

Program Information:

Title: Geoffrey B. West: Why Cities Keep on Growing

Location: San Francisco, CA, Cowell Theatre

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Good evening, I'm Alexander Rose, the director here at Long Now. Tonight's long shot came to us the first person who sent it to me was Austin in our office but several more people sent it to me, it's by Josh Owens, and I think Stuart even sent it. but it's a once again it's a cop out to doing a film about long term thinking in a short form, in that it's a time lapse. it it all one it it it it it

it it it it it it it it it it it it it it it it

it it it it it it you all these all the fun few keywords and phrases

all for it was for fourteen years there for me for all feat was looking all

over China this week it was for the most fun thing she can act update this

and the fuse complex adaptive system and just the level of discourse is stupid or that

of course for Mac earthy the cat chasing the new building but the medium something difficult

I put him on the border on this thing so that the quality the conversation but

every now and then the whole often change science on the years to go to West

and James Brown macro ecologist and some others all explained the history and biology called clever

law having to do with stealing an organist it bigger to get more efficient the store

and to the lake when the mechanisms that even the mathematics pretty good purposes whenever you

guys miss round physics biology and physics test um not content stay with Aunt Lora Leigh

why don't you even stranger organist and said she could see it in this bill be

whether lasting by Healy something full of originality in full pattern all complex than that this

city life going on but the weather beating against it Healy complex adaptive it also seems

to have finesse and kept walking it worked the the the the the good thank you

to it and thank you everybody to cover the bottom of the bike with two both

belts that is to do a flight that fought the cold but good to the La

Belle the bishop had so the spiteful actually I really owe it to list your typical

but because the day it's just that plastic cut above the boring academic Michael which the

cause of the ThinkPad of provocation speculation that supplied the spiteful but this is in fact

what ought to be talking about and up it's really part of something that stuff is

much bigger than office to these questions or visit the offices to these questions I'm really

up talking about at some level the whole question of sustainability and the question about what

all of this the new form of social economic life of life that human beings the

of the fold of the last ten thousand years was a bit forward to this form

of this is actually a sustainable and that's really an underlying theme of everything under the

talk about my and in the suit also about his cut of an even bigger questions

some ways because the taunts the question of all the balls of life that can be

quantified put into a predicted frameworks Rican culture questions like one of the top of the

one implied want to buy him the title and of the whole question of sustainability of

socio economic life and our calls them lights and the big big clothes the citizens so

and so forth his record on topics that is because stitches had been installed the Crucible

of civilization um the place where we've come together and they all they represent what is

really the greatest impact that human beings have had on the spot on an audit to now faith is and what has been happening the last two hundred years the last two hundred is of three of them exponential rate freeze to urbanization and over the station has in many ways trip to Sonoma to problems that we filled up the place and the beginning of twentieth century everything from global warming questions in Parliament the questions of health promotion

disease financial markets risk a column is eccentric spectral all of these problems in courts are generated by cities because that's what everybody lives um just to give you some of those when the country was formed when the country was formed two hundred years ago less than a few suspect that didn't fit now more than eight to two percent with fifty two or three years ago the ball crossed the Hoff with Maw Maw Maw office now open our eyes China is building up baby three hundred years says is in the next twenty to twenty five he is and when right but on the slide to this remarkable fact that if your average over the next forty to fifty years every week every week Asian people of the oven on some fun and this is going to have a profound effect on all of us the meadow where we live as we stopped at the pressure of resources managing its going to accommodate this is the shoes so urbanization is that these are an extraordinary phenomenon which has led us to be big problems that we have to deal with but also to suck up the urbanization is the solution because the other remarkable fantastic facts about stitches is the active vacuum cleaners bad minutes tops the brigade and creepy people that's where ideas of May that's where the wealth is created and that's where the solutions to these problems in the alternate all to be that because cities attract treat the people I suspect I don't know but I suspect that the percentage of two ERA the defense efforts this go without warning though in the business extort the migration to cities and or attractive in fact the film expresses it about bombs extort lead of that is the essence of this is so that's what we're going to talk so um before going trip I just want to mention the struggle read advantage of brown Murray you to collaborate this and this is the people most of these people double booked if I'd like to think beyond the great fortune to the Cubs it it right into that some of the ideas but what distinguished at the top three because longer be talking for the post of this talk about biology organisms and the work Mr referred to was gone to the top ten to browse for distinguished apologist for things to call it this far and this was the Easter post op and you know until it's the responses it's not like one people of all ones that have been in full hundred and sixty work and in particular like adventure we call them basic leverage one last week so um the ten billion people but don't inhabit this planet in twenty fifty in some form or another oh one to live in places like this the majority of them one of them places like this hitting things like this and participating in places at the moment like this coat of restaurants them so long having I've had some art folk art possible the rest of that stuff to begin a comment is that the continually increasing and everything's getting back to the will to be wonderful but that offers this Prof is this you know that crippled but you also have to crate entropy and it's a pretty is this sort of which means essentially that you have to have a moment like this this this this and the real question is is that what happens this goes to them apply in twenty fifty but what the doctor looked like London or cinema like this without challenge so I would say that um in order to address

these problems we desperately to be a serious science of stitches to complement the present more on quantitative thinking about science the stitches remain evidence before a much more quantitative hopefully back

