

Time  
and  
Again

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I have presented three papers with the word time in the title and when asked to present a paper this season, I asked my wife to choose a title- she did- Time and Again, a fourth time. It may have been mere coincidence and it may be that my timely presentations may have seemed time out of hand for her. In selecting this title, in discussing the concept and use of time, we could consider the use of time in literature, how time is evaluated in memory, and the scientific concepts of time.

Time is evanescent, it can be passively on your hands, and militarily marching on. Remarks may accrue to time, and arrivals and departures can occur on time. Rudy Vallee sang a song indicating that time can be shared by two people and realtors can afford the share with condos. Although time itself is invisible, it is possible to see someone in time. Also, we have the great double play combination, from time to time.

TS Eliot was quite intrigued with time. In the Love Song of J. Alfred Prufrock, he indicated that “there would be time – time for you and time for me, and time for yet a hundred indecisions, and for a hundred visions and revisions, time to turn back and descend the stair, and to prepare the faces that you meet.” In Burnt Norton he went on to speculate about time present and time past, speculating that they are perhaps” present in time future and that if all time is eternally present, all time is unredeemable.”

In Dandelion Wine, Ray Bradbury’s young protagonist, Douglas Spaulding, realized that we are all time machines, living a past in the present after hearing an old timer describing an accidental killing by a magician in the Boston of 1910, that Douglas’s time machine could go back six years, and his parents’ thirty or forty years. My time machine can go back to about 1938. Can I communicate with the past? Not really, but the past has communicated with me. When I was

eleven, I was down in a subway station and sent a message to myself in the future that I would always remember where I was. I can bring back an instant photo of part of the past in my memory, and the smell of burning ashes can take me back instantaneously to my cub scout experiences in 1944.

In biography, reading the chapters backwards allows me to peel back a personality to its origins, peeling through the layers of an onion so to speak so that the fully developed person is gradually reduced to his or her elemental form. One time I did that starting with the last chapter of Manchester's biography of MacArthur and using the same technique in that chapter, going backwards in time. He fooled me since his last chapter, the first one I read, was just such a backward portrayal in time.

. A thing I cannot do is to evaluate realistically the palpable experience of living in a distant past. I have thought that in order to understand earlier centuries, you must peel back time so that you appreciate the changes in reverse, getting familiar with each time period until you reach the century of your interest. Otherwise, you cannot appreciate what it was really like to live in Medieval times barring your experiences in the last several contemporary years. I suppose that archeologists and historians may have similar approaches. As we shall see, novelists and playwrights have used various approaches to recreate the past intriguingly by time travel. It is easier to describe the past than the future, although George Orwell attempted the latter in 1948. Unfortunately, 1984 did not meet his predictions, nor did 2001 in another attempt at prediction.

It is impossible presumably to live in the past and the future, more on that later. However, you cannot even pin down the present, which is instantaneous and becomes the past before you can grasp it. The passage of time is itself relative- as you get toward the speed of light, your time

does not appear to change but to a person in “normal” time, your time has slowed down and if you slowed down to normal time several years later you will find that possibly centuries have passed, as I will also consider further.

Kierkegaard had written that “Life can only be understood backwards; but it must be lived forwards.”

Martin Amis, in his novel *Time's Arrow*, has done what Manchester did in his last chapter of MacArthur's biography, present a person's life from death to birth. It was presented in the first person, who is in blackest sleep initially and awakens to find himself surrounded by American doctors. Why American doctors? Initially, the dialog is presented backward such as “oo y'rah” for How are you? Of course, the author could not continue this way, but it was understood that all dialogue remained backward. The protagonist eventually gets stronger and finds himself now practicing medicine. He finds that he is starting to find love letters in the trash from his girlfriend, stuffing them in a drawer. One day, he takes from the trash his medical certificate and hangs it on a toilet doornail. Years later, he changes his name several times and moves to Europe, eventually finding himself a physician in Auschwitz, where miracles are created, people brought to life with injections of phenol or gas from a gas chamber, and then families united and sent into boxcars. In the Germany of the 1930's, as a young man, he sees that the Jews are getting plum jobs and society broadening out to increasing civil liberties. Finally, the novel ends with the protagonist as a baby, living dreams and colors.

Reverse chronology has been used in plays- and motion pictures in addition to literature. The epic poem *Aeneid*, for example, uses reverse chronology within scenes.

How do authors handle time travel? I will present four examples published over a century, contrasting the approaches. These include *A Connecticut Yankee in King Arthur's Court*, published in 1889, *The play Berkeley Square* (1929), and the novels *Time and Again* (1970), and *11/22/63* (2011).

