something that's gone

wrong in somebody's brain and then what

that looks like in terms of symptoms and

experiences and behaviors and what it

actually feels like he's really very

good at conveying you know the feet you

know how does the world how does how

does your experience of the world change

if you have you know if you have these

specific brain lesion or you're unable

to remember or you always live live in

the present and that teaches us a lot

about consciousness there's another

class of surgeries so medical sciences

in general and surgeries probably taught

us more about consciousness and most

other fields so a series of experiments

that I know you know well that were done

at Caltech by a remember Joe bogan the

new search and and Michael Gazzaniga and

Laura Sperry you know who got a Nobel

Prize forth with these split brain

experiments yeah and so what happens in

a split brain experiment of course you

have a person who's epileptic seizure

the seizure might start in one cortical

hemisphere so seizure is just a hyper

you know hyper excitable above and

electrical activity that can if it

spreads can engulf the entire brain and

then you get these core model' you know

these attacks so to prevent it from

spreading as spreading a radical

therapies to cut the why the why is

there tuna if you look down at the brain

right it's like a walnut they're two

halves and the two halves are connected

by 200 million fibers called the corpus

callosum and if you cut that that yes

beautiful exactly and if you cut that

you can you can prevent the seizures

from and from spreading but then it

turns out now you have two minds in at

least some of these patients you have

two minds inside one scow you have the

left brain that gives rise to a mind and

that's the one that speaks but there was

a great discovery that the the the

speaking parts is really specialized in

most of us it's the left hemisphere

Bacchus they are in Veronica's area but

you can shut that off focus on by

initializing it by injecting sodium

amytal

and then there's the other mind in the

right hemisphere and they don't know

about each other it's like being on the

dark side of the moon there's someone in

my hair but it's not me you know like

the Pink Floyd it's on quite literally

because each one is its own experience

each one believes itself to be the only

thing inside their body but then of

course the patient you can ask the

patient and sometimes the patient

complains the patient she or he will say

oh my other hands always does things

that I don't want it to do right yeah

because it's the other consciousness

that have also a will of its own and

then they have to duke it out yeah it's

the problem of identity and self is

there a single self if you can so easily

divide a brain into two my so easily I

mean it is massive you know it's it's a

pretty rare surgery it's not it's not

done that even yeah but if you

physically cut the brain into two yes

then there will be at least this way not

this way but if you cut it this way

there will be two now you can do the

opposite also so this is what I talked

about so I can take your brain in my

brain and I can do sort of the very

opposite of split brain so I can start

putting in wires between let's see my

visual cortex and your visual cortex

okay so let's see I have some future you

know neural link Elon Musk like

technology that allows my visual cortex

to talk to your visual cortex so at

first what what the theory that I

discussed predicts at first I can see I

see normally like I see now but I also

see a little bit through your eyes so

what you see is like a ghostly image

like you know augmented reality

superimposed onto what I see but I'm

still me and you're still Michael now

with the theory predicts it's integrated

information theory predicts that as I

increase the bandwidth of this

connection as I add more and more fibers

this to this artificial brain bridge

between your brain and my brain at some

point and it's very precisely defined

when at some point abruptly I will die I

will disappear Christof will be no

more Michael Shermer

will disappear instead there will be

this new thing this uber mind this new

conscious mind that has foot

in that houses that lives in to brain in

your brain and in my brain it has four

cortical hemisphere it's Sisu for eyes

and hears through four years and it

talks to two mouths but a different

world it'd be a completely different

experience well it still has some of you

it still has access to your memories

this mind still has access to my

memories of course it will have aspects

of your personality in my personality

there could be big Freud's going on but

it will be a single mind just like the

bog the e there will be a single mind

you know I'll call it Michael Christof

you know some some amalgamation of your

mind and in my mind there's always only

a single consciousness and then as I

progressively reduce that there's

bandwidth these wires between my and

your brain at some point abruptly you

will find yourself back in your brain

and I will find myself back in in my

brain the sensor I showed this picture

of your dog Ruby through your eyes you

know sort of looking down you can see

your legs and there's Ruby for those who

are just listening to this podcast if

you had a brain link between your visual

cortex and your dog's visual cortex

if you cranked up the electricity enough

would she suddenly see that almost like

looking in the mirror like there I am it

would well if it's a single mine it

would be a sort of a weird canine human

mind we would be fused yes it's it's

it's a very weird that is really spooky

I mean it's it's easier to think about

it yeah you know so for example when

you're making love you must have

realizes you know so you're making loves

you you're sort of your bodies are

interpenetrated but you realize that she

is assuming you're making love to a

woman that she is still her own mind and

you're still your mind and you can look

at each other but you can never bridge

that gap right mind the captors always

care now with brain bridging this the

the theory says if I directly connect my

pride mum my brain was harebrained and

at some point there will only be a

single mind we will truly be merged like

lavas there will only be one mind like

Kristen is older you know

in in in Varanasi eponymous opera there

will be one mind there will be no more

and there will only be twisting is olden

you know that I think it was a New

Yorker cartoon of two behaviorists after

making love the one says you know you

had a really great time how was it for

me

[Laughter]