because of all predicted by the theoretical framework what we can come to address these questions in a credible fashion this is very hot much meant to be to complement the additional about that and so it's just to repeat again what I said no to all but universal quantify bull principles the bungle on it the fabric of our lives so the two questions I'd lose myself in addressing this work of these two also has a cup that is just very large organisms that just bought a bunch of real grub apology or the stuff came from biology and that the question is is set for Cisco and elephant New Yorker great big whale Microsoft the beehive and if I asked him what was all very we often use going to the teacher did for use by much but also fun to talk about the College of the marketplace the DNA of the company the metabolism of the city and so all those shows with it to come back to force or is this there is substance to it and if so the question that is applied and sparkle to the store how come then that cities don't seem to buy its extraordinarily difficult to come with it and pass the faces of the billions in it on that of road on the spot it almost all of them was still with us we drop some bombs on cities in thirty years later the ride so it's very hard to come with it if there isn't a color copy of the billions of competence for the continued coming through on which the debate in the area although sort of by and we had a bean life I woke up this belt and is that there are a very few companies that the Balkan one to two hundred years old most of those for special to watch for is wondrous the question is that we develop a serious period so that we can the tub and predicts the provocative question what Google and Microsoft are going to go kbox the queso or is it possible so so will its been a bitch was then so here are just some of the cart respects of life but they're also characteristics of social organisms my book to read the complete you can see and feel so but all of them ofcourse short video with but four of them have the best the force of catalogs and social organizations and this is what I've already said that this will repeat it again as it does this coming to this it is the question all that any universal kind of balls Britain marriages the convicts were protected under there so it's this is this is something that simply by Michael recently which was adapted to this so you know you all stop the laws governing this kind of cartoon and as was so this is the question is this is what I want to do at the right way this is what we should be good in order to read about this that what the hell is going on it up it but the good good look all been there for seconds to get it Arkansas to put slightly differently his facts just another version of this now this which ever been the forest looks like some random collection of trees the reason that long since gone but because it actually cuts which broadly regularity and structure and you can see that far off doing a whole bunch of questions like how it resolved of a given song of health fund you have to walk retrieve a given size to about the tree of roughly the same thought averting crunches of a given slices each one of those trees have leaves that much energy is flowing for each brought how big is each canopy eccentric said to any question you can think off in a general way about that for this you can on some

and put in a bout with about the magical former enough and predicts everything about the generic structure that forest monitored the forest that any florist across the globe so visit their ethical framework which I will talk about briefly shortly the can just try and predict everything on the average will recall was crying about that forest and in the forest on the plan and one of the reasons for this is something destructive remarkable about life is crucial for its resilience and robustness and that is the problem of state of inductees be knitting the same phenomenon and the bad infested of extraordinary scales as the as the hip and shown in this quiet this is just OS this is OS battles going over a range of one hundred million in size from tiny true to form although by then the way old well which is bigger than this building and just to provide sure because the ready to get this post nobody forgets that this is the biggest animal has ever existed on this planet secondly back up there that he who walks up to his shoe on the scale of five the elephant that surprise you but what does surprise most people is that this is an elephant on the scale of a boy where was I would like to form a few words that is very very very big as the storm a thing about this is that these asked elbows one even though the doctor from London to emphasize that bomb moment but they look very different but the same physics and chemistry the same organization the same on functionality exists through all of these and it looks over the six forty range which it did take a photo because life itself actually stay olds in a systematic way from paying of the top left hand corner which is that the two engine the privilege and that's a cop two of the Baltic towards the purchase of the court ATP which edge or current events the people the buff alive it that people injured at that all but thousand of those that go engine is inside that makes the box which is like to ponder at the sub for thousand of those more to come to inside the top of itself and as a seven up bright and warm at all of those have to work and some extraordinary poker and fashion or those religions have to work together so that might to come to work together properly and was much to talk to have to work together so soft and function then you take ten to fourteen of those cells and put them together and make things like this and this at all of those have to work in the six forty integrity of its budget so I can be up there waving my hands passionately tell you how extraordinary all this is because it doesn't stop there it makes all this stuff including this so something extraordinary is happening that big top in the backpack or not isn't making this that's what we do it with just stale of goods and making it so how on the help of all that work of its several bit and use it on but give our kids and bought it bodes by natural selection somehow constraining be so good it doesn't all former pop in and bid thousand it off billions of years except that this piece which we don't know this is on and off it some pictures for a few hundred baby because it felt to do stupid stuffs well we talked about staying ability but he's one of the second is from stale with export growth it's still dark and um that's what his schedule the subs Iraq you have what it is is wait was his age for the sole rights and there it is it's what you reckon are to grow quickly in the new stall for him all the grease off because it's also our own visits it's all going at the same theory with the same principles that Dave the description about Florence the bigger the top when applied to the growth of a rapid fat loss that's the prediction of those points update it's the same theory