*Connecticut Yankee* begins with the author, Mark Twain, encountering a mysterious stranger while he is visiting an English castle. The stranger seems to be an expert on the armor and “seemed to drift away imperceptibly out of this world as time and into a remote era and old forgotten country”. This stranger came to speak about the Arthurian Round Table of the 6<sup>th</sup> Century as, the author commented, he would speak about his closest friends. As the stranger spoke, he appeared to become unspeakably old, faded and musty. He spoke of transmigration of soul, and when the author observed a round hole in an armor suit, the stranger indicated that he himself had created it with a bullet. The stranger left, but as Twain dipped into Malory's book about the roundtable in his lodging that evening, the stranger knocked on the door. Being invited in and having a few drinks, the stranger recounted a tale of his time in the sixth century.

He was a very practical and adept Yankee, as we shall note, working in an arms factory in Hartford. In comparing the time trips in the novels we shall discuss, we will find the mechanisms of transmigration quite variable. For this time traveler, his trip began when he was knocked unconscious with a crowbar in a fight with a fellow worker and found himself sitting under an oak tree with a helmeted knight in front of him. The attitudes of these time travelers that we will encounter are quite different, depending upon how their trips were planned or unplanned. This mechanic, who will name himself Sir Boss in his new environment, did not appear shocked. In fact, he thought that the knight was a lunatic, since he could not answer how far he was from Hartford. The knight on horseback indicated that he was his captive and marched him to a faraway

town. On encountering a vast fortress with turrets and towers. our mechanic asked the knight whether that was Bridgeport, and was answered Camelot. Although our time traveler thought that this was the first time he had ever observed this scene outside of a picture, he still had no concerns. The rest of his narrative was written in a journal that the stranger submitted to the author that evening after his introductory remarks.

Following was a long disquisition about the stranger's experiences in the sixth century, that was written matter of factly. There was no indication that he was alarmed and wished to be transported back to the late nineteenth century. At first, he had been told that it was June 19, 528. .Yet, he still believed that it was the nineteenth century and he was in the presence of lunatics and that with his intelligence he could boss the asylum. If, on the other hand, he considered dispassionately, if it was indeed the sixth century, with his intelligence, he could boss the whole country inside of three months. His situation was somewhat alarming since he was a prisoner among twenty other maimed, hacked and carved prisoners. As I indicated, he was adept and in order to demonstrate his prowess, incredibly, he happened to know that an eclipse of the sun was to occur in two days. He indicated this to his captors as an example of his powers. As he was about to be hanged in front of King Arthur and Merlin, the future Sir Boss pointed to the sun and predicted the calamity. Sure enough, the eclipse began and our stranger now became the king's right hand man. The story continued, including his feelings of being trapped in a suit of armor, sweating with bugs inside the helmet and other distractions. The portrayals of conditions at the time appeared realistic in the sense that the harsh treatment of slaves and peasants was well described. The language was not Old English of course but typical nineteen century novel idioms a la Ivanhoe.

Sir Boss's exploits included developing a factory system, a telegraph and telephone communications system, and the manufacture of guns and other armaments. He ran roughshod

over his environment, therefore, including killing many of his assailants, without any indication that it would affect future events as they were to occur, an important consideration in later novels. One might cite a Ray Bradbury story where a future time travel program allowed people to travel into the past but had to stay on a restricted path so that they would not influence the environment. One traveler stepped outside the path by accident, and stepped on an insect, which changed greatly the political situation when he arrived back to his time.

Getting back to Sir Boss, in the ensuing few years he marries a woman whom he saves from slavery or execution, and has a child named Hello-central, named after a woman that the mechanic has known in an earlier life, who was a telephone operator. He organizes a cadre of young supporters who assist him in developing his factories and armaments and gets into all sorts of life-threatening situations saved by his ingenuity. For example, he and King Arthur have decided to see how the peasants live and venture forth as peasants themselves, finding themselves sold into slavery, they are about to be killed when Sir Boss has his assistant in Camelot telegraphed to bring Sir Lancelot and his knights to save them. The knights come to the rescue just as the noose is placed around King Arthur's neck.

The final reckoning develops when the Church promulgates an interdict that lays waste to the population and almost causes the Queen Guinevere to be burned at the stake. By that time the king has died and Sir Boss sends out a proclamation that the monarchy has lapsed and that he proclaims a republic with himself as having executive authority. At the time, he is holed up in a cave of Merlin with his young cadre awaiting an attack by thousands of knights. He builds an encircling ring of electric wiring fences, dynamiting the surrounding land to fashion a moat, and causing thousands of attackers to die as they touch the fences, or by Gatling bullets.

However, as described in a written postscript by his young assistant, Sir Boss was wounded , stabbed by a dying knight as he bent over him. How was the author able to get him back to the current time? He used a witch who made curious passes around his head as he lay unconscious and when confronted with the boss's cadre, said that he would sleep soundly as a stone for 13 centuries, until the nineteenth century.

Twain was using ingenuity in narrating his time travel, especially contrasting the ability of an adept mechanic and intelligent man to overcome the difficulties of living in an earlier time, with a great deal of luck as well. Belief had to be suspended in this intriguing narrative, and as we shall see, further time travel exploits were depicted in perhaps a more realistic fashion.