know this now interesting this might

happen already on this planet there are

twins I'm thinking right now of

identical to Siamese twins in Canada mmm

yeah in north of us here in British

Columbia and they were born with what's

called a brain bridge and salami brain

bridge so due to some birth defect their

brains never really truly separated into

into two brains and there's some so the

New York Times you know Gordon long

article about it and there's some

evidence that one of the girls can look

there the other girl can look over the

end can partly see through the eyes of

her of her you know Siamese twin partly

because of this of this bridge so for

the one looking that's just such a weird

idea so they're really getting different

inputs and combining them into some kind

of field and I mean it I'm envisioning

some kind of a split field but but a

bird that has to you know eyes on either

side of its head

it I think of it like augmented reality

at that point right you know the

portable augmented reality for where

this car I see I see still the real

reality but then I have these virtual

images that are that are super that are

superimposed except here they are not

virtual they are again they're they're

real but at some point if there's only

one mind then this is your experience of

the world you explain you see the world

through four eyes I mean invincible yes

we we are of course only used to seeing

the world for two eyes but in principle

you can imagine how I see the world

soulful eyes a single conscious view is

singer mind maybe this would be so the

augmented reality may solve the problem

Thomas Nagel is what it's like to be a

bat yeah we can just actually put the

goggles on and they give the Aquila

sonar and you're now not a bad you

that couldn't you know your badge human

which is different from the pure path

that's true right so in that sense I

will never know really what a what

Justin bath is by itself because my

brain is different and so my brain

cannot be you know the brain of a bat

the most the most of that would happen

you'd just be a bat wondering what it's

like to be a human or something like

that I had a lot of experience with

virtual reality but I was at a

conference recently where the the

virtual reality goggles helmet thing was

a image from a hundred and ten story

building in LA or wherever it was

looking down on a plank sticking out of

the window and you walk out on the plank

so just standing there watching the guy

you know they were gonna if you can last

the whole two minutes or whatever it was

and you can walk actually walk all the

way out to the end you get some little

present whatever they were giving away

and and it to me it looked ridiculous of

course I could do this anybody could do

it because you know that the plank is

actually sitting on the floor one inch

above the carpeting but the moment I put

it on it's like I can't do it I am NOT

gonna be able to make it out there even

closing my eyes I would just kind of

open them a little bit in peak and you

know I'm looking 110 stories down it's

like I can't do it ourselves it's really

interesting it shows how that visual in

our case because we are visual creatures

visual input can override our prefrontal

cortex knowledge as you said you know

perfectly well there's no danger there

but the visual input sometimes it's even

more powerful when it's combined did

they have like sounds of wind no there

was no sound it was just just a visual

yeah the visual input by itself is so

powerful it can override your knowledge

it's like visual illusions idea I mean

you know this again there are these

powerful visual illusions you perfectly

well know you're being fooled but you

cannot not see the illusion my favorite

is Jerry Jerry Jerry Andrus is

impossible create illusion where yeah

yeah did the actual create built yes you

perfectly well know that it you know it

can't look like that but your brains

fools you because that knowledge isn't

sufficient to break the the individual

percept yeah

so what so the the musk mind-link or

whatever that's this thing is gonna do I

haven't really followed it that closely

uh but the moment they say you know

we're just gonna open up your brain and

stick this thing in there it's like wait

time out that's fairly risky surgery to

do that right just you know take open up

the skullcap and put something in there

and then put it back on that's not a

that's not a trivial thing to do correct

and so right now and for the foreseeable

next decade or two or three that risk

profile is only worth it if you have you

know if you're paralyzed or you know

Hemi player Parkinson's disease or no

toxin disease or you know if they're

significant if you're significantly

impaired all this augmentation right now

it's just simply too risky and no search

and in the at least in the West would

would do that because it's simply too

risky there's always a chance of

bleeding there's obviously a chance of

of infection etc and so you only do that

you know if you if they're strong

reasons to justify those risks yeah so I

mean if you had contact lenses that had

access to the internet or glasses or

something like that that seems fairly

easy to do a cochlear implant you know

that seems far far less invasive than

then what musk is proposing yes but you

know they people have done this now

brain machine interfaces in fact that's

also what knurling wants to do for

quadriplegic so these are people you

know wherever high up lesion in their

spinal cord who are you know can move

any of the limbs and so in that case

it's worth it you know in order for you

to control a wheelchair or to control

your you and your phone right so that's

that's such a great example of arthur c

clarke third law you know any

sufficiently advanced technology for

magic so all Geo's you see is this guy

is sitting there any and then things

start moving as he's thinking about him

well that looks like telekinesis unless

you know the the brain ship that's in

there how far is that come along since

it's still so you know if you look at

there are a few cases of these patients

online but then you you know it takes a

team of three four five six engineers

and three PhD students

a lot of support and you have to go in

the clinic and you know it takes you

sort of five minutes to take a single

sip from a straw so it's still very much

in its infancy but it's like any other

medical technology right early on all of

these things like contact lenses are

incredible primitive and then as

technology gets relentless better you

know these things will be easier to use

but as you pointed out any time you go

in vase if you go inside the body the

risk you know increases dramatically and

so that'll slow down any any technology

so adoption for most of us who are who

have not actually augmentation versus

just replacing a loss function it's

still a ways away yeah yeah now when I

read that I remembered my mom had

meningioma brain tumors and you know at

the moment they did brain surgery I

think she had to take like anti stroke

medications and and other medications

for the rest of her life yes just by

opening up the skull well she did she

had five craniometry these tumors kept

growing back and and then five radiation

treatments when they wouldn't operate on

the brain anymore and she felt Amelie

died of this but she was in a coma she

eventually she fell and hit her head

when she wasn't functioning too well and

was in a coma but so I was you know

reading your whole section here on

people in comas and or vegetative States

and so on and same kind of things so

many people experience I would hold her

hand and say squeeze my hand

you know and then she would do it pretty

much every time so what can we conclude

from I mean the lights are on a little

bit you know the dimmer has come up just

a little bit if she's responding in some

way or is that just more like a

knee-jerk reflex with a verbal command

ultimately it's difficult to know but

general the assumption is if it's you

know if you ask me if you hear me

squeeze my hand or you can also ask you

can ask him more objective knowledge you

know where you born in Kansas City or

not so people do those sorts of X you

know trying to communicate well you know

what the answer is and you see is it

just a reflex every time the the the

brain here's a command it just squeezes

or is it much more sophisticated more

challenging a case

what's called minimal conscious MCs