so we have pondered this generic universal thirty kms on many things biology and the thing that is interesting is that you fit the question is can we take back by these kinds of ideas which I will elaborate on a minute and apply them to top it is in the Commons now that go back to this this is great bus and it is fall been very very important this kind of a weak or sick boy who wrote stop growing very important for all residents and the residents of all the while Georgia law however this is very very very bad if your an economy or city or town the bird bad just stop row buried what we want to see is this this data is revenues rose is a huge box of software companies use a date don't look like this like this the hockey stick Jerry people going up and everybody and that those companies make billions billions of dollars a bottle the south of here all relative I don't look like this road very very this is crucial this paradigm under which we live in the paradigm the sled or refused to come and no cause to go back to life well but it's different than this that's the best looks and flooring and is the economy but Dr said that souls however that the oft cited to outgrow which is this visit talk so I threw the growth of competence which is this festival companies end up like this what we do and that's actually just wanted to get extremely important very very good the company's dime for every book we die so that we can in all the cute things calm you why does happen OS though thousands of billions of years you all this is much more fun stuff for important so that new things can fall into that well but they get into this a bit color quantitative three of them all the science and his remarkable brass section referred to and stir it into the auction this is why those lol and it is what it is is plopped it on the bus collects this is the best of all that great so that's how much energy you be the second to stay lot to chew on um it's York two thousand from Congress that's what it did plus that this is the wait that's a bunch of organisms and their dues and fluffy and this kind of curious way in order to get everybody on the spot he notices of the newer it goes up by fact is that a lime and a hundred Watts and to one hundred thousand kilograms so into the realm of saying Papa what you see is something truly remarkable men way despite the fact that all these organisms represent maybe the most diverse and complex the bobbin and the students nevertheless therefore mind up on this very simple lot plus that this was so out of this complexity this extort the complexity or on line this extort the box that is some exporters simplicity and this is remarkable because we believe is that each one of these organisms in bold in its own unique and departmental niche with its own journey evolutionary history for each each one of these organisms including off it's historically contingent Pentagon all kinds of phenomenon during intermission its machinery of history and so do what I've expected when you bought something like this these things be all over the place representing the individuality and the individual history geography environment it's the top of each one of these are but each one of these organisms each substance the beach all good it's all talk except that each one has its own evolution of history and yet magically that all lined up in some very fun for her simple way and this is for him to bed they stop the newest elite because the other interesting thing about this crap is that the slope of this the radiant that this is report so it only goes up in the way to talk to it but it got a free five four times moving along now that three courses has left them on the spot reports of Manila and that has

an interesting consequences because if it was if it did in the near what is happening that means if you double the size of an organism you would double to about a vintage it would be enough for two would've expected because double the number so so you would expect to double the amount of images a sport that what this says is used to be double that report is actually to be translated into second double the size of the double going in the seventy five percent so that says that the biggie you all the more efficient and want to have this sport is sport economist and deduct the show to nominate him as the purple paper showing that this is true across all applaud the same phenomenon in and out the cells is the same verifiable believe that this is the same why does all the way down to sew them back so the light to come to visit the short version of the solitude of this and how I might but the dumping of this extraordinary economy of scale the big did you all the best engine in the capital I'm not going to flip back for one second that this class to point out something but it is very important and that is the local stay with this look into the war but go across and see how much that I bought a new duty to second to stay alive it's not that it might pull shining at me that blocks the store you did it's one of you to the space doubts that it is only using a hundred Watts so we or extort mother did you have a drink the common this goes to the good but the Oberoi scale is fixed or baseball or indeed as the hundred blocks to stay alive two thousand through paddlers the day which may sound like a lot it's only a hundred Watts and on to show you at the end among them the repeat this if you're off a different question how much energy to really be the day to stay alive meeting where dough balls and let the students want to also show but the ball to right the good old ordinating a hundred watt so on to got the result of this climate of the new four hundred Watts still to the Hindi I made it seven thousand Watts the dip them in February one of its strong but the way this and with bro moving towards a billion people or for Obama to be that way this ok now this this time a state within the severed and read them from its normal bought anything you can think of any physiological bearable the bike history event scales in that system at the very simple way just a flash from a couple of them that does operate decreasing systematically this is life span but just in from the song because it runs out that decrease the rate of which are decreased all operate is exactly the same way increase lifespan for mammals to multiply the two together the increase and decrease cancels that was what my spent our operate it doesn't change from a small screw up the whale but my spend five hundred copies of a lifetime so that this extraordinary Fr awfully Foxman role that even though beautiful things the very last part much fun you fall slang trooper to co operate the one thousand pounds it will operate his uniform and would've been if it wins the day but they do it in such a way that they have the same number of topics from a lot of them all but got just a bit numb but you would understand like a big fall in production everybody in this room would be dead than a hundred years in fact looking more carefully a row today so this debate and has the points such as these extraordinary roles the plumbing apology as I say the most complex by the system and the universe how come it expresses somehow this storm is perfectly well he is the onslaught it's because all of life is sustained by and networks of one form or a bomb store for a minute with my best to

suppress the truth renal system in loans to dual system but there are of the books inside cells and spot market on the door and that works inside forests the tree is all this did not work but the trees themselves to go but foreman at work and what we will come to room to talk about citizen companies we of course form but it is the mathematical geometric organisational puppet is all that works but it did her best not to perform the pumpkin y or those that want and if he felt about them at that one can understand or have been spared was a much more but just flashed on pitches that were too familiar with that's the thing that this is part of the muffin and all the view that there is this do for work at the point is that you go back for prizes and all these balls did for the ride and throw them all understand the dynamics of the map so to propose he wanted to know the greatest length polls for its plot for right I'm drawn to the office the sector's system this bath before that tells you what to do I don't know what they'll choose the office this but I know it's right but that's what's that stalled in the basement so let's go back to work today and very briefly so it is the theory abroad in and you know all the bells and whistles been taken off and assessment of the prize for support to its allies the energy that goes distribute it through the netbook to maintain cells already that replaces month by Negroes years but that into mathematics that's what gave rise to that due to fall sick boy to cope with the rock is the spitting distance about magic slping an obvious this actually when his bike and stuff but this was some rides some facts about biology for him to the main top of the fall just to repeat the things I've said it is extremely beautiful sustaining laws they have an economy of scale you have seen what I wrote to stop growing and see you there I didn't emphasize the pace of life systematically gets lost the bid you all ought to be assured of apartments on the slow systematically the longer the plot that fuses across them start ups isn't if yours is a cross membranes slow the Bijou off but everything in a systematic way Bay is very simple will and claim is that this is because of the bath mat to mat the question is as the troops that well suited from the book but it's awful it's just me just emphasize something divide said Richard is a pic of them so did them both away all this in the ocean the draft with a long neck it wrong I'm standing on to be a mushroom rub off on and on actually those characteristics are obvious the purposes of the store but to be superficial because of the eighty five ninety percent but poured it over the size of about all I can fit everything about it but it's physiology and it's like history the ninety percent accuracy and a tad bit wrong them from the beginning Ocean off the top attempts we understand that the ferry call strange level we understand much of the way these systems work because all be that works that sustained them into question his coverage of this thing is that the company because on that works with baby even though their door and separate Cisco and sent the furry and Boise made look quite different are in fact all the facts don't doesn't want his son this is just a scaled down the door and Santa Fe this is the best pizza stone even though we are to from shore but there was a different history we're made of Adobe job to do with the thrift store and so on so the question is all that is in fact of stale bread cheeses that one city in United States and or stitches of Joss Stone presence of them according to the simple rules I say but on that book that is one of the network supplies that this is the most