Parenthetically, it was not a coincidence that Twain picked a Connecticut mechanic as his subject, although the author lived near Hartford at that time. Typically, his protagonist represented the artisans who grew up in that area of the country where public education was most prominent and afforded the ability of non-college educated innovators of skilled workmen to develop commercially successful products. For example, Ichabod Washburn, a blacksmith from Worcester Massachusetts, developed manufactured wire products, Charles Goodyear of New Haven patented a process vulcanizing rubber, and Elias Howe, a journeyman machinist in Boston, patented a sewing machine, all in the 1830's and 40's.

I take you now to 1929. By this time special and general relativity and quantum mechanics had shaken the Newtonian world of physics but played no role in evincing the mechanism of time travel. A delightful play, Berkeley Square, appeared on Broadway in November of that year written by John Balderston, interestingly, born in the year of the appearance of A Connecticut Yankee. He was of British descent, and worked on the US Government Committee on Information during World War I. Also of curiosity, his great-great-grandmother, Betsy Ross, made the first American

flag. In a play, you cannot jump around too much in travel and the setting of the play was one location, a Queen Anne House in Berkeley Square, London, in 1784 and 1928.

The first act takes place in 1784 when the Pettigrew family awaits the appearance of Peter Standish, an American cousin of some wealth who is scheduled to appear that day and may become betrothed to one of the Pettigrew daughters, an event greatly anticipated because the family, quite frankly, needs the money. His coach is heard and the playwright uses the mechanism of a clock striking the hour to dim the stage lights just as Peter appears and segue to 1928, in the same location, where a descendent, also named Peter Standish, has come from America to live in the same house. He is engaged to a young woman named Marjorie but appears to be very enamored of his ancestors in that home in the 18<sup>th</sup> century. He seems to want to change places with his ancestor, having read his diary and is quite aware of the conditions of the earlier time, having learned almost word for word what happened when the earlier Peter Standish appeared, down to knowledge of a Kashmir shawl that one of the family aunts gave a family daughter just before the earlier Peter came over from America. The 1928 Peter, played by Leslie Howard, clearly indicated his desire to enter that earlier period and apparently traded places with the 18<sup>th</sup> century Peter as the clock struck. Parenthetically, there was no direct portrayal involving the 18<sup>th</sup> century Peter in the 20<sup>th</sup> century except for later comments by the 20<sup>th</sup> century contemporaries that he was a ruffian.

Peter II walks through the front door in 18<sup>th</sup> century clothing but the family notices that his boots and clothing are dry although there was a downpour outside. He is here to meet his betrothed, Kate, but falls in love with her sister Helen. Peter notices a sedan chair outside and a family member suggests that he acts as if he had not seen a sedan chair before. When a family member comments about the “colonies” eight years after the Declaration of Independence, Peter replies that “Our forefathers- I mean we- have brought forth a new nation, conceived in liberty and dedicated to the

proposition that all men are created equal". Of course, the family thinks that the proposition is absurd. One thing that I want to emphasize, the family members do not speak in a stilted manner, and their 18<sup>th</sup> century idiom does appear natural. Of course, Peter speaks in 20<sup>th</sup> century idioms, explaining that these words are American novelties. To complicate things further, Peter with his knowledge of the situation, errs in commenting upon matters that the family has not revealed, such as the Kashmir shawl. He is falling in love with Kate's sister Helen, although he knows that the earlier Peter will marry Kate. However, his behavior appears too strange to Kate that she spurns him. His character and presumably his appearance seems dissimilar to that of the 18th century Peter to a traveler who had come across with him from America and who was visiting the family. The other concern for the family is that the 20<sup>th</sup> century Peter appears to talk about them as if they are living in the past. As for sanitary practices, when Peter indicates that he wants to take a bath, a family member considers it an eccentricity. When he comments about the value of the Queen Anne furniture, the family considers it of no value and may get rid of it in the near future. The behavior of the English according to the mores of the time finally gets Peter to call them savages because of their habit of still burning people at the stake and flogging people in public. One of the family visitors considers him a devil and tries to exorcise him using crossed candlesticks. Finally, Peter admits that although he was in love with the past, he feels that he is being sentenced to life in that earlier time in a pigsty of a world. "What a period. Dirt, disease, cruelty, smells. God, how the eighteenth century stinks". In the final scene, Peter emerges in 1928 at the exact time when he left. The only residue of his visit to the eighteenth century is that he fell in love with a woman who died one hundred and forty years before.

As in *Connecticut Yankee*, a *Deus Ex Machina* is used to transport the protagonist to another time period, and compared with Sir Boss, Peter cannot adjust to his new environment and acts as

any 20<sup>th</sup> century American would in that environment. As in the time travel novels we will discuss, the traveler returns to his contemporary surroundings at virtually the same time he has left it, although he had spent several weeks in 18<sup>th</sup> century London, and presumably was no older.