state or vegetative state where you

don't even get that where no matter what

you ask or you ask them to move their

eyes there's no response and there are a

few thousand of those patients and you

simply don't know whether there's

anybody home and then you need these

this technology that I described in this

book there's so called zap and zip or

you when you stimulate the brain it's a

little bit like you take a bell and you

hit it with a hammer and you're looking

at the reverberation and based on the

complexity of those who are vibration by

that you pick up using eg you can

ascertain whether the brain is still

conscious or whether it's truly in an

unconscious state like in a deep

anesthesia or in a vegetative state when

truly no one is home anymore you still

have the shell of the body like you

remember Terry Schiavo yeah she she

didn't even have a brain wasn't it just

mush or just mostly you know I don't

know she had a brain so she had an

anoxia for 25 minutes before she was

revived and put on a on a on a

ventilator and post-mortem they turned

out the brain at shrank by by a great

deal by more than half 50% but she did

have a brain and of course like many of

these patient in a vegetative state she

has occasionally these responses you

know where she would move she and the

eyes occasionally would move

occasionally she would grimace you know

it's very good see she laughing or

crying or what so she clearly had some

reflexes so so there's a difference

between brain dead when you have no

reflexes whatsoever and vegetative state

patience when you when they okay they

will open their eyes occasionally they

will they will move brain that patient

doesn't have any of that right so what

can you assume that in terms of

personhood or sentence said brain state

as fast we can tell if your brain is

dead you're dead

yeah your body may still be alive

although that's disputed but if your

brain is dead there's no one home

anymore and if you're honest um at the

modern definition of death it used to be

death a sensation of breathing sensation

of of pulse right but now we know that's

unique I can animate you right we people

invented in the 1950s ventilator so now

I can keep your body

live almost indefinitely so now we we

define deaths edom cut your palm mean

our death or a brain deaths if your

death if your brain is irreversible

broken then you're not home anymore

yeah although to your loved one you know

you might still look a lot you know

alive you have skin pala your your body

is warm your you know your your your

chest goes in and out but that's because

you're on a ventilator right well but

but I'm thinking of that that in between

state the coma state they squeeze my

hand and they do or whatever what is

well if they do then they are then they

are fully then they're there how much

are they there you know are they just

mainly there right are they just sort of

in asleep most of the time and

occasionally they wake up for an hour -

very difficult to to tell and with

technologies interesting you know again

50 years ago those people all would have

died very quickly but it was more than

you know 911 emergency it asks you

helicopters modern trauma surgery we can

pull some of them back and most of them

you know we you can we can return to

normal life but then there's this subset

of patients who's so gravely injured

they I'm not there but they're not fully

alive they are sort of you know hovering

in this unfortunate State and of course

with modern technology you can keep

their body alive for a decade was it the

Terri Schiavo case where the the husband

wanted to pull the plug and the parents

didn't or is it right yeah it was

litigated all the way up to the Supreme

Court a member of Congress met on the

weekend and the Supreme Court major

George Bush got involved yeah W Bush but

yeah so but that's not exception as I

said there are thousands of cases like

that mainly interesting homes hospices

etc and it's a great time it's it's a

great tragedy for everyone

yeah yeah right and then general

anesthesia

where does your consciousness or your

sentience go well it seemed pleased with

it goes when in deep sleep he's gone

it's benign it's simply it's not there

anymore because your you know your brain

is now in a different state you're

simply not not conscious that's what

defines states of unconsciousness yeah

yeah and then when you come the magic

you know you wake up you know I can I

can ask you Michael Michael and then you

come food and suddenly you it kind of

the lights come back on the lights come

back on again yeah the one enough at all

yes yeah

all right so walk us through this this

latest theory of you know neural

correlates of consciousness and the

information processing and all that well

I mean it's not it so they are really

two sort of popular scientific theories

scientific theories of consciousness

around one is the the global neuronal

works P theorem that essentially says

sort of it's a funkiest account that

essentially says consciousness is a

performance of certain function

involving short-term memory involving

planning involving self-monitoring and

and those things are implemented in

particular parts of the brain and also

once you replicate those functions on a

machine you know including monitoring

self having planning having ability to

speak etc then you will get a conscious

a conscious machine the other popular

theory is called integrated information

theory is by this psychiatrist and your

scientist Giulio Tononi and I'm a big

fan I've worked with them for many years

that says no consciousness is more

fundamental consciousness it's different

from its material underpinning it's a

distinct difference thing in fact it's

the only thing that I have directly

acquaintance with and and really has to

do altom Utley was with was a complexity

of any physical system ultimately it has

to do with with with the ability of any

physical system to to causally influence

itself ultimately it's about intrinsic

causal powers it's it's something else

total said 2003 not years ago you exist

you're conscious to them to the extent

that you have that your brain the thing

that is conscious has causal power upon

itself that means it can be influenced

by its previous state and it can

influence it can determine its future

state or self-referential

in some events a causal power ultimately

how do I know anything exists it really

goes back to

two fundamental ontological

consideration how do I know anything

exists I only know things exist by the

influence they have on me so gravity I

know it exists because there's tides

there's a famous Apple you know of Isaac

Newton that's how I that's how we know

ultimately gravity exists now this

theory applies causation to itself you

exist to the X you exist as a thing as a

conscious thing to the extent that you

that you have causal power upon your own

system and the more causal power you

have the more complex the system is the

more you exist the more you're conscious

and and and there are certain

consequences that you can test in

different dreams yeah and then it uses

something like that in his book freedom

evolves where he argues for something

like free will or volition as a function

of the complexity of the organism to do

what you're describing so the more of

that you have the freer you are or you

didn't say that he said the the more

degrees of freedom you have to make

choices within your environment to move

around and affect things and in the case

of humans we can self reflect on that

and know that these are the things that

cause me to do certain things so I'm

gonna change my behavior to redirect

that causal vector to do something else

that I know it will have that effect and

so on and so on in a self referential

way it's correct but of course Dan

Dennett

also fundamentally believes that there

isn't anything like consciousness itself

that's really a big illusion in in his

eyes we're really confused about it

ultimately consciousness is just a set

of behavioral dispositions ultimately

consciousness is a function I carry out

a whole set of functions I carry out and

once again once you implement those

function in a different system like a

computer that system will be conscious

so in that sense I this runs radical

contrary to his notion or the general

notion that's that such a myth in in

anglo-american University departments

and in big tech that ultimately machines

