

TIME LINE TO THE FAMILY ENDOWMENT FUND

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I am now 73 years old. It is tempting for people to cherry-pick a few select moments and start making declarative comments.

One of them is: You always had disagreements with your colleagues, didn't you?

Answer: NO! When a cat goes meow and a dog goes Bark-Bark, they are not disagreeing. Cats do what cats do and dogs do what dogs do. I did what was natural to me and my colleagues did what was natural to them! Starting from childhood, I got some opportunities. When I took advantage of them, my life went in an off direction. Others came through the regular grind and that grind continued. They could not speed up if they wanted to and I had no intention of slowing down for their sake. I don't think any of the students or faculty can say that, because of me, they were held back. I never failed a student. By 1980, I had developed a Bayesian method for assigning grades. So, to each student, after each examination, I would give the posterior probability of their making various grades. I was always eager to discuss where they were headed and if they did not make changes, where they will end up. There were never any arguments about the final grades. They had made their bed and they lay in it.

The amazing part is that after this more than half a century of trial and error on a fairly vast arena, I did not change anybody and nobody changed me!

Think about this when you are discussing US-attempts to bring democracy to Iraq or establishing a new economy in Afghanistan and other countries.

There is a rule of three generations: Assuming that I have succeeded, some 2% of the population will follow the lead. In the next generation, it rises to 10%. In the third generation, about half the population gets into this mode as it becomes available to them. The remaining 50% stays in its old format without any changes for ever.

An example of my daily operation is in order.

A student from Pakistan, Bashir Khan, working for a UN branch wrote to me about working in our department. He was honest enough to say that he has not been a great mathematician so far. I wrote to him, "If I tell you about mathematics, will you listen and follow through? Do you have the motivation, energy and time to pick up on things that you do not know?" He gave an enthusiastic yes. He was in.

When he came, we met. I told him that infinite series have no value. Thus, you write:

$$\text{Sin}(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \text{etc},$$

If you want to compute Sin(x), you must develop your own formulae.

All items, including capital and knowledge, deplete at a rate of the order of 12% per year. So, over a ten year period, you are on your own – or you return to the minimum wage law.

I introduced him to, what are now called, Cecil Hastings' approximations. I got access to a matrix based language, called APL – stands for 'A Programming Language'. He computed a few. The answers matched the values given in the tables of $\sin(x)$ to six significant digits! He was impressed. He got convinced that thinking fresh helps.

He started worrying over: Is it really true that the sample mean and sample variance are independent for normal distribution and only for the normal distribution? He put together some fifteen papers that have been written on this topic, most of them by Professor C. R. Rao and his group. We went to a meeting of the JSM (Joint Statistical Meetings) where there was a contributed paper on that topic. There was another proof. Bashir kept a sharp eye on the steps from where the exceptions were coming, for which the sample mean could be independent of the sample variance.

John Tukey was in the audience. He saw the interest in this detail. Tukey said what Bashir was about to spit out: Sooner or later, you differentiate. So, the proof does not apply to distributions that do not permit such differentiation! John Tukey asked one of his students to give Bashir a bunch of crazy distributions that he had developed. He told Bashir, "See if the sample mean is independent of the sample variance for these distributions. If you do not succeed in giving an algebraic proof, use simulation. Take some 200 random samples of size two, compute the mean and variance for each pair and then plot the mean against the variance. If the graphs look random up and down it tells us that there is at least one more distribution for which the mean is independent of its variance. If all graphs show significant patterns then it is time to get started to prove that independence is true only for the normal distribution."

When finished, the paper written jointly by Bashir and me was published in a Journal for Probability Theory!

Who would have expected that a survey sampler at a UN Branch in Pakistan will get a paper in a Journal of Probability Theory!

Around the year 2006, I was roaming through Columbia when Dr. Gary Krause caught me and said, "You were bull shitting so high about APL that I thought it will take forever to catch on. It is just like a hand held calculator. You type a formula and the answers come on the next line when you hit enter."

A question to ask is, "Did I really fool people by giving a big talk and 'head them off at the pass'?"