Jack Finney's *Time and Again*, constructs time travel as a government project around 1970, where subjects to travel are identified by government agents because of characteristics that provide an ability to return to earlier period, and undergo rigorous training in order to do so. These characteristics include young adulthood, and the ability, seemingly rare, to see things as they are and at the same time as they might have been. The protagonist, Simon Morley, is in his late 20's and is an illustrator for an advertising agency on fifth avenue in New York. He is somewhat bored with his job. He is approached by an agent of the government to participate in a secret project because on his service record. He appears to have the right characteristics to participate, especially inner directedness.

After extensive psychologic testing at a large west side warehouse that the project directors use, Morley is let into the secret of the project. The project organizer, Dr. Danziger, an elderly theoretical physicist on leave from Harvard, explains to Morley that the project is related to Einstein's theorizing. Danziger interprets Einstein to indicate that we are mistaken about our concepts of the past, present and future and that they all exist at the same time. Parenthetically, I am not a theoretical physicist and cannot vouch for Einstein's comments, but nonetheless this was the rationale for the project. Morley is led into several areas of the large warehouse where he sees depictions of various locations from different eras such as Paris in the fifteenth century, a war field in World War I and an early 20<sup>th</sup> century location in Vermont. In each of these simulations, a chosen time traveler is living there as if he or she existed in the time period in order to accustom

the traveler to the real period. Morley is assigned an island, Angel Island, in San Francisco Bay in 1901, but his girlfriend has shown him an old letter from her stepfather's father named Andrew Carmody who had killed himself in the early 20<sup>th</sup> century and a letter addressed to him dated January 23 1882 in New York where he was then living requesting a meeting about marble. There was also a note presumably by Carmody stating in part that states that "the sending of this letter that led to the destruction by Fire of the entire World (missing word) seems well nigh incredible" and that Carmody blamed himself for the incident.related to that meeting at a location near City Hall. Morley's girlfriend also had shown him a photograph of Carmody's gravestone in Montana where he had moved with his family and where he had shot himself. The grave showed a nine-pointed star inside a circle formed by about 100 dots. What was the meaning of the letter that might have led to his eventual suicide? This mystery intrigued Morley so much that he suggested that he would rather travel back to January 1882 to try to solve this mystery. For some reason, he was able to convince the director that this would be of importance to him, and, as a matter of fact, at that time Danziger's parents met for the first time in the lobby of a theater in January 1882 and Danziger wanted Morley to witness this meeting so that Danziger would have an account of this. I am going into this in detail because this was the rationale for the decision that Morley would travel back to New York with approval by Danziger. It was decided that Morley would spend some time around January of the current year at the Dakota apartments, an 1880's building on West 72 street overlooking Central Park, lately occupied by the likes of John Lennon and other notables. However, the specific apartment overlooking the park, virtually unchanged there from 1882, was necessary to help Morley create the impression that he was living in 1882 – helped by period clothing, appurtances of the apartment with 1880's style gaslighting, and meals delivered by messenger of food and drink in the style and packaging of that period. Morley was also taught self-

hypnosis, the means of travelling back to that period. One night, when it was snowing heavily, and there was virtually no traffic, he hypnotized himself to enter the park and return- the only vehicle he saw was a sleigh. The following morning he was interviewed by the project staff in his apartment and could not convince them that he had gone back to 1882 until he mentioned as an aside that he had seen the Museum of Natural History from the apartment's window. That decided it since it was impossible to see the museum from his apartment in the 1970's because of the intervening buildings.

Morley next decides to travel in time with his 1970's girlfriend and taking a fifth avenue omnibus to view the letter being mailed in the City Post Office near City Hall by an unidentified man. The man is followed and they find that he lives in a house in Gramercy Park. Morley returns to the present, is debriefed, and examined and as far as the organizers can gather, there has been no change in the present based upon Morley's comments about everything he can tell about the present. He is instructed not to interfere with activities as much as possible and spends considerable time in 1882, moving into the boarding house in Gramercy Park and meeting the man who mailed the letter to Carmody, named Jake Pickering, a rather nasty individual and, it turns out, a blackmailer of Carmody. Morley also meets and falls in love with Julia, whose aunt runs the boarding house. Morley is first appalled at the narrowness of the streets, the garbage and the slowness and stench of the omnibuses. He is impressed with the faces and aside from whiskers feels that the faces are unlike those of the 1970's. He and Julia find themselves at the location of the meeting of Carmody and Pickering across the street from City Hall, and secrete themselves in a vacant room next to the room where Carmody and the blackmailing Pickering, meet. The building where the meeting is held had been at one time the location of the New York World newspaper and was still called the World Building. By some accident, a fire starts and Morley and

Julia escape but the building goes up in flames. (leading to the letter commenting on the destruction of the entire World). In the street, imprinted in the snow, is the nine pointed star and circle seen on Carmody's tombstone, taken from the heel of the boot of one of the two who left the building. They eventually discover that Carmody did not escape the fire but Pickering, swathed in bandages, did and assumed Carmody's status at the behest of Carmody's wife, who needed Carmody for financial reasons. It was the simulation of Pickering's boot that Carmody's wife placed on his tombstone, instead of a name.