will be conscious because hey once he

can do everything we can do then of

course they're gonna be conscious and I

think this couldn't be more wrong well

then Howard yes

how would they how would you ever know

the machine was conscious well okay so

so okay so let's take this apart it is

true if you if you think about

intelligence intelligence ultimately

it's about behavior it's about function

and there's no question at least in

principle machines can do anything we

can doing including being creative and

speaking and talking and all those other

things where selves we are gonna be able

to write novels pretty soon at some

point yeah you can go to open may I and

you can use that GPT algorithm and it

generates pretty cool you know text pose

but that's there but but those are all

about functions yeah so there so

intelligence ultimately it's about

behaviors about function consciousness

is not about function it's not a state

it doesn't have to it doesn't relate to

function it's it's ultimately being it's

ultimately a state of being and yes in

evolved creatures function and

intelligence and continents usually

evolve together but you can certainly

artificially separate them and so you

can build a machine like deep mind or

you know Alexa you know 20 point

oh and fifty years from now that's

incredible smart smarter than you and I

but it won't feel like anything to be

this machine which is very different

from consciousness here which is

ultimately about being yeah my favorite

example of this is meeting David

Ferrucci the designer of Watson the

computer program that won jeopardy yes

so I asked him miss Watson know that he

won jeopardy I mean was he just totally

excited that he beat Ken Jennings and

and Brad Rutter and and and he's the

world champ no of course he doesn't even

know that he's playing jeopardy doesn't

even know what jeopardy is is it's just

an algorithm grinding through Wikipedia

pages to find the you know best

inference to the likeliest answer and so

forth yeah but most people Michael don't

have that into it most people say well I

mean dantana would suddenly say well not

what's maybe but if you make Watson you

know sophisticated enough it does all

these computation yeah of course it's

conscious because what else has

consciousness and carrying out a bunch

of functions so that's what what I mean

by but by my subtitle of my book

consciousness can't be computed it's not

just a simple computation so even if you

made a supercomputer simulation of

assumed being including

of its nuance that's just a computer

program that doesn't mean it's conscious

just like a weather simulation doesn't

make it wet right if you simulate a

rainstorm it's not wet inside the deer

hunt yeah yeah of course all the

different things but we are machines

I mean we're made of molecules atoms and

molecules that's a machine that's

correct so in principle you're entirely

correct so my brain as I say it's a

piece of furniture like any other

furniture okay it is - it is by far the

most complex piece of active matter in

the known universe

and so ultimately that if I want to get

a conscious if I want to build a

conscious machine I have to build it in

the image of man so you do what's called

neuromorphic engineering you build an

IBM has a project like that you're

actually trying to build neural hardware

neurons that have this massive overlap

in the input in the output that don't

talk to us - three or four transistors

but talk to 10,000 transistors yes so in

principle you can get a machine that has

human level consciousness but not

digital programmable machines right now

because their architecture at the level

of the metal of the actual wires at the

actual gates is vastly simpler than our

plane yeah but if we a so we just apply

a Moore's law out front on another

century or two and eventually we get

human level complexity it's still kill

no no so so yes you'll get human level

intelligence I'm not disputing that but

ultimately look conscience ultimately

it's a physical thing it has to do with

the complexity of the of the ultimate

Hardware not with a behavior so you have

to ask if you actually look at the CPU

you look at its wiring you have one

transistor gate that's typically hooked

up to three or four other gate or other

transistors whose very little overlap my

brain is radical different my brain has

one neuron that's connected with 50

thousand other neurons in the

neighboring you're may share 40,000 of

those inputs and outputs enabling one

may share 39,000 it's a it's a radical

different architecture this architecture

all evolved architecture really gives

rise to a high level of internal of

offer of intrinsic causal powers which

the theory is what consciousness is

which is very difficult it different

from simulating it in a digital program

on a vastly simpler machine no matter

how big this machine is so then again if

we're if we're a machine then how is it

that it happened with us but it can't

happen in a computer it cannot it could

happen in a computer if you build it in

the right way I said because the way we

build our machines is not to give rise

to consciousness and it is to do simple

things over and over and over and over

again right if you put in your tax

return or doing all these other things

that's what machines excel at and

they'll get better at it and ultimately

they may be smarter than us but that's

very different from actually having an

experience

look there's a great metaphor or great

analogy so I have a friend she's an

astrophysicist she writes down the

equation of general relativity to

simulate the black hole at the center of

the galaxy okay you know that there's a

there's a black hole at the center of

our galaxy it's roughly a million solar

masses but funny

she is not concerned that she's gonna be

sucked into the black hole when she

writes out the equation now why is that

it's a perfectly good it's a best

simulation invincible off of the power

of gravity yet where's the difference

why doesn't she get sucked into it

because it doesn't have the caller power

of gravity just because you simulate the

equations of general relativity does not

mean that you get the cause of power

that goes hand-in-hand with spending

space-time you know it's that mass does

same thing with constants just because

you simulate some of the behavior so she

was conscious does not mean you get the

same causal power that consciousness

Houston I got you okay so you're a Star

Trek fan data could never be a person in

in the sentient way that we are well

know I don't know what is hot ways in ex

machina right you know it's suggested

there's some sort of neuromorphic brain

you know it's never really explained

yeah yeah if it's if it's if it's

similar to the architecture of our brain

yes it could be conscious could even be

more conscious than I am okay so it has

to do with the purpose of the design

what are you doing able to do not the

purpose it has to do with the actual

and the actual you have to look inside

the box yeah

actually look at the hardware you know

there's stuff that actually does these

transformation and you have to ask how

complex is that using this specific

measure called Phi you can actually

compute for any particular piece of for

any physical system you can actually

compute how much fired hasn't principal

it's it's totally computable it's not

some very very mysterious stuff although

maybe this cause of power it's the only

thing that exists yeah so tell us what

fire is again so so much of thi your ph

are the Greek letter it's it's it's a

measure of officer it's a single number

between zero and and any positive number

if it's zero the system doesn't exist

for job is not conscious has no powerful

power pond itself the larger this number

is the theory said it's really a

quantity of consciousness if you want it

doesn't describe the qualia it doesn't

describe whether it's a smell or you

know the feeling of life itself or the

seeing red and so for that you need

different measures but fine self just

characterizes the the irreducibility of

the system how much the system exists

for itself ultimately it's sort of the

quantity of consciousness of that

particular system yeah so in my my last

book Kevin's on earth I have a chapter

devoted to the the people trying to

upload the mind the cingulate Aryans and

all that so I met this you know this

group that that are trying to not copy

the connectome in a in a scanning kind