Gary and I were together for 25 years. I used to hold a personal seminar in my room once a week, every week during my 35 year stint at the two Universities. There were many theses and dissertations, each one containing a flow chart, a program and output. I gave at least five seminars on APL. Each one started with mu computing a variety of formulae without writing a program with an end statement and asking the computer to run it. Gary could have picked up on this any time.

He was a busy man, running his show in his own image. He had 24 hours in a day just like all of us. His calendar was full.

If he had my DNA and my experience, he would have done what I did, ending with such an endowment fund!

Notice that my successes should not be over rated.

I was never the highest paid faculty in the Universities. I never got to swindle the Universities into paying for foreign junkets! I did not buy the biggest house in a posh area. I bought my house in 1970 for \$29K. So, I have always been a rather middle of the roader on all daily issues.

Phase 1: In 1942 when I was four years old and my mother was 46, I remember suddenly waking up to the realism of the world, and hearing my mother telling me repeatedly,

“Most of what you hear or read is wrong at best and mischievous at worst. So, you must validate everything. I mean you must validate everything. If anything validates, hang on to it with your dear life and build your career around it. ”

I said, “OK Ma!” To my surprise, almost none of what I heard could be validated.

- Most of them were made up stories. So, no fiction here – out, out, out!
- Many of them were old stories, with people writing their own versions of what he/she thought it meant. The stories were put under the word ‘religion’. So, no religion and ‘pomp and ceremony’ here!
 - I told this to my mother. She thought that this was a serious error. She had come from a highly religious family and married into a family that owned a large group of ‘Shriniwas Temples’. So, she had a box full of idols of Gods/saints. She had many scriptures. She picked them up, went on the street and threw them one at a time with full contempt and disgust across the street. She tore up the scriptures and let the pieces fly in the wind.
- I was only four but I started reading arithmetic books where each question had a single correct answer – no more of your opinion against mine. Mother introduced me to the numbers 0, 1, 2, -- 9. I wrote it on a slate with chalk repeatedly a vast number of times. I said (to myself), “What comes after 9? It must be 10.” Mother agreed. I was amused and disappointed. “So, the humanity has not come too far, has it?” Humans are not that different from goats and chicken. They get born without their knowing why. They do the most obvious and die when their time is up. I should be able to figure them out fast, get on to figuring out new and true things and build my life around them.
- ***This means one thing for sure. I cannot expect anything from anybody. If I have an idea, I must subsidize it myself and carry on with my projects all on my own.***
- I would solve the problems at the end of section/chapter and check them against the answers at the end of the book. Half the book-answers did no match my answers.

My mother’s antiques and my list of problems in the arithmetic book that did not match the answers at the back of the book caught the attention of a disciple of Gandhi. I gave him my list. He sent it to a Professor in Cambridge, England. The Professor agreed that the answers in the book were wrong. I did not need any more approval. I was ready to validate everything.

So, I lost all interest in the society around me. I had no interest in wasting my time with the people around me and seeking their approval. I had my own world and I lived in it.

So, I never engaged in conversing with my neighbors, giving them advice and enjoying my successes in comparison with them.

My mother developed three rules of daily conduct:

- Given any topic, divide it into three parts: sublime, ridiculous and trivial.
 - The 'ridiculous' part should be chucked. It should not be phased out or postponed. It should be chucked – erased from the memory.
 - As for trivial stuff, “**do it once and do it right** so that you do not have to revisit that topic again.”
 - Work on the sublime parts as long as it takes. There is no need to rush! It might take decades.
- Don't spend your time evaluating others and giving them advice. “If you put out sugar, the flies will come. If you succeed, others will follow you.”
- If money is open, nothing else matters. If money is not open, nothing else matters. So, when people keep talking without referencing money, get out of there and get back to your work.

I would be working on my own projects up to 2 AM; and then get up at 6 AM to start again.

A teacher came to our house and told my mother right in front of me, “I do not know why he does what he does. But it should be encouraged.”