important one this is read is really a symbol of the social network we all part of the social but when we told him to connect with one another wheat pasta in very good of those kinds of was in the family his jaw is sore my one maverick on this minute that this isn't the end is the most important that were that dominates that not the infrastructure that will come so does the fuzz dates are the result that was often the very question all cities in fact scale dozens of one another when reaction to that date so it is the third Bombay date that this happens to be well we're in Britain and Europe is on its European club races at gas stations as a Fox subside so this is the same plopped my surgery biology except for gas stations and size is that we use the population here it is it's that same going up by fact is apparent at what you see it's pretty good still Utah with the size of a city in Spain I will tell you how many gas stations this add what you say is its tales in all these countries and its tales in the civil away in each country in fact the slope of these great and the line she bought the site and the less than a minute this it's a short moment this is the video which would be doubled the size of the city double the number of destinations know there's an economist Dale not surprisingly the bigger the city election day less gas stations per capita in a systematic way across Europe but you know something it's the same graph in United States China Japan and so bloated that it's the same for any infrastructure sure that that is due to the Department of roads look like much lines watch the Lions anything you wanna think of to do with infrastructure do cloth it it looks just like this anywhere in the world with the same slope thing right so that this extort universality in infrastructure but much more important than the fact this is very much like biology very much like vomiting opps this is much more important we looked at the moment up that have no knowledge of biology these often on the characteristics that did not exist and the planets you'd likely so they did not exist on this planet until we started talking to one another and former committed to use it to ten thousand years ago and then ultimately form and cities but wages and some think that my friend Richard Florida who was super crazy people Jude law for trouble in that same way the same with the deposit in others quite a bit more staff that which you see a definite statement read and what to also say is that the slope of these lines big of them won no top miss them on record this soup a video from them so opposite of what this means it is in English but look at the top that just about to trade the pick of the city the hub the wages happen to and the ball fence expenses stupid free to people about all the capital but to also noticed that the slope of these lines is Percival up about one point one five this fifty cents bad you added that the deficit will this does out to be true for any socioeconomic on the socioeconomic meeting something that has the support on the Lord on his white wages to the cricket but it's true not just in an odd States it's exactly the same everywhere and the will it's the same or vote for Bob about that happens to be at its produce in United States the pride in Japan this is police facts the state's construction that and here we put together one plot what we did the sweet talk it with a GDP of the city that number pad is produced did a number of the crime and being calm and you can see the Oprah did much for the same line and or puppets roughness were roughly one point one five to fifty percent value added and this is true we could produce section

on state state that but it's the same in China and Japan but still to a Columbia across Europe all the stitches that all the countries where we've been in good faith the business out of explosion of a stomach that which is remarkable to ours citizens to pay it bold picky independently of citizen Europe that so somehow or eighteen people and farming community the mother of what kind of political process went on a walk at a planning was adopted in America what kind of community action was done on the average on the average there with these constraints of work that but made to suit the other conform to the statements of bats it over the size of the city in a given ovens this to be uniquely United States I can fit in a padded eighty five percent level of the principle of the patents of AIDS cases of many hospitals the length of road saw expect to so does the novel way of saying it that can double the size of the city today was just about sick to get a fifteen percent increase in the number of patents colleges creepy people police crime a flu Lucia which also dead at fifty percent savings in infrastructure it's amazing and it does no one go for the reporting comes this that because with very good and ignoring or Jude law and the sentences go because of all the wonderful things to you Joe hopefully except the culture you forget about AIDS cases and crying and so on which is also increased emphasis on performance actually occurred so this is a bit too busy this was an apology was written as my squirt post does that put it on because as this wonderful quote goes to which is broken which you can read it sucks when the following sorry about the summit of back ups in biology we had a similar kind of thing that is that it was always saw the video roast all economies of scale and pace of life Scott slope the big day you will all Pac ten or because of that it is Matt works that are giving rise to this it is underlying that works talk to them the network and it is simpler than that gives rise to Superman about it then the pace of life according to their boss increased systematically things that cost of the big draw and that's what this quote was because we know that it's the one that often lead to the toe box on to this post sure to whimsical a bait this is overdue to operate with Bob that it decreases see that the slope there is very close to one four the area but on the right with the query puppet walking speed boats the signs and you can see that it's just a massive tickets to go it also falls to go with it the fault will it be Lions roughly speaking to but that the other thing that happens in stitches the unintended consequence which is very good does that the carbon footprint that both the bigger the fifth because his faith that we ought to and with the same way back to Sunway what you see up in the corner of Bell is that the book which is less than one point eight seven whatever it is that it's mine three point nine his smoker but it's less than one which the pick of the city the best problem is being deposited the past plus it is all fantastic because everything it's more a new staple so it's been very very good for the Mets no doubt was all wonderful things the last hundred years been happening that is number one thought of it which constraints things so that in things that would look for the ball and that is associated with growth don't know last summer about what to say that of the stupidity of Batavia is the result and feet back on too well all production brokerage in a systematic way and the pace of life systematically has to get off the and the last thing on the Orthodox that is what the company is finishing up his talk about the road lots because this is the