of way they they want to actually they

sacrifice like a sheep brain froze it

and then and then sliced it up and then

scanned you know scanning electron

microscope of each of these slices with

the the idea at some point you'd have a

digital file that represents every sit

this is a group in Cambridge right yeah

yeah well yeah there's a couple groups

there there was one that was doing this

at a at a at a lab in Fontana California

21st century medicine that their main

job is is organ preservation organ

transplants and so on but then they also

have this little subdivision I'm not

sure they're still doing this but where

they would freeze freeze a brain

you know sacrifice the animals and then

infuse it with a president preservation

you know antifreeze so that water

freezing doesn't shatter the neurons and

then unfreeze it and slice it up and

then you can see that the synaptic

connections are still viable so this was

for them a proof of concept that you

could be if you could do it properly

with cryonics although they still have a

ways to go on this in principle the

memory self so they're defining the self

as your memories and I have a problem

with that because I think we're more

than our memories we're also our point

of view self through the eyes cell from

one moment to the next

and copying the connectome and then

turning it on somewhere else or putting

it in a digital file into the cloud

that's not going to be you it's not your

point of view looking through your eyes

self it's not your consciousness Michael

that's right it's not your consciousness

so leap yes leaving aside all

technological problems you'll be

actually doing this we have a project

here at the Allens dude funded by the

Aiyappa where for the first time we cut

up at electron microscopic level with

3.5 nanometer resolution a complete

cubic millimeter off a bra of a mouse

brain you know it's a it's a few

petabytes leaving aside all practical

methodological technological

consideration the theory very clearly

says if use run the simulation on a

digital cloud it's all fake

consciousness it won't feel like

anything it's digital rapture for nerds

and your your app into nothingness

yes so it's not you know it's nothing

it's nothing it's not even a thing it's

not even its self conscious correct it

wouldn't be a copy of you thinking I'm

the real Christoph Kok and that other

guy down there is just a copy correct

but you know I'm sure people will do it

because you know we're desperate to

cheat death in any which way and so you

know the finalists build this gigantic

pyramid so of course a modern version of

it you're gonna do the connectome yes

did you ever see that I usually a bigger

part there was a documentary film made

on Ray Kurzweil called the

is it the aterna no not the immortal

list it was the single yeah no not the

singularity is near this was on his

personal life and in any case it sort of

follows him around of course he has a

whole basement in his home devoted to

his father his father died at age 51 you

know and so he's keeping as much

information as he can that will be part

of the reconstructed essentially

resurrection really that's the right

word resurrection of his father but of

course the father isn't there it's just

you're interacting with a copy of that's

closer than a memory photo book say a

photo album people want to reach

immortality any which way and this is

the modern way of doing it's not that

different from the photo you know having

his slaves and and you know all of his

entire household killed and you know

putting his pyramid yeah

karakurt's wasn't in the basement it's a

little bit less glamorous than the

pyramids of the he of the flowers I

can't remember I think you were at that

conference the singularity summit was

meeting in New York City yes this was

right at the time of the Occupy Wall

Street I forget what year that was

and maybe 2009 or so in Ray Kurzweil he

gave his I have a dream speech you know

and I mean kind of reminded me of being

in church again like you know we are the

generation that are were the chosen ones

we're the were the ones that are gonna

make it rapture the rapture for nerds

yeah and then after he spoke somebody

else had a bunch of these little BOTS

that were supposed to be all coordinated

is like a hive mind on the stage and

they were gonna run around and do

something but they couldn't get it to

work because somebody had something on

in the room that was interfering with

the you know with the the system that

they were using and I thought well we're

not even close to having these little

robots working much some of the working

issues with heaven and I did there's

always going to be some issues with bad

words in heaven yeah I mean so I mean

this is just opens up just

the ideas I mean if you live forever I

mean what would that even mean in some

other the assumption everybody makes I

think is that your consciousness

continues even if your physical body

dies either in a soul or a copy of your

connectome in on some other platform

that continues we still picture

ourselves waking up in this other place

after the death of our body so it's it's

sort of a natural born dualism as Paul

bloom calls it you know we just have

this brain wired up to think that you

know there's something other than the

material stuff there is a mind as well

as a brain there's a soul as well as a

body and so on and it's almost

impossible to not imagine that in the

sense that if I say imagine being dead

you can't do it because to imagine

something you have to be alive so in a

way all this has to do with the fact

that we just can't imagine something

just epistemologically I don't know what

it means to not be alive well it's

interesting because people never think

about where they were before they were

born right but you know obsessed about

what happens after this but where were

they before they were born this is the

only boat that were they already in

heaven before and then they just got

downloaded onto this particular planet

that's right oh their life and then they

gonna go up again and of course it's

terrifying right - most of us you know

it is terrifying

you know the idea of seas of not

existing anymore is it you know I was

writing one of my chapters I dealt with

this terror management theory it's

called yeah based on the idea that

humans are the only species that know

we're gonna die and therefore we're

terrified by this and this motivates us

to be creative and build pyramids and

write music and and win Nobel prizes or

whatever

I think there's better explanations for

why people do that that have to do with

sexual selection theory and trying to

impress potential mates but that's a

different discussion but the but you

know again this idea that people are

terrorized by death I don't think so I

think most of the time we're not walking

around thinking oh my god I'm gonna die

maybe if you're 90 or something or you

have a a terminal illness but you know

most of the time I doubt that you think

about it well that's probably because

we're very good suppression techniques

right so it's an interesting question

when we

in evolution did we first have this

inside we were gonna die we were one day

not gonna exist anymore is it is that

neon assaulted me enough L know this

right is that the origin of religion why

did people when they first realized

hominoids that they were gonna die that

one is that one religion I think some

people are truly terrified I know and

not some of my acquaintances who you

know who are now constantly talking

about death obsessively really yeah most

of us I agree I'm not terrified by it if

I think deeply about it it's scary it's

no question it's scary right if you

really think about not being anymore

forever never ever it's certainly scary

but most of the time I don't think about

it yeah I don't believe in this terror

management theory yeah but people in

general particularly this culture where

we've removed death you know we don't

talk about death there's private dese's

takes place in the confine of a hospital

it's not part of our public life anymore

most people are suddenly uncomfortable

talking about it yeah think about it

yeah or be reminded of their own

mortality it's not polite

yeah right yeah no well so I've looked

into that in in my chapter on you know

what what who's the first to realize

this of course we don't know they these

things don't fossilize but there are