In a simplistic physics book – what else did you think I would read at the age of four? – there were the three laws of Newton, one saying that everything stays at rest or travels at constant speed at the same velocity unless it is disturbed by a side force. “Who did you say said this?” Someone sitting next to me said, “It was Newton.” I asked, “Who is Newton?” I fully expected to catch hold of Newton and question him on that. The boy said, “He is dead.” I was disgusted. “So, you are quoting a dead guy. If he is wrong, there is no one to take to task.” We know that earth moves, moon and planets move. So, these Newton's laws are a pot of crack; they are a wrong direction to start. Some called it s the first approximation. My response was that everything is an approximation to everything if you are willing to accept big enough error. This is a wrong game.

There were some simple experiments at the end of each chapter. One of them asked that we roll a spherical marble and see how far it goes. It rolled for a while. When I put a penny and pushed it, it stopped within inches. “Hey, the Newton's law applies in a limited way to spherical marbles. It does not apply to flat coins.”

When Gandhi's disciple came, I showed him. He said, “Good thinking. Keep your mind fresh like this. This is the kind of fresh thinking that India needs.”

He also recommended that I read books written in English. They are a little more accurate – but you cannot let down on your vigilance of validating. If they were all right and beneficial why would Mahatma Gandhi be protesting against the British?

I started reading the English alphabets, any way they came my way. Some British visitors would leave their books in English in our house before leaving. I would read them myself and see what they could possibly mean – of course I had to correct them if they were wrong.

Phase 2a, five year old:

This Gandhi's disciple looked at a simplistic arithmetic book which covered fractions. He said, "Let us get out of these fractions where each one has a different denominator. Let us make 'ten' the common denominator. Here is one banana; here is another banana; so together, we have two bananas. If I keep the first banana, make ten pieces of the second and picked three, what do we have? It is more than one but less than two. We write it as 1.3. Now, you can take one piece of this, cut that into ten pieces and take seven pieces. Then what do you have?" I said, "1.3.7". Gandhi's disciple said, "Life is more simplistic than that. We just write it as 1.37. Successive numbers are how many parts of the previous piece you took after cutting it into ten pieces." He asked me to keep cutting the banana this way and see how the number $\frac{1}{3}$ looks in the decimal system. If you cut it into ten pieces, three pieces is less than $\frac{1}{3}$; but four pieces is more than $\frac{1}{3}$. You can cut the small piece into ten parts. So, 0.33 is less than $\frac{1}{3}$ but 0.34 is greater than $\frac{1}{3}$."

In one of the books, there were many questions of the type, "Is $\frac{5}{6}$ greater than or less than less than $\frac{11}{12}$?" I would convert them into decimals and the answer was obvious. Others were working on the 'minimum common denominator.'

I did not realize it then but now that I think about it, various people would keep workbooks on different topics in my corner, including English alphabets and English literature. I would read them, mark up things that are new and true; cross out erroneous / bullshit material and move on to the next book. So, the society was mentoring me. I never found out who these guardian angels were. I know that even if I knew them, saying "Thank you." has no merit. In the life cycle, I should leave behind a better society than the one that I found. I will. Don't worry. I will. The delay in thanking the 'village' that brought me up is not that dire.

Now that I have done some research, many of the guardian angels were 'London Returned'. They were patriotic people from India who had gotten their education in England and returned to India to build a better India. **How much more lucky can I get!**

Phase 2b, five year old:

We were in a village named Halyal. Mother Yamuna was dead set on sending her first son to a Graduate School in Pune. Everybody was estimating the cost of travel, boarding, lodging and fees. Soon, they jelled on the figure of 300 rupees. With my father making 30 rupees per month, this might as well be infinity. There was a neighborhood store that sold rice, wheat and similar commodities. I went to the manager and said, "We need 300 rupees badly – to send my brother to Graduate School in Pune. I can do the arithmetic that I see you doing. Can I have that job and you give my family 300 rupees?" That man said, "You go and do your work. I will talk to your mother about it." I left. When I came home, the discussion of the '300 rupees' had disappeared. My brother was fixing to go to Pune – looking up the train schedule. I never asked how that problem got solved.

To me, they were all 'one time' problems. Once they are solved, you move on. So, there is no need for discussion.

I never thought of life as being repetitiously doing things that you like and relish it. When people would say, "Same Old! Same Old!", I had no clues as to what they were getting at.