color to know what happens to borrow to just repeat he saw the new behavior giving rise to fall spirit the beginning of it stopping for stable situation for resilience attrition and that is very bad the stitches economy is an additional wonderful piece of theory I think that if the Spirit gives rise to super good about it because of the netbook then the same fear it's an equation which fixed income and resources roughly speaking maintains what's the roads and things that kind of framework gives rise to this role in stopping this is more to stop it actually predict something like this which started off with an experimental which in fact it's what's been happening so that's very good expect it has a horrible patch it has the catch was given by this line that says as you get to go somewhere to approach the line which we call it school finite Friday but it's very important because you as you approach it eventually collapsed on the right side up you start date then collapse so avoid at all we avoided at all we avoid this he did this collapse is actually intimately related to the running out of resources whatever does that strike to the economy at some point approaching this buffet line with a quote on it now public about that because of it because you have to remember that this kind of growth the time for medical to Tokyo was up based on given kind of power the line that is determined by a BG innovation the dominant culture whatever but the pair were looking so this could be the beginning of the dumpster revolution so cold Stevens on this could be something that happened recently made a discovery of the candidates or it could be fun to get the ball recently the transition to a tee so that's what really happens is that your stop this huge growth can continue to would collapse it over it we just saw the everyday it's set to record additional conditions in its offices for her dad saw a major innovation all with this problem we go but then we read which the situation a threatening situation in Greece thought that their butts but that's what we've done so there is a common fear of them to rock it says if you want to have continuous growth and avoid collapse you have to have continuous cycles of innovation this is true without actually the whole economy it's true or any social stage a major breakthrough the Co to buy some major change in the it and social economic culture the future to talk with a major bridge it's accepted theory says yes you have to do this but also says that ought to go for it that a business is serving multiple times this is the third and long time in a systematic way meaning that the chair of the army innovate of a continuous but that repetition of a false false false the rules govern by this expanded network so the images that probably already on the treadmill on Fox actually we have to change treadmills false and fall so the real question is is that toll sustainable do that where's that somewhere out of this this time our dog stupid stuffs olds and two men do that in order to have wealth creation we rode and rode meets the van Gogh and this time it's a quick fashion and we need to have major innovations that to continue so I just thought what the problem this to show you that but I might do what they are to come back to the question second but I want to fuss Paul briefly about to go back on this to one of these drafts one this tart dough and is the scale in Iraq so this is what would be predicted we had a complete theory of social this is the line that represents the average idealized it a go of the city anywhere in the wall to stop in Japan that you'd notice top of the top last dog which happens to be Tokyo he's actually the performing them a bit dull which means it has the best crime rate than it should for City of

its size where's the soft up the next one as a vessel more pride than it should have for safety of its size therefore some then we can distinguish the individuality of assisted by how the city deviates from what it's the state of mind which represents the idealized he could even use the word possibly optimized it's the best trick for thought so that's what tried this yet and so this gives a way of ranking stitches according to prove it overall in the fall so we've done that for the top three hundred and sixty three sixes the United States and as a draft of the two thousand and three patents it's spelt wrongly but the city that mostly over before sought to explain this picture instead the straight line across the queue cycle not mine he would sit exactly on the scale in the packets you have the right number of times for dual sided and you can see fix as of the ball whereas Denver has a vehicle that's so maybe without your isn't very good and the shifting of fifty of the world both I'm on innovative succeeded by the dead two thousand for it with Abilene Texas the bar is a debate is that the scope of its northern and not surprisingly second city is way off the top of it with but Sutton said the center's a interests of a compound that I should of said city Sydney metropolitan area we don't use office that the school boundaries sentences go Rovers six emphasis to remain but the ball to fondle reasonably well defined metropolitan area of the book of short features mine this year so busy and it's the way of ranking them and one of the mud interesting things that came out of it and this is the reason I walked for about one two shows this is what what to do now is the time sequence of those deviation so that line of like mind if you want not like mine here would be exactly on the state in the ad you would if you stayed on that line the route from nineteen seventy to two thousand and five beyond you'll be stuck in a statement so each one of these points represents the tragic truth apart you deviate and the signature get from this is that if your shit the city in nineteen sixty eight your shit the city in two thousand and ten if you're an exciting city in two thousand and ninety six the hero filled with right thing of a performance that in two thousand meaning that there are a halt to change says the stitches are which brought her over and resentment and resistance from major attack so all the stuff that you do have to take it a stove optical systems time is not politicians time of the dove to his infinity it's the case forty fifty years and there are very few veterans that you can change quickly the top of the patents and production retarded or will boast of the new year the metrics abit of a bad or stupid effects of this website somewhere but find out more about this that this right up of hide and took the cup that is in a minute that I want to just be well a vehicle bit going back now to why it is we have is extremely scared what is it I've said that works but what is it that is universal how how the Japanese cities and citizen should way to the United States and Portugal all stale in the same way the same slope so what is it that is universal across the globe well the universality of sixes this up people people off that this is the most important thing to recognize is that it is not all those beautiful buildings on the roadways them Islam them right actually stitches on a physical manifestation all of social interaction the network that connects us the network beginning with family on report family but to no family here means comedy people could actually have a stronger alleged remark on with block which block well universe with this number is somewhere between ports you cannot five hundred best friends on Facebook but that