Meanwhile,, the police suspect Morley and Julia of starting the fire and start hunting them down . They find themselves in the arm of the still uncompleted statue of liberty then located in Madison Square Park at 23rd street. Morley transports them back to the 1970's in the now completed statue in the harbor, and although Julia is at first astounded at the changes, appears to adjust to them but still wants to return after she learns of the horrors of the twentieth century based upon illustrated books of the two World Wars. Morley is then assigned to intentionally alter the past after the project organizers learn, based upon historical research, that Pickering, now is the guise of Carmody because of his face distorted by burns from the fire, had influenced Grover Cleveland , talking him out of purchasing Cuba from Spain. The project organizers consider that exposing Pickering would stop his influence on Cleveland and lead to the purchase, preventing Fidel Castro from taking over Cuba. Therefore, Morley meets with his directors and they convince him to go back and prevent Pickering from involvement with Cleveland..

However, they indicate to Morley that one of the other project participants, who had gone back to Denver seventy years in the past, had made a change which caused a friend he remembered never to have been born. Because of this, Danziger, the project director, insists that the project be abandoned but is overruled and Danziger resigns from the project. Although Morley goes back to

try to change the past involving Pickering and Cleveland, he decides that he would prefer to live in 1882 with Julia.- He also decides that the project should be abandoned and goes to the theater where Danziger's future father is to have a chance encounter with his mother and diverts his attention so that they do not meet and the project presumably never occurs. If that is the case, how does Morley remain in the past?

In day to day conversations, Morley makes anachronistic errors, similar to Peter Standish, some of which indicate the subtleties of the idioms and living habits of the 1880's. He talks about Czechoslovakia which does not yet exist. He sketches a portrait of Julia on the frosted window pane which is not characteristic of the styles of the 1880's and displeases her, He has to redo the portrait in the exquisite detail of the period using a hard pencil. Unlike Yankee, and Berkeley Square, it is an outside agency that provides some rationale for time travel and there is careful planning to initially prevent the past from being changed.

The novel *10/22/63* and its cover illustration obviously relates to the the prevention of the assassination of President Kennedy. The novel, by Stephen King, not the Republican Iowa congressman, was published in 2011, and by that time, astrophysics had gone beyond Einstein's theories and quantum mechanics to string theory, which has some relevance in the novel's world of time travel. The portal to the past is not in San Francisco's Golden Gate Park, but in Al's Diner in a small town in Maine in the early 21<sup>st</sup> century. Al, the proprietor, discovers a wormhole to the past in the pantry of his diner and takes a number of trips there. The author provides some ground rules about time travel: You always arrive at the same date and time in this location outside of Al's Diner, to wit, September 9, 1958, you can spend years there but always return to the diner through the portal only a few minutes later in real time, but you age just the same while in the past. There is always a mysterious person just outside the portal encountering you with requests or comments.

Although past events can be changed, return trips to the past reset these changes back to the results of the original past, nullifying the previous changes, although the past can again be changed by the ensuing trip. Efforts to change the past meet with a palpable resistance with obstacles attempting to prevent the changes that develop in proportion to the magnitude of the attempted changes. Finally, we learn that the mysterious stranger outside the portal is an agent, there may be more than one, who guards the changes in the past that may produce multiple “time strings”- the possible allusion to string theory. These time strings have to be guarded by the agents, since a proliferation of all these realities from the original reality may cause reality to cease to exist. Guarding these changes in reality is stressful for the agent who has to keep all these realities in his mind- leading to mental illness, alcoholism and eventual death of an agent. Another precept of this time travel is that the traveler keeps meeting people in various locations with similar names and similar events occur. All these ground rules go far beyond those of the previously described portrayals of time travel.

The protagonist is not Al but Jake Epping, a recently divorced high school English teacher who also teaches a creative writing class for older adults in Lisbon Falls, Maine, an actual town.

On the diner’s wall are photographs of prominent figures in the town in the recent past. One photograph shows Jake handing a diploma to a graduate of the creative writing class, Harry Dunning, now a janitor at the high school who had written a dramatic narrative about his father’s rampage, murdering most of his family and leaving Harry with a limp. Jake had been in the diner many times in the past few years. It is now June 2011 and Jake drops by the diner and is told by Al to meet him there the next day. The following day Al has changed in appearance remarkably- he is now aged, emaciated, coughing, and dying. He has lung cancer. In fact he has spent several years in the past attempting to prevent the assassination of President Kennedy but realizes that he