those grave sites Neanderthals and early

Homo sapiens with flowers and the in the

bodies are arranged and like a prenatal

condition where they're sort of you know

buried like almost like they're in the

womb again with some flowers and grave

Goods and so on the assumption is that

they're thinking well this guy's going

to continue on in some other state and

we're sending them off with some Goods

no grave Goods that kind of thing of

course we don't know I mean it's it's

like these you know werner herzog made

that beautiful film about cave art the

the dog what is it called they that cave

of these dolphin yeah now what was that

we looked that up I mean it's it's a

phenomenal film but you know you

basically we're looking at these images

that are 30 40 thousand years old and

thinking well if I did that what would I

be thinking you know that's just so

projection that's yeah but you know in

terms of biology we did I mean yes

there's still a evolution going on today

but our basic cognitive operate

both already fully developed 30,000

years ago Cave of Forgotten Dreams yes

yeah that's yeah they said yeah that's

right you can do that accent I can't do

that accent let's talk about altering

your states of mind this is becoming

more acceptable now doing it you know

like micro dosing hallucinogens you did

the you you write about doing the

floatation tank with your daughter in

Singapore I guess you did this yeah I

did this I know back in the 70s when it

was popular then I haven't done it

recently but yeah you strip down you're

in that it's almost like the salt and

Sultan of the Dead Sea and you float and

and and so I think I was in maybe an

hour and a half two hours and after at

some point I remembered not not really

hallucinating but I can almost see like

stuff was my brain was generating

stimulation as if it were coming from

the outside and what did you experience

well I have cause had the opposite

experience I had this what Buddhists

call a pure experience right so the

question is can you expect can you be

conscious without being conscious of

anything

all right so usually we're always

conscious of something I'd be conscious

of an adding headache or the the worry

that you know you have to deal with a

tax return or you know their sound a few

way or pain or whatever so the question

is can you be in the limit conscious or

not asleep but without being conscious

of anything and so my experience was in

the isolation tank yes you strip you

float in there so very quickly you lose

your bodily feeling where the

orientation because you're suspended is

totally dark of course you don't see

it's soundproof you don't hear then

early on you can still hear your you can

actually hear your heartbeat right and

at some point you adapt you adapt to

that in my case and you know I try to

quiet my mind you know of course all the

imagery of the residues of what I was

thinking in my you know that sort of

comes up you try to avoid thinking about

that and at some point at least I felt I

come to this perfect place where I'm

like suspended in nowhere and not

conscious of anything but I I but I'm

still somehow there it's it's a limit

state clearly because what would it mean

to be conscious without being conscious

of anything and it's very it's I found

it very very attacted and of course in

the Tibetan Buddhist tradition it's one

of the things that they feel they want

to attain the in fact aining this in a

permanent state is sort of one form of

off as close you can get to to being

enlightened yeah it takes them 30 years

to get there you did it in an afternoon

maybe that's a quick way to do it

it's obviously a quick and it takes this

artificial aid and and you know I did it

the second time and it didn't work the

second time the second time I was

constantly thinking about being in the

state I was too obsessed with it oh I

have to get into the state it's like

trying to fall asleep by making yourself

fall asleep by thinking about following

this exactly exactly exactly have you

ever have you ever done any

hallucinogens or anything like that yep

psilocybin and it's it's a wonderful

experience

right it's an absolutely wonderful

experience these all these colors and

and they're sort of more real than real

and and you know it's feeling some of

this ego loss so it's a little bit like

that and of course that's DMT right the

claim with DMT is and you know the

spirit molecule dimethyl ethylene that

you can also go into this black hole

state where you're conscious but you

lose consciousness of space of time

you totally lose consciousness of ego

you know this ego dissolution it's very

powerful but only short acting so that

may be another way to obtain this the

state of being conscious without being

conscious of anything and again the

theory says so the brain that's minimal

active will be conscious but without

being conscious of any one specific

content so it's not about function here

I was you know in a in a tank I was

fully conscious yet I was my brain

wasn't computing anything it wasn't

planning it wasn't speaking it wasn't

imagining it was just in a state of

being is that like the global work space

theory hurry no no it's very different

to a global work space so that's the

other competing theory was integrated

that competes was integrated information

theory in the man in the market space of

ideas say

that I'm conscious of a specific thing

like now I'm conscious of the this

question you just asked me so I have to

keep that active and I put that onto

this blackboard this is the metaphor

they use a black box architecture it's

going to be put in by them workspace and

then it's broadcast to the rest of the

brain so now it's all about answering

this question and then it's podcast am I

talking to my speaking module to my

planning module to my working memory

module and in the act of broadcasting

this is what gives rise to consciousness

sort of the act of broadcasting all this

information different kinds of my brain

that's what the theory says ultimately

it's it's about this function of

broadcasting which is very different

from from integrated information theory

although some of its newer prediction

may be similar but what I'm asking is is

is taking a trip like that does that

give us some information that supports

one theory of consciousness versus

another or is it yeah it speaks towards

more I integrated information theory

because global work space you have to

have a Content so per definition if

there isn't any content to broadcast you

wouldn't be conscious yeah would you do

it again why am i you would oh why don't

you do it every day or every week or

whatever yeah I know no it's a very good

question it's a very good question life

is busy and you know you have to if

you're too stressed it doesn't work mmm

it's an excellent question Michael why

do this every day I should actually well

so I mean my listeners is podcasters

gonna get sick of me telling the story

but I you know after being on Joe

Rogan's podcast with Graham Hancock this

is the alternative archaeology guy that

writes about places like gobekli tepe

which is something like a spiritual

center that's about eleven twelve

thousand years old much older than any

other monumental architecture so it's a

bit of an archeological anomaly I have

to admit but he as a separate part of

his his career he does a lot of

ayahuasca and you know DMT this thing

and he believes as do apparently most

people who do this do the ayahuasca a

trip and they've invited me to come try

this I've never done anything like this

that that they think it represents a

place that you actually go to that

you know opening the doors of perception

you know the arguments did you feel like

this is a different reality that exists

in some way or this is just my brain on

loose imagens well look I did

experientially I mean experientially

it's as real as anything else right but

I know because you know we study this in

in people we can study then animals it

has lawful relationship to the brain I

can partially induce it you know using

other physical methods so I know it's

something that the brain generates it

does feel real it's no question it

wasn't like oh this is all fake you know

like if you have you know if you take

follow-up psilocybin or LSD that it

doesn't feel oh this is fake no it's

real because it's the only real to your

app it's reality your brain generates

but then you learn it's very lawful it