doesn't mean anything that really means something of the people that the peak there are about and that is to cover all of sorts from the stomach the thought that the public but if this is the crucial echo of the whole network structure of the family it says people patrol very strongly connected this is true incidentally even in them is fifteen each individual actually on the next about four or five were strong fifteen all of this front so at work that goes off to those families than interact jobs and soul so that the whole hierarchy of fostering all the way up the the fire on the social organization and it is that structure and it does structure of those networks of being reflected in the state league goals and why the origin of those because that kind of structure is the cottage it evokes destructive the structure of human interaction social interaction and social cluster now one of the clustering of the code is incompetent and so um odd one out for a bit of a bar companies from the shop and the first question is as we did that stupid we just discovered that kind of on the average New York is a skilled up sentences this is the stovetop one question is what our company sought comfort is still buzzing one it seemed to be quite different and I'm fun just to show you a teeny bit of date because the sport is very much work in progress the public shouldn't this crap this is one of these is the calm of which one is using common re its assets the company is and what to do the same way dug up by fat and juicy and we do despise of the Cup but they are employee sales actually but there it is what you see is stored the state I think the pop won the one which as you note this over and bit him well as several million employees it the wall so amazingly warm up what this cup is this company about a hundred employees such as scaled up to one hundred and one it so we have been taken actually up with more to the fact that much went to two thousand it's tragic it and this is not some of these but forgot to charge two thousand company is a brutal that all of the experts but at that meeting all of the things that twenty five ml various factors they purport to be in Tamil refugees it's an open fire in his state with the fluctuation fact been seen in the sky opps steering is part of important but even as important is what I've emphasized for the slope of that line the slope of this line can you believe that is less than a lot of that one day it it's less than walk the name bats it's up the video among which are yours and the bigger the company the best assets employee for the missing calm total income the company employs its very much like thoughts it is all very much like else stitches at the super video for it opened everything expanded use all the growth of really getting bigger and expand it is not like that so if that theory applies to this you shouldn't get hockey sticks you should have the supermarket of these companies timing oboe and stopping growing that's not the image below show to the beginning of the imagery that this is the imagery time there that this is the actual date of the warm up it does look like a hawk instead but to notice the change to the triple a stop to that nineteen ninety four on a budget for thought his belief that state what to say is even a warm up they go go it's my name is inspired by the steering thumbs up from there it might mention that netbooks so the department's top gun in nineteen ninety groups that will mark the one hundred and three aisles do it it but there it is and so they're starting over but true soul also that although somewhat often over like this and markets will continue to develop this this is the signal of stability

which is good but also what spurred it is good for shuddering that the beginning of depth at Walmart it for sure this but at the graph this is twenty three thousand companies the United States whatever but it looks that causes this stop all of whom it will recommend the book everybody eventually goes flat and everybody eventually thought Richmond but just to give you a bad idea sorted out the top competence to consider this to the and this one I think it will fall that uses the bed over and over and up to much sleep with ultimately the road now or talk about OS briefly a few minutes read on the discharge of the focus is fun this it is off Porto various all you have become reduce the resort this is a graph of Gordo various functions all summer to function so that stuff back to breathing capacity by two of us the real world is all the things to keep you alive Dr Smith and this is the plot of the percentage of what was your duty as you get older at what you see him improve the road then you drive through the one says that everything gets worse they're good about it the course thought now I'd use it all goes in a very systematic way and the question is that this is not the topic of his talk this whole separate or does why is it that we devote a hundred to one of a thousand years will be a few months with the help that number come from why couldn't it themselves and where does that come from scientists from all the bomb victim of stuff or with jeans so blessed to call but it just in TP well I just say some words now as to the room about the dawn on wander over to that and has won because it's kind of poetry the very system that keeping her alive the system's those that worked off what we call this the plate which in simple English means that the Hertfordshire and do it with a surprising mode where are all in the stream those systems by having clothes wet the bed but this topic flows like a dress that uses the Obamacare flows inside draw much or condo so these have some catalog of friction make you the truth fiction onballer complied with each other and forcing damage but also chemical friction which the logo which the production of some oxygen radicals which bad the oldest of which takes place necessarily as they fight for a box of metabolism and metabolic that works and that netbooks the student so of natural selection of courses open to us do but it becomes incredibly costly to repair faithful in a beverage or cough Ahmed of another actually have time to take it in there to try fifth tooth systematic way take it and get it serviced the bench with nowhere else in your heart some of you could of course spend an enormous amount of money and every week of the engine rebuild the opening bell this then of course or jewelry stores and natural selection has of course allocate energy so that we prepare all souls them off so that the now quote Metro State forward by what school and just using a hundred two hundred Watts this they alighted we would live to about forty fifteen to twenty children and to which the off the line that's on top of every socialize and we've been able to extend lifespan the most because we were just watching soon as the washing up stalls the major reason for the mice and men who also won so that my expense increased but nevertheless there is a bit miffed about the flood or storm in the cinema to that of the bench to do with the system and boost competition to talk about all this but a new digicam Steve Crawford speaking with this and that just popped up as it was a most important way on the how can it be that it did this piece of tissue it's a bit of a mile and a bit about us well that didn't stop there would be dead in two or three