cannot last the five years in the past from, 1958 to 1963, and needs someone to take over for him. It is important that someone take over soon because when Al dies, the diner may be demolished and the portal closed. He convinces Jake to undertake this, giving detailed instructions on how to enter the portal and live in the past. In comparison to the initial purpose of Morley's time travel in the novel *Time and Again*, the purpose of the intervention is to change the past. Jake travels several times in the past each time returning to the diner only several minutes after he left. His escapades include preventing the murder of Harry Dunning's family, but since Harry was uninjured he is no longer a Janitor but dies in Vietnam as a soldier. Jake also prevents an accidental shooting of a girl by a hunter and she is no longer crippled for life. However, the most important task is to get to Lee Harvey Oswald to prevent the Kennedy assassination. Although Al could have attempted the murder of Oswald well before the assassination attempt, he was unsure of whether Oswald was acting alone, and as a case in point, wanted to determine whether Oswald had previously attempted the assassination of General Edwin Walker a year before. After a trip into the past Jake returns to the diner to find that Al has died, so there is little time to accomplish his task of preventing Kennedy's assassination before the diner is demolished. He therefore re-enters the portal to September 9, 1958 and spends the next five years in that past. This includes preventing the murders and accidental shooting previously mentioned, and then establishing a separate identity and traveling to Texas.

Fortunately, he had been given a large wad of 1958 money. Remember, although the money might look the same, the years on the coins and the signature of the Secretary of the Treasury on the bills could not be anachronistic. Jake can always make money by betting on events, such that the Yankees would win the 1958 world series after being down 3 games. However, the large amount of money he wins at long odds make the bookies suspicious and they make several attempts

to injure and assassinate him, one causing major injury to his head. That is one of the problems of capitalizing on future predictions. You have to deal with the mob.

Jake does some substitute teaching in Jodie Texas, near Dallas, and searches out Oswald in several locations, at one time living in an apartment below Oswald's. In the school where Jake teaches, he meets the librarian Sadie Dunhill, and falls in love with her. However, he like Morley in *Time and Again*, sometimes uses anachronistic colloquialisms which makes Sadie suspicious. At the time of the Cuban Missile crisis, in November 1962, when Sadie is scared for the future, Jake relates to her the dénouement and indicates to her that he can predict the future. Eventually, Jake is convinced by Oswald's activities and the attempted assassination of General Walker that Oswald is acting alone, and he and Sadie pursue him to the book depository on the fatal November 22, from Jodie to Dallas. However, the obstacles to prevent change in the past are thrown up when their automobile loses a tire and the bus they then take also meets with an accident. They finally hitch a ride and reach the book depository just before the time of the assassination. Jake attempts to divert Oswald but Oswald shoots at him but kills Sadie. Oswald is prevented from assassinating the president but the secret service fires at the window and kills Oswald.

Jake is feted as a hero and thanked by Jack and Jackie Kennedy. He is secreted away by the service and is allowed to disappear and returns to Maine back through the portal. He learns that as a result of saving the President's life, three days later, on November 25, 1963, a massive earthquake in Los Angeles had killed many thousands. Jake decides to return to 1958 in order to save Sadie if not prevent the assassination of Kennedy. When he returns through the portal he meets another mysterious agent who explains that travelling through the portal does not actually change the past but creates the multiple time strings stretching the fabric of reality. Lisbon Falls in 2011 is in ruins, due to radiation damage, Harry Dunning is no longer a janitor, but has survived Viet Nam however,

with a brain injury causing paralysis in a wheelchair. Since Kennedy was not assassinated, the Civil Rights Act of 1964 could not be passed. Although Kennedy did not commit to escalation in Viet Nam, his successor George Wallace had used nuclear weapons on Hanoi after Saigon fell in 1967 and over the next few years of instability, nuclear weapons were used by terrorists. Jake returns to 1958 and finds the agent quite in despair saying he must go back to 2011- since all the changes were undone by Jake entering the past again. He does so briefly and makes no changes. His original past is now back in place. Back in 2011, Jake finds that Sadie survived and he travels to Jodie Texas to meet her apparently for the first time although she is in her 80's.

There was no indication of who were these mysterious agents who guarded the past, and why they were needed. The presumption is that it was expected that time travel into the past was implicit in one or more portals, but no indication of why they were available.

One aside, here. From the point of view of the historian Daniel Walker Howe and some other historians, a more important intervention in American history would have been the election of the Whig, Henry Clay, than the Democrat, James K. Polk, in 1844. Howe suggested that if Clay had won rather than Polk, (Polk's plurality was 38,000 out of almost 3 million cast), there almost surely would have been no Mexican War, less reason for the status of slavery in the territories to have inflamed sectional passions and possibly no Civil War.

We can conclude from the accounts of novelists and at least one playwright that time travel is relatively easy but fraught with hazards. It is relatively more rational to discuss travel into the past although travel into the future meets with more speculation, The takeaway from the travels into the past is that it is dangerous to change the past and therefore to beware of stepping on butterflies. It is interesting that Mark Twain did not comment on whether the artifacts of telephones, Gatling guns and pyrotechnics from the 6<sup>th</sup> century might be found as a result of the

Connecticut Yankee's efforts. One issue that was not considered in the literature discussed was the return to a time when the protagonist was alive but younger. I leave it to you all to determine whether you would like to travel into the past and especially the earlier years of your life, a time that you well remember.