as a lawful a relationship with doses

you know with particular parts of the

brain that are active the same parts of

the brain are gonna be active in you and

me etc so you know it has all these

lawful relationship and so we realize

it's kind of your brain your brain

generates in it's not that you're

physically traveling is just like I

don't believe when I dream I'm back you

know in honor on a climb that I'm

actually transported to your mouth no

I'm still lying in my bed my brain is

generating this dream mm-hmm but why

would the molecular locking key

mechanism even exist in the first place

why is it there oh because you know why

why is mine why do most of us appreciate

music

right it's a evolutionary span though

why do some people are why are some of

us very good at math did you know what

is really necessary for kommandantur

Homo sapiens to survive over and to out

do you know nyan Asano's it's an

evolutionary span all that happens to be

that happens to be useful for certain

things or maybe not even useful

pleasurable like alcohol you know you I

appreciate a Pinot Noir do I believe

that there's a specific evolutionary

reason for me to up to like Pinot Noir

no it's it's a side effect it's

something we discovered by experimenting

with lots of different drugs and we find

there's this one that gives that gives

rise to pleasurable social interaction

when you drink it none of the near-death

experience people argue that these

naturally occurring chemicals in the

brain are there for when you face death

when you are there at the at the edge of

helping you transition from here to

there wherever there is doesn't matter

if there's nothing there after death but

that it reduces anxiety about dying it

quells the uncertainty of it because

it's a real warm good experience that

people have this is one argument anyway

so that it's an adit it's an adaptation

estar Gyun yeah and I think that's - I

mean there well I shouldn't use

miraculous in this context but the

wonderful thing about near-death

experiences is that you can also have

them if you're not religiously inclined

and yes it it massively reduces the

anxiety that people have you know facing

death or near death and we don't really

understand the mechanisms you know why

that should be if we could somehow

understand them and then distill I'm

into some therapeutics and we can give

that to people you know when they get

into those states and when they are very

often agitated or very very afraid or

anxious yeah so it's a very interesting

phenomena that the dying brain

particularly the anoxic brain the brain

when it's cut off an oxygen some subset

a small subset of people you know 10

percent 12 percent can experience yeah

yeah the experience is real the question

is what does it represent something out

there in the world are inside the head I

think the experience yeah yeah you can't

argue with the experience experiences

early it's as real as any other

experience but again it seems to have a

lawful relationship to the underlying

brain matter yeah so what do you what is

your team working on in the future well

so with respect to consciousness you

know we're trying to a further push this

project where what are the neural

correlates of consciousness you know in

which part of the brain in both brains

of animals and in in brains of patients

and people and then we know this really

interesting collaboration called an

adversarial collaboration where we get

together with these people who have a

very different attitude to consciousness

the people

the of the global workspace where we

agree upon a common set of experiments

and where we agree ahead of time and get

this man is Capri submitted we're gonna

do this experiment we're gonna exactly

specify ahead of time what this

experiment is when it comes out in this

way it'll support your theory if it

comes out in that way it'll support our

theory it's called an adversarial

collaboration so it's really a new thing

in the sociology of science and we'll

see how that works out Congress should

do this well I mean it really in a way

we want to solve the homelessness

problem or the immigration problem or

whatever yes it would be great it would

be great if that were to happen same

thing with science we're all trying to

understand consciousness we're very

different takes to it so let's agree on

some experiment that could actually help

distinguish you know my theory from your

theory yeah I've I have a little excerpt

here from Steve Pinker's last book

enlightenment now about his opinion on

the hard problem of consciousness and

then I just get your reaction to this in

the end I still think that the hard

problem is a meaningful conceptual

problem but agree with tenet that it is

not a meaningful scientific problem no

one will ever get a grant to study

whether you are a zombie or whether the

same Captain Kirk walks on the deck of

the enterprise and the surface of Zack

Dorn and I agree with several other

philosophers and it may be futile to

hope for a solution at all precisely

because it is a conceptual problem or

more accurately a problem with our

concepts and he discusses a little bit

of Nagle's what it's like to be a bad

and and Colin begins running away with

that he says our best science tells us

that consciousness consists of a global

work space well you won't like this part

representing our current goals memories

and surround but even if that's wrong he

says the last dollop in the theory that

it subjectively feels like something to

be such a circuitry may have to be

stipulated as a fact about reality where

explanation stops in in other words we

may we've hit an epistemological wall

you know our friend Deepak Chopra he

that's what he says you know

consciousness is the ground of all being

it is the you know ontological primitive

there is no explanation for it because

it just is ok so that may be right

there's no law in the universe that says

everything will have a rational you know

reducible empirical testable explanation

just like quantum mechanics why does

quantum mechanics hold right we don't

know and people have thought about this

physicists why are we living in the

universe economy can you seem to be the

best explanation some people say it's

just a boat fact we just happen to live

in one end of discussion

yeah however we do have to be careful

you know our imagination is very

powerful what people said before can

never be solved you know then some neon

ideas later can be solved and of course

there is this now you may have seen

there several books that have now come

out about what's called pan psychism hmm

all right so pan site-- is his ancient

belief pan every website he sold that

everything is in sold that may be

shredding out they give the guy after

which the slitting equation of quantum

mechanics is named you know he thought

about this that maybe at the hood of

physics we have to include consciousness

so this matter and space and time and

energy but there may also be

consciousness this is what what ITR that

what the integrated information

ultimately says and so maybe we have to

include consciousness in our very

formulation of physicalism so maybe on a

Death Note and physicalism you know you

know the modern version of sort of

materialism has to be cast larger and

has to include subjectivity you know so

that I think that's a very promising

development so I'm very skeptical of

pessimists to tell me oh you shall never

know maybe yes maybe no I know for sure

if we don't I will not know it's my best

argument for cryonically being

chronically frozen and coming back five

hundred years from now and it's like Oh

consciousness we figured that out 200

years ago here's the explanation Oh

obviously

maybe maybe hopefully I just had that

Donald Hoffman on my podcast that I

think we released it last week yeah so

he's you know he has this interface

theory of perception you know that that

like your your laptop screen here with

the little trash can down in the corner

if you open up my macbook

Pro there's no trash can in there you

know these are just icons that represent

some process some algorithm that's

grinding along here and that's what he

says about you know the reality of you

know this cup is you know there's no cup

in my brain it's just a bunch of neurons

and this is just an icon that represents

something else

and so on but he's taken that pretty far

not quite the celibate ISM but but that

there is no possible way to know that