years Robin haven't been on the full seventy this is this the sexes when in fact by stating of these depths so of what happens is that of course you've got to degrade the system and life is full of fluctuations and eventually even if you survive or diseases hence the song eventually fluctuation comes along that don't you the one that all of twenty three so about competence thickness of the pickup something interesting that I said we have this funny old business good or bad things decrease on a per capita basis that was the last economy of scale but most important profits them remarkably profits decrease this method but after beating the number of employees both sale this is the most important sales continued been doing profits I'm afraid go sub annuities the puck up the bed decreasing where the cells remain constant this means that eventually it cannot be sustained because it's just like you even though the profits by increasing the increased its focus the old fluctuation comes the company calm and polite it's been a typical thing and bought the theory with this framework culture since that sub let me know what intelligent is that what the trial that the commoners of schedule of an innovation innovation is associated with the soup of an estate in stitches all it does on innovative they open up opportunities as they grow they get bored but post but the more interesting stitches alright crazy people we just walked off the street to the summit of assured of the people of a new kind of thoughts but none of those people number of those people are all rooted in a company companies do not tolerate crazy people this is part of the problem it's only when playoffs strips and Kevin says advise them that they'll Ltd to the crease innocent so so when the best of about fifteen hundred employees use in law the fluctuations that's because innovation accompanist form you know a lot of attention are too small and the not so bored now structure and organization and Bill White but eventually across you have to have that this is in the sense that the company Gordon administration that eventually led to the cartoon of this a competent basically becomes its bureaucracy administration and its innovative all get squeezed out and these companies thought of it now that's the trouble with this we should it was very difficult this is awful the press all of the press stop but at the top right it's the probability of mortality notice it goes to one hundred percent off about twenty if you ever voted on everybody's cup of this and some of our eye the compre some go back a crop of Accra good and some just of course the quad boats but it's the same moment what to say is that it's lucky dip that this is the part of the three ABC very few people survive beyond fifty sixty I'm too old to do so but very few of the three hundred is only one competent its own to live up to us all laugh about that that's a very special reasons ok Sunday to fish off to remind June of this said this is part of the ball my books two thousand which also show metabolic rate is seven thousand Watts and the devotional the spirit that can calm and go this what it wants to be like this so that's the child that saw portable all the questions many of which I did not dawn so Mike into the drums but I've wanted to give you credit the big picture to office will occur due to fight to the biology statistical it but most importantly to stress the extraordinary phenomenon was printed in times of stitches with all that attentiveness and it's been what to do this to me but well like this and a slight puppet show you the competence of red but more like costs and pay all costs participate and says is that we do and desist is written form the background in farming Ryles will this happen and then one of the things that I was sure that is the question is to sustain this we have to innovate foster an

offer and white well it the the the the the review it people all this time
all he hit me up till the crazy people we all will do the crazy people
it today I suspect that that did not my duty up she is saying that the
companies are sub linear Caesar's to feel they are home what else might argue that also
notice the up it does not we don't know read this work work work up with
it it's not much work progress because that backdrop of the mortality of reproduced just a
couple weeks ago we have adjusted to the but um and certainly not because of this
the good stew Porsche I bought what I mean by that Wilson or two for one
what I mean is that this three people is that it is it's all just just
practically all continues to cope with growing the doorbell well although that is that they're continually
bubbling up in the re inventing themselves that bringing people in of integration sick to think
critically important and new ideas to it we believe that it is that the continuous flow
of the new information local and the opening of opportunity that is the wife was sick
and weak on chops that ad and in the distrust that this has been affected this
using comp troughs two of our organisms and beats that it is in the critique of
organisms but we brought her stall but we as individuals for naught if all the blocks
yet whereas this piece is if all the palace O both periods of botched longer fitted
into the too much sixty eight ball that respect and the implication is that competence of
the initial either in the Bay to the promotion period was over it very quickly tend
to become all too well from the very difficult to break out of a bold tilt
the cup is also the exceptions the role of reinventing themselves to stop the ruler for
his country the companies are run by the engineer and or go over to the accountants
and lawyers it's from the people Santos and Kevin Kelly both best of our nation the
Britpop the moment of truth and that we got some cool that they shouldn't there be
more like cities and gets a lot more like sisters but the reason we have is
that the countries it is accountable to the gritty did you know it's true much like
the Balkans did it but come to soak up more political than at these that offers
the expenses of bed much less will get a slope of what the pulpits of a
bad picture of its tail thought but we took it off with a lot of attention
to the world about the peak intensity of the people of that sort of on top
so accomplished haven't thought of them for it just a goal you want to after yes
we did in fact when I go back to Santa Fe week off next we have
collaborators for all that all that who all think in terms of countries because they're interested
with the Kennedy school when the development the vegetable tray traded for all the heat and
up to one hundred degrees to fix the kit and Asian economist all of the trillions
of dollars lol the network so much to own the question John Christensen can you predict
the love of nature parks open space plan for him this and the Los Angeles famously
as Brock legal parked so that the bird is the courage to question because that is
what we did lots of other things that we struggle with it started with beginning what
is that it was what defines us that my textbook Metropolitan or metropolitan area and very
rough speaking this means that we didn't get it so but because if you want to
have some stuff area where everybody is connected somehow with someone fines now then you all
stick to it what about the fighting sixty s in there what's the area of this
this then it's back to this question density that to reverse the bits that the Democrats
and all open space to recruit that according to that song and up a bus that