Remembrance of past experiences has been called mental time travel by psychologists, who have studied it extensively. This includes the capacity to mentally reconstruct personal events from the past, called episodic memory, and to imagine events in the future, episodic foresight. In addition, the ability to store and retrieve information has been termed semantic memory. The term mental time travel, however, comprises episodic memory and episodic foresight. The ability to travel mentally in time, so to speak, has been considered a potential prime mover in human evolution in preparation for the future.

Memory as part of mental time travel can allow you to imagine the future as by imagining a change in reliving the past. It was St. Augustine who remarked that "out of the same storehouse, with these past impressions, I can construct now this, now that image of things that I have either experienced or have believed on the basis of experience- and from these I can further construct future actions, events and hopes; and I can mediate on all things as if they were present". Recent research suggests that remembering the past and imagining the future share a common basis.

Episodic memory has been studied by asking people to report or describe events they have experienced. By providing a participant with information and assessing the memory of this information at a later point, accuracy of recall can be assessed over hours days, or weeks, etc.

In an attempt to simulate the past, an episodic reconstruction may include imagination. President Reagan once told a narrative about a World War II bomber pilot who performed a heroic act, as if recounting it as part of his own experience. It was eventually found that he was really reliving

some parts of a popular movie. This is an example of episodic imagination.

What role does memory play in the understanding of time? How is time represented in memory? It may be obvious that an event cannot be conceived as real unless the time of the event has a bearing on recall of the event. In relation to the time when past events have occurred, judgment is needed to remember the time and location of the event. The mechanism is different from remembering past historic events beyond our experience. The psychologist Endel Tulving links our sense of the flow of time in which we live as “an ever present awareness of...being...in a subjective sea of time, always a transition of what is now becoming the past to what was once the future”.

Psychologic studies demonstrate that the subjective passing of time tends to speed up with increasing age. This often causes older people to underestimate increasingly a given period of time. These may be caused by a variety of age-related changes in the aging brain, such as a lowering of dopaminergic levels with older age. In studies of younger and older individuals in which the participants were asked to estimate when 3 minutes were up, the older individuals estimated the passage of the same time period 25% longer than the younger individuals, that is, a longer time period tends to seem shorter in the elderly.

It is theorized that there are several complementary systems governing the perception of time, possibly related to activities in the cells of the upper cortex. This may include explicit timing, or the estimation of the duration of a stimulus, and implicit timing, estimating the time from an impending event expected to occur in the near future.

What is termed temporal illusion may be perceived as the perception of time including recalling recent events as occurring further back in time than they actually did. Short time intervals with many changes may be perceived as longer than intervals with fewer changes. Time durations may

appear longer with greater stimulus intensity such as loudness, and auditory stimuli may appear to last longer than visual stimuli. A journey covering a greater distance appears to take longer than one covering a shorter distance even though the time elapsed is equivalent.

Drugs and disease can affect the brain's processing of time. Drugs such as amphetamine that stimulate dopaminergic neurons appear to make the internal clock run faster and drugs inhibiting dopamine appear to decrease internal clock speed. Although recent events seem to be remembered better, there are separate locations in the brain for short and long term memory. With Alzheimer's dementia, the hippocampus, the repository of short term memory, becomes dysfunctional but long term memory stored in another area is preserved. Disturbances of the cerebellum interfere with the timing of motor activities. Persons with basal ganglia disturbances as in Parkinson's disease have timing deficits on repetitive motor tasks. Prefrontal cortex brain damage is associated with relatively little impairment in remembering events but difficulty in performing memory tasks that require temporal judgment such as the sequence of events in the past.

Psychoactive drugs alter the judgment of time. At higher doses of traditional psychedelics such as LSD, psilocybin and mescaline, time may slow down, speed up or events may seem out of sequence. In one experiment with mescaline, a participant experienced a period when time did not seem to end. Stimulants lead to overestimation of time intervals while depressants have the opposite effect. If you are depressed, two hours may actually seem like one hour, for example. These changes are related to the levels of brain neurotransmitters such as dopamine and norepinephrine. Dopamine has a particularly strong connection with time perception. Activation of dopamine receptors causes a significant speeding up of time perception. The perception of other person's emotions or activities can change one's sense of time. For example, if one spends time with a person who walks or speaks slowly, the observer's internal clock may slow down. Anxious

people, or those in great fear, experience greater "time dilation" (slowdown) in response to the same threat stimuli due to higher levels of epinephrine, which increases brain activity (an adrenaline rush). In such circumstances, an illusion of time dilation could assist an efficacious escape. When exposed to a threat, three-year-old children were observed to exhibit a similar tendency to overestimate elapsed time.