Phase 3, seven year old:

In 1945, we came to a city called Pune which had a decent school system. The Principal, Mr. Kinker, had heard about me and my mother. When I followed my older brother to school, the Principal took me to his room and asked questions. I knew the answers – though in my own format and not in the format of the books. He said, “I will put you in the seventh grade. Depending on how much you catch on, we can put you in other grades.” It was OK with me.

So, at the age of seven, I was put in the seventh grade. Other kids in my class were 13 years old as a minimum. Some were a little older than 20. One of them was married and he used to make funny remarks to me about ‘playing games on the side’ – outside of his married life. I did not understand what he meant. But I would laugh away. He was one of the few people who took the bother to talk to me!

Two of the incidents are worth recording to bring realism to the write up.

1. One student was having his birth day. His parents wanted all of us to go to their home, eat and celebrate his birth day after the school. We were asked to bring our own pillows to sit on or whatever else you want to do with it. I told the teacher, “I cannot come. I am not supposed to come out after sunset.” The teacher said, “I will talk to your mother. She will let you come for this one occasion.” He did. I went to the home of the birth-day-boy. They gave a heap of stuff to eat and a lot of drinks, including coffee – yuck! When eating finished, we all sat on our pillows. I picked a corner spot and rested my head on the pillow. The next thing was that I woke up and found myself in my own home. I never asked how I got home. It is time to get back to validating additional information and building my life around the very few new and true things that I discovered.
2. Every year, one day was set up for talent show which had the formal name ‘The Gathering’. It was in the evening. Again, the teacher said, “It is not a big program. I can get you back home.” So, I went to this ‘Gathering’ and sat next to the teacher with my head resting on his arm. The next thing I remember is: Waking up in my own house in my room!

I was never invited to any program again.

Phase 4, age 7-12:

Principal Kinker was as much of an Indian patriot as they came. He had divided the students in a given grade into parts A, B, C --. Class ‘A’ was for students who can read on their own. So, the teacher is there to conduct discussions around the topics. I remember one time when people thought that being in the A-class gave them higher dignity. So, some forty people joined in class A. When the teacher asked them to read a chapter and come back, they wanted to know what the teacher gets paid for, if the student has to read on his/her own! Many of them dropped out and the class reduced to some 12 students which was usual.

A few discussion points might be educational since I followed that general style in all of my activities including teaching, research and family organization.

- Principal Kinker read out from a local pamphlet, “The British, along with other Europeans believe in white supremacy. So, the white people demean the

nonwhites and kill them without thinking twice about it.” He asked the class as to what they thought of it.

- Outside of me, the rest of the students were members of an ultra right wing Hindu Party, called RSS – Rashtreeya Swayam Sevak Sangha – national coalition of self sacrificing volunteers.
 - They said loudly and in unison, “So true! So true! We must protest and otherwise make their life so difficult that they will find leaving India a good option.” They were in a rioting mode and their noisy arguments continued until Principal Kinker called the class to order some three minutes before the bell rang – his usual style.
 - He asked me, “What do you think of this?” I said in a matter of fact way, “Russians have been bombing France. British are bombing Russians. In his biography, Winston Churchill orders the British Military to drop bombs on the French Navy on their way to Germany. They are all white. So, the thought that they are racists, is out right foolish. They are something but ‘racist’ is not it.”
 - The rest of the class was ready to kill me! Principal Kinker said, “Whoa! Freedom of expression! Each one of you gets to work in your own mode. In the course of time, we will all know who is right.”
 - Next day, I found my name and my statement in big letters in the glass case outside our class room. People would stop at the glass case, read it, bend down to look at me and smile. I did not think twice about what they might have thought of me. I said what I thought was right and I moved on.
- It is 1945. I am seven years old.¹ Principal Kinker raised the question, “When do you think the British will leave India?” The students from the RSS group were hot under the collar. “They won’t leave if we sit like lambs and take it on the chin. We must put the scare of God in them.” They were already organizing marches to protest the British rule.
 - As usual, when it was some three minutes before the bell rang, Principal Kinker asked me, “When do you think they will leave?” I said, “Next year, may be a year after that. They are a tired group. The heat and the heavy rains of the monsoon are getting to them. They won’t be around too long. What the RSS people say or do does not make a whit of difference.” The Principal asked, “How do you know?” I said, “My brother is working on his Ph. D. He is trying to figure out to whom he should submit his dissertation. The local Vice Chancellor, a British, has left and they are not replacing him. Do you want me to give you some names with whom you can check?” Principal Kinker said, “No need for