the permanent they typically book that shows very typical of systematic it oh well it's place it's that if you know there isn't a system at the state and that does seem to represent will be in the trophy history a joke of the Pacific the Dalby thought the historic moment so like never park and stuff like that Brady of this elemental so ugly head well priced because people don't take that back pain superbly from oh five will get the stitches were popular to buy a fridge now it occurred to me that they had quite enough open space that had the best though that there was no doubt that some pressure I saw that true stories the tree and pepper tree she stays like that Paul E O s a question can you make any predictions regarding global people's happiness sites the city well so that the crest of the day all people that have had your budget in its effectiveness in this and no we do not have unfortunately there's not enough the top of the summit will succeed they tend to come the oven off it use it the Allan Cup Obama on the story of the countries and of industry Dokic up to speed up the suspected it and what it is the time it they have a bit it harder to be happening yet but of course you know everyone having succumbed although that does happen this is not connected with wealth the state the shoe theory explains the train question from the local its terms distribute the predictability of what's exciting Detroit well what did you know so exciting with the exciting or different way and you find a job well Detroit's is for it brings up another piece of work that would be good too so all that they too were shown here was averaging over this but almost so we could not be if not yet but this will want to do with them if the state to deconstruct it's that bad happened you know booking about half of this updated its forces from the stock goes up data for the door it stopped so of going out to Detroit to what you find in Detroit is that of course the central office to come across its own no doubt will be resurrected thoughtful if you look at the integrated Detroit despite the exporters radio all last these the series decrease the street Detroit the Hon Joe stop of reaching a height that industry add if your average over Detroit to try to think about it actually is and do a good bet that what's happened is that there has been a migration call an attraction of immigration into the three and be at all those books that for all ha very important course now that if you want in terms of applying this to plan aimed to this on too political questions it's very important that this will ultimately props to start thinking about the structure how have we believe that gender roles or a focal and integrated area but now that the straw this but it's all the while we made point going in this series for schooling or because they're so probably yet and cities were basically you think you mentioned fitted so we cleaned up in the next door we may have noticed that the tapping of mine and we have nothing to do the stadium a discussion with axes does that change the whole picture it is the current two inch thick rich over the phone and that is the question for the possible going back to it's that it can be made innovations are critical for driving growth and continuing for the portrait the bleak as long as the year and use the Internet City so it the bees talk about no to everything so upbeat Kerry so the question is possible of the Internet provides that the form of communication and it decreases from this viewpoint doesn't actually change the social that work and be fined of its effect social in a way that it affects the theft but it's for I've got both boys were both started thinking about that part of my dog gets it goes it's the coolest speed well

and the exits now boasts the Celtic about it is going up and stealing way with the quantity of people on death definite doctor nurses Matt Capps law that the value of the net so this is clear that the number of notes from funeral with it other than work shud to change it it should be treated fiction that you wrote the fall for that one of its thing actually the spirit it's that be this and it has not affected this post we fell for any of these the ball up bring a point that we came across global years ago is that basically corporations International for free in the past because the telephone in the chapel and then allowed to do to which connects to the east into what amounts to a world city in which these multi national corporations on this is another ur urban phenomenon also for it I'm sick and collaboration the coverage with free statistics that all this points to the both of their stay home what to do with it that it's the key state of the fifty state like no other with a bit because it has broken the law in to land in or if it weren't all that it's iffy Hoffman and Asia above a show would be connected with Singapore but picky disconnect really because it's real connection it through it all on all that good or a lot of Rio soul so of wannabe so one of the questions for us questions fist Singapore part of the system and so will we go out this project don't try to compare to all festival requested Singapore but didn't Americans that the Fed is that of its bid to expect now then unit of the roads to the structure to the top of AIDS cases that except for that at the pictures that go with it comparable to him about that but more importantly it is a system the Prince now open the oven system in your mind in Singapore at all they now mobile at work so with this topic but that they are but you brought up the bike to work it has been a bell for the stitches it it's that stuff top people we stopped at the book of this in fact I've been on the ride for the roast it's that second thought for the road Stoker replied it is the word of what second life is so he spoke on the streets the truth hurts it its peak D so he was very kind to offer us the date set for the privilege of second life and could we look at this complete somehow flawed it struck a tree across the state cut the question revolves about it as the city but in particular doesn't deviate in subway or all the various pastas forward on second life to be stale bike Eric institutes mobiles that this or is there something you if all three of it show you all is a tee hee it oh well groomed was doomed on the good doctor to doctor and knew that if somebody has to be up to discuss the fate of a Pope it or the wheel of cheese this day the shared year with the US Congress who carries the company's dying her she's too big to fail it showed that the US Congress of the most effective SEO and sem of an abomination dream well it isn't in this this we did the speculation it it since copper does seem to be very much bomb like organist and it's been in organisms or you know deep in thought word and evolution is purple the ordnance stock so that the two ideas the ball I think that's crucial for the top it's crucial that well and so of course there is in a bid to get that it's the B final you know it's perfect to be consequences for the Opal someone some politicians don't be the sauce but I study I will stay young third for pockets that one of the problems inside the sport frustration the people making decisions of them it will sign for great Britain or two social scientists that the Pope recalled though but so suppose one of things

I have discovered incidentally in my book that politicians posted the song is that to most people don't understand what next and it eventually you don't understand what it eats and if you have given it all do you're at it um sorry but to provide want to bake it has to happen so might know that if I stop with a fork in the morning for the bacteria off the top picture there it so few of these factors it fixed and it doubles papers respect and calculate it did question when is it awful one time thing it to all second that well so Tony Hall force that will help pick up the phone to pick up five seconds that well five seconds before his two two but that is that it's free five seconds before his discretion and it's just that he would oppose bacteria no such rights the blog Roy Evans fantastic looks like it in the victory to go into the room was the five seconds like that or what that's expected to grow that's the prob so Robin slowness the the news it's best just before the news gets catastrophic to question one from rather slow yes we design companies less like mammals likes to tease me well I think that's a huge question because those are the Potter go over to them beyond it's just that doable but you notice that the person with the couple what this suggests is that you know when so what happened to come what the debate begin and often to growth in many industries it has to stop research to develop but typically what happens is that as the big fines can be bought economies of scale to the football hell and sleep well funded all that research development but that fact that it's costing us a lot of money its moment of its fall short we can and reconstituted to produce for the Cup is that some companies like IBM which is doing well and longevity a rule that don't no idea for their boa