the true nature of reality yeah I mean

this is an old argument by Immanuel Kant

right if you ever read can't one of the

German idea list you know dusty talks

about dusting and Zee the thing itself

yeah and we have these categories of

space and time and causality we'll never

know what reality is really like it goes

back to our very beginning discussion

it's ultimately an inference process so

the most likely explanation is that

there is something physical called this

card you know how do I really know what

ultimately I don't know it's an

assumption I'm gonna go with that

assumption you know and it served as

well right it served us well making this

assumption allows us to manipulate the

universe to build you know nuclear

reactors and cars and and send rockets

into space so I think it's a reasonable

assumption would we really know what

it's ultimately like no we don't yeah

but the fact that we can send a

spacecraft to Mars and it actually gets

there and sends information back is a is

a pretty strong argument for there is a

reality yeah and we can know something

about it even if not everything about it

or perfectly represent it yes but yes so

you know it's an old idea yeah it is

cool I never know but I'm not really

sure what yeah I mean it's like this

problem I wrote an essay about why is

there something rather than nothing

Eve even trying to get our minds around

the idea of of nothing is not that

simple

I mean no thing it's a thing that's

there maybe we've hit rock bottom will

we ever be able to hand somewhere

there's anything either nothing I don't

know I I mean I love this quote from

Robert Kuhn he co-authored a book yeah

yeah yeah yeah you know you know

Lawrence cuz you've been

and always book about the mystery of

existence yes yes he wrote with John

Leslie yeah so he says you know and talk

about nothing that not just emptiness

not just blankness and not just

emptiness and blackness forever but not

even the existence of emptiness and not

even the meaning of blackness and no

forever I mean at some point you know

we've just hit rock bottom there's the

words just fall off the page and like I

have no idea what you're talking about

yes I think this is very likely one of

those cases you know it's I don't know

how much you've read about the mysterion

mysteries you know the the it could be

our brains we're just not big enough to

have the concepts to answer those kinds

of quitting enough to think of the

concept and the problem but not answer

it at least our conversion yes yeah or

you know Vic and Stein used the words we

use we don't have the right words to

have the concepts to even think properly

about it or not yeah things like that

yeah so I'm just talking about a little

bit easier things like called yes that's

right you have the easy problem the easy

problem of consciousness well the neural

correlates I guess sir this suppose it

easy but they're not that easy all right

so the feeling of life itself this was a

sequel to your you know romantic

reductionist what are you what what's

next on the on the Christoph agenda for

big big big questions I don't know I

mean you know I'm running this large

Institute with Serena plus scientists

we're very productive so on you know I

might take a break from from from

writing although you know right now I'm

several sonic American articles coming

out on brain death his brain Dias

irreversible there's some really

interesting you know science going on

there so stay tuned they're always

interesting things happening in the

world of neuroscience and unlike

cardiology let's say you are your brain

and you know most you know they're all

these fascinating ideas tied up with

your brain and your identity and where

do you go at night and where do you go

after after death and what can we do to

preserve the brain etc what's the future

of the Institute now that

Allen's gun so we are not secure you

know this was you know we we talked

about with Paul about this many times

they say estate his sister Jodie Allen

is in charge of the estate and and we

are now planning for 25 years

mmm we wickedly are moving on at 25

years trajectory there was there was

discussed at great length was with with

Paul Allen so we are here to stay the

earth and you're there for the duration

your yeah I mean you're not going back

to Caltech or being a professor or

anything like that I don't know I'm not

going back to Caltech well my exactly so

my presidency you know was for ten years

so that's that's gonna I'm gonna step

down from that in two years or something

like that and to return to a more active

role as scientists I fundamentally I'm a

scientist I love science and so I may go

back but remain here at the Institute

and just do signs and writing full-time

again because you're mostly doing

administrative work yeah I mean they're

three no people you have to make

decision what the fun but not too fun

you have no hundred employee I have six

employees and that's five too many I

don't know how you 300 yes it's

sometimes it's challenging and are you

still mountain climbing no I know here

because it's much more conducive so I

don't have a car i I just by Gabby being

a ho you know cool boring it's also much

more copia to the metaphor being a team

knows you know in a boat was eight and a

Coxon you're only as good as your

weakest link and you know no matter

whether people are big or small or of

you know my or you know have a big frame

or a small frame you know you have to

synchronize you have to be a team it's

not the star performers really the team

and it's set as a whole that counts and

so it is was our Institute here you're

like a single neuron with all these

other neurons that are somehow coming

together is a single brain yes so we a

team so what makes very different from

folks in university we try to only take

on one or two other things as a team and

to discuss so that has some unique

challenges as any other large you know

astronomy your elementary particle

physics project yeah yes

yeah and in do you guys work at all on

brain diseases like Alzheimer's and

senility and dementia

we will we're starting to think about

that so most of what we do is still

basic signs by trying to get the basic

layout on particular of the human brain

but assets become very successful we're

now moving into developing viral

technology for the human brain so in

other words once we know there's some

specific defect of a specific gene

that's missing in a particular type of

cell can we then devise technologies

like viral technologies to deliver that

missing gene to those right neurons in

order to cure people yeah so we're

starting to think about disease

applications yeah you guys got to solve

this problem before you and I hit the

wall because you know these people like

when I was writing my book you know it's

like Shermer don't you want to live to

be 500 I'm like look just get me to 90

without prostate cancer and a hundred

without Alzheimer's and dementia and now

these are hard problems and you know we

ask them through our mutual friend

Deepak I met you know Rudy tanzy from

Harvard he's you know like the head the

big Alzheimer's guy and it's like when

you really bore down on it you know

we're kind of clueless about the causes

and you know the plaques and tangles

yeah but what causes the plaques and

tangles no one knows is you know

genetics environment you know he has you

know general stuff you should eat well

and exercise and sleep yes yes yes I

know I'm doing that but what else and

you know show I do Sudoku puzzles you

know there's not much I think you'll

find I think you'll be fine just just be

very active yeah I mean but the brain is

by far the most complex system it's

vastly more complicated than any system

physicists have tackled with and it

might well be a while before you know we

fully understand these diseases and can

cure them yeah we just have to keep

trying oh it's Michael yeah I know it's

a pressing on your time now the book is

the feeling of life itself we will

release this on the day it comes out in

September whatever that date is and

congratulations on another good book

thank you much that was a great

conversation you are fantastic question

you always leave deep background I don't

know I'm kind of a dummy I just ask good

questions because I don't really know

I'm just curious you know along

okay I will see you next time I'm in

Seattle or next time you're right

yep all right