¹ According to my mother, I was born in October 1938. She was using the Indian lunar calendar. It takes much effort to translate it into the Christian Calendar which regards date of birth of Jesus Christ as ‘Day 0’. I tagged along with my older brother to the one room school in 1942. The British had the rule that you must be six years old to join the school. The 1942 school year started on June 20. So, the teacher made my birth day, June 20, 1936 and I was properly registered in the school! This kind of silliness was common in that period. The total economy being so small, and with the very low level of communication and high level of diversity in the world, such silliness went on till 1950 when the United Nations started developing some standards.

- that. I will look into it myself.” Next day, on the glass case outside our room, there was a writing in big letters, “Shriniwas says British will leave next year – may be a year after that. What RSS says/does will not make a whit of a difference.” People would read it, look way down where they could see me eye-ball to eye-ball and go away wondering. Nobody would discuss anything with me. I was only seven years old. I was skinny, short and shaky. So, they left me alone.
- August 1947 came and the British left. I did not jump with joy about my being ahead of the rest. I knew that we needed to figure out lot more things and find solutions to our many problems. These relative successive successes have no virtue.
 - There would be many other discussions, with each side loudly proclaiming this or that. Once a speaker asked me, “What do you think of this discussion?” I said, “They argue with each other. The monsoon is coming next. I do not know what arguments they will give to the monsoon.” Next day, this sentence was in the glass case. I got back to doing my work. I never felt any exhilaration in winning over my colleagues or family. The original problems stayed unsolved. These arguments and competition are ‘diversionary’.
 - I never felt that there was one job and two people were competing for it. If we had a good solution, we could use all hands that we could get.
 - **Better economists agreed that competition, ‘supply/demand economy’ etc are trivial issues set up for the less than talented people to get them motivated into working –otherwise, they will slough off.**
 - **With the automation and industrialization, it is better to not stir the bottom rung by talking about starving them into submission. It is better to give them simple nullity jobs as churches do and let them live out their lives in some level of dignity.**
 - There was one occasion which is worth noting. A teacher, not the Principal, was trying to teach something. He got upset with a couple of students who were sitting next to me and lazily mucking around. The teacher came with a six inch ruler in his hand, shouted at the students and he was ready to hit them with that ruler.
 - **I spoke up, “Hey! Hey! Hey! We are involuntary members of this community. We did not ask to be put here. We were put here. If you promise to beat them up, I will take you to them.”**
 - That teacher had never heard a well defined lecture like this from a skinny youngster in his life - also in the English language. He reported it to the Principal. The Principal came to our home and talked to my mother. I do not know what they talked. But the home atmosphere changed by a very big margin. In the classes, all the noise died out. Ruckus arguments of RSS disappeared.
 - I remember Principal Kinker taking me to some four temples and letting me speak those lines. I thought that what I spoke was right and I had no difficulty repeating the lines. Now that I think about it, I was becoming a one person ‘**Family Planning Committee**’.

Phase 5, B.Sc. with honors, age range (13 to 17):

I went into the twelfth grade at the age of 12. I went into junior college at 13 & 14.

Calculus and infinite series were the rage. Since I spent all of my time on self work, I covered those voluminous calculus books in a few months. Couple of things became obvious:

- All of the cute calculus results are based on this one result: $\frac{d\{exp(x)\}}{dx} = exp(x)$. So, there is no need to memorize the massive list of formulae. Just write everything in terms of $exp(x)$ and go at it.
- Infinite series do not work. Take $\log(5)$ or $\sin(35^0)$. Write the infinite series and try to compute it. You will not get the answer to even one-decimal accuracy.

So, I am on my own. I tried some alternatives. I could easily get two-decimal accuracy. I talked to a professor. He knew about it. But he did not wish to get too deep into it. He had other priorities. I let it go and started working on Matrix Algebra and Complex Variables.