These findings and speculations lead to questions about the nature of time. To answer these questions, we need to consult physicists and cosmologists. Don't worry. We are not going to go over any equations and try to understand time's arrow (if it points in whatever directions) as simply as possible. I am no physicist nor adept in mathematics, but I have felt that there is only one reason to live 500 years, and that is to learn about the developing knowledge about the universe. However, it's about time to discuss what is known as of 2019 or at least since the beginning of this century. Of course, you can only quantitatively record the passage of time by clock or digital timer unless you want to use a sundial or an hourglass. If you are fastidious you can use an atomic clock. More generally, the arrow of time can be defined psychologically by our perception of time's flow, by the growth of entropy, a thermodynamic quantity representing the unavailability of a system's thermal energy for conversion into mechanical work, often interpreted as the degree of disorder or randomness in the system. By the second law of thermodynamics, entropy increases continually. We know from Lorentz and Einstein that time appears to slow down relative to one standing still as the speed of an object increases up to the speed of light. For someone on one of these rocket ships that approach the speed of light, although not noticing the slowing of time, his or her watch would tick as before. To the standing observer, the rocket ship shrinks in size and if he can see the traveler's watch, the time change would decrease significantly so that it is possible that the traveler approaching the speed of light could live the 500 or more earth years and return to earth

at some time in the distant future although growing older only within the context of his or her time period in travel. Thus, according to Einstein, there is no absolute time unrelated to motion. The slowing down of time is called the Lorentz transformation (time dilation) . Einstein used mathematical equations to predict that time can be altered by gravitational fields. The stronger the gravitational field, leading to acceleration, the more slowly time runs. For example, travel time delays near massive objects such as the sun. It is possible that if you travel very near a black hole, with extremely large mass, you may live for earth centuries. The use of particle accelerators affords smaller subatomic particles such as electrons and muons to accelerate to great speeds that prolong their life before decay.

Several years ago a large group of physicists and some philosophers met in Waterloo, Canada at a Time in Cosmology Conference. I doubt that the location had anything to do with a definite disposition of time but one comment was that “the future does not exist... Ontologically it’s not there”. It is theorized that the Big Bang, when the universe began to expand dramatically, presumably from a dot, began from a low-entropy state to progressively increased entropy as it expanded. It has also been theorized that at a time point, the expanding universe may begin to contract. That could affect the state of entropy and interfere with time’s arrow. As the galaxies and matter clump together, gravity would increase leading to a slowing down of time.

Of course, time is one of the four apparent dimensions, the other three the coordinates of space. However, according to quantum theory, there may be up to 11 dimensions, with about 6 curled up space dimensions and one curled up time dimension, that are very small, well into quantum space. It is conceivable that if one could diminish our size to that below what is called Planck’s length, after Max Planck, the German theoretical physicist who discovered quantum mechanics, which is a billionth of a billionth of a centimeter, and traverse this curled up time dimension, after a lapse

one might return to a prior instant in time. The 11 dimensions are not arbitrary but based upon equations related to string theory, which allow string theory to make sense. String theory postulates that matter is made up of vibrating one dimensional strings that are the smallest known matter, and whose properties afford a connection between macroscopic general relativity and submicroscopic quantum theory, the connection that eluded Einstein. I will not delve into this issue any further but recommend that you read Brian Greene's *The Elegant Universe*, published in 1999, that provides a relatively current perspective on the physics of the universe.

Another concept of the passage of time is named causal set theory. This concept, first proposed in the 1980's, is that space-time is discrete rather than continuous. Although apparently continuous in the macroscopic world, at the very low submicroscopic quantum world, elementary discrete units of space-time may be present, discontinuous but linked, these units continuously coming into existence. In our macroscopic world, we visualize a continuous flow of motion. What if we could perceive changes in millionths of milliseconds- is it possible that the motions we perceive in real time can be discontinuous, and that time stops and starts again like the motion of a grandfather clock? Could we see perturbations in space that disappear in "real " time? In fact, it is suspected that in quantum space, the notion of a smooth spatial geometry may be destroyed by violent fluctuations of space and possibly time in this ultramicroscopic world.

An intriguing concept of timeless is found in the book *The End of Time* by Julian Barbour, a theoretical physicist. His precept is that time does not exist at all. The main aim of his thesis is to introduce a definite way of thinking about instants of time without having to suppose that they belong to something that flows relentlessly forward. Instants of time are like still photographs, which are somehow brought together by the brain to produce an illusion of movement. In regard to this concept, in certain kinds of brain damage the ability to perceive objects in motion is lost.

Interestingly, an observation recorded by Oliver Sacks, was that some patients suffering from post-encephalitic Parkinsonism found themselves frozen in time for years, until released from this state, though only temporarily, by the drug levodopa.

My time has run out. I will end with a limerick I remember from reading George Gamow's book *One Two Three Infinity* many years ago, which has stayed in my mind with the long passage of time:

There once was a young man named Fisk,  
Whose fencing was extremely brisk,  
So fast was his action,  
The Lorentz contraction,  
Reduced his foil to a disk.

With that, speaking of Fisk, it is time to retire.

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