- Under the heading of 'Matrix', you can refer to a page-full of data.
- Under complex variables, you permit terms such as, $\sqrt{-5}$. What is it? It is a number that sits there. When you square it, it becomes '-5' and you do to it whatever you do to any other number. Some calculations become very easy when you permit such numbers in the middle steps. For example, a polynomial of order has five solutions – some real and some complex. When you use real variables only, if the problem is enough nasty, you keep hitting such numbers and you spend a lot of time going around it. There is no need to go around them. Let them sit there. They cancel out in the course of time. Effort spent in going around them is pure waste.

Now it is 1954. I am 16. I came across some derivations being done by R. A. Fisher – he had not been knighted yet. Between him and two senior mathematicians, S. N. Roy and R. C. Bose, they had a 68 page proof that a certain multiple integral equaled $(\sqrt{2\pi})^n$. I converted everything to matrices and complex variables and the answer came out in three pages. Dr. S. N. Roy saw my derivation and said, "This is an old result. Keep up. There will be many new results and we will print them in journals." It was good enough for me.

I did not know that this news went to England and from there to Iowa State University where Fisher was a regular visitor.

Phase 6, MA & Ph.D. at Iowa State, age range (19 to 21):

Even before I had finished my B.Sc. in April 1956, I had an offer from Iowa State Statistics Department for admission and assistantship towards a Graduate Program. You do not need a high school diploma or an undergraduate diploma to get into Graduate School. I was 17 ½ years old.

My brother Ramanath was there. So, it eliminated a lot of trivial discussions about finding an apartment etc. I came in August - college started around September 20. I went to see Dr. Bancroft, the Director, in August without waiting for the school to start. He knew about my work through Fisher – whom he and others regarded as God. Dr. Bancroft had a six year program set up for me, two years for background work, two years for MA and two years for Ph.D. After talking to me for a few minutes he said, "I am going to excuse you of the background courses. You have done all the thinking that we teach there. You can start working with a Berkeley Graduate that we have – Dr. John Gurland is his name."

A discussion might be of interest to you.

Professor Oscar Kempthorne was a student of Fisher. **Kempthorne got an MA degree. He did not feel the need to finish his Ph.D. Note that Fisher never finished his Ph.D. either.** That speaks for the times.

He asked, **“Why does Fisher recommend randomization?”** The rest of the class had many imaginative verbose answers. At the end, it was my turn.

I said, “Professor Fisher worries that his worst enemies (Karl and his son Egon Pearson) will complain that he gave his favorite treatment to a chosen group which was receptive and the placebo/comparable treatment to duds, there by biasing the results in favor his own treatment. When he randomizes and assigns drugs at random, if someone complains, he can say to the detractor, “You do the randomizing and finish the trial. Your answers should agree with mine to the usual level of probability. Going to an extreme like this to avoid future arguments with an entrenched detractor is a good idea. I do this myself in many different ways. I never leave anything at the level of, “It is your opinion against mine,” Gandhi wears that towel and walks semi nude for the same reason – to prove to people that he has nothing up his sleeves.”

Professor Kempthorne was impressed. He started giving me some serious papers to read – rather than the commercial books with color graphics, aimed at the lower rung, not so much for telling but for selling.

Dr. Gurland had obtained a four year contract to compute tables of confluent hyper geometric distributions. While walking around the building, I saw that they had an ‘accounting machine’ which could do addition, subtraction, multiplication, some internal storage and a ‘baud rate’ of 10 i.e. it could do ten additions per minute. That was fantastic – in those days. I converted Gurland’s functions into recursive formulae so that at any given time, you do not have to do anything more than a few multiplications and additions. I computed a bunch of them in half a day, got them printed out and showed them to Dr. Bancroft who was standing right there. Dr. Bancroft said, “That is good. There are other people who can take it from here. So, you go on and work on some other topic.” Now that I think of it, Dr. Bancroft set up a computing laboratory around this accounting machine, assigned one of my friends as the head and he was given the task of computing for the Department and its students/faculty.

I was sitting in the Departmental Library and I saw some thick books which contained tables of logarithms, $\sin(x)$ and area under the normal curve. I looked up the old $\sin(x)$ on which I had worked in Delhi around 1954. I put my formulae on the accounting machine and printed a few pages. They agreed with the values in the book to two-decimals. I tried to extend the formula to get higher accuracy. When I got four-decimal accuracy, I showed them to Dr. Bancroft. Dr. Bancroft yelled out, “Everybody, come here for a quick meeting.” A faculty of about eight used to sit right around Dr. Bancroft’s room. When they came, he showed them and explained it to them. Two of them said, “We know this. These are called Hastings’ approximations. There is a man named Cecil Hastings at Princeton who has been developing such approximations.” Dr. Bancroft said, “Could you write or call and get any manuscripts or books that he has?” They all said, ‘yes.’

Within a week I had a dog-eared notebook on my desk with formulae that were cleverer than mine. I used that style to compute the area under the normal curve – that was the big deal in Statistics.

By the time I had computed a few pages of the table, with the numbers agreeing with those in the books to five decimals, Dr. Bancroft said, "Others can take over from here. You move on to something else."

Dr. Bancroft remarked, "When you take on a project, you are so self-sufficient – you finish the job without asking for any additional support. That is a great virtue. Keep up."

The Statistics Department was working on corn borer infestation. Others were looking at the number of holes in the corn stalk and used a t-test to see if the number of holes in farms with a spray were significantly less than the ones in the farms without any spraying. There was no significance. I noted that there was a two stage process going on. First, adult borers make holes and lay egg masses, about 18 eggs per egg mass. They hatch and produce some four healthy new borers. We must take this into account.

Dr. Gurland knew of exactly such work tried by Professor Jersey Neyman. Finding a maximum likelihood estimate was a most difficult task, even with the use of the accounting machine. Professor Neyman was using least squares and method of moments which were a little easier but not too accurate. I kept hacking, with many bits and pieces of results.

I was at Iowa State barely for 2 ½ years when Dr. Bancroft came to my room and said, "You have been doing a lot of work. Put all of it together and write it up into one document. We will call it a dissertation and give you a Ph. D. degree." I did not take the time out to enjoy this unusual success. I knew that with all of this, all of the basic problems stayed unsolved.

I wrote the dissertation. Dr. Bancroft got it typed with four copies on onion skin paper. Dr. Bancroft arranged for a meeting of the faculty, with I sitting with the administrative assistant Margaret Kirwin in the office space. Within fifteen minutes, they all came out and said, "Now, you are Dr. Katti!" So, I got a Ph.D. without a defense of dissertation – and without taking a qualifying or comprehensive examination. I did not know that normally people go through all of them. I assumed that what came my way is about the right way to get a Doctor of Philosophy Degree.

On hind sight, other ten or so people who joined the graduate program with me were still in the process of taking their qualifying examinations when I got the Ph.D. There were many courses where I got an A-grade while the rest got "Gentleman's B".

None of the colleagues or faculty or neighbors came to me and asked, "How did you do that? How did you get a score of 95 out of hundred while the rest of us had difficulty getting even 50?"

I remember occasions when they would be standing around the table where I would be working and speaking to each other, "He thinks he is a smart ass by talking off line like this. This might sell in a University. But let him try to get a job in an industry and he will see the errors of his ways."

In those days, 1956-1959, our Graduate Assistantships were \$125 per month. My colleague, Sydney Addleman argued with Dr. Bancroft and got his salary upped to \$165 per month. Sydney let me know that! After the Ph.D. degree, I got a job for \$700 per month. Sydney was depressed.

None of them had any interest in asking what I did or how I did it! I was not particularly trying to proselytize. So, I went my way and they went their way.

Phase 7, My First Job At Florida State University, Part I of 2, Jan 1960 – August 1964:

When Dr. Bancroft announced that I had been given the Doctoral Degree, he called me into his room and said, “There is this head of Board of Curators at the Florida State University, located in Tallahassee, Florida who is trying to develop a Graduate Program in Statistics. He and I agree that who is more qualified to develop and operate a Graduate Program than you, who have been through it all your life.” I accepted the offer – without an interview or application. I did not know what the salary was, what the designation of the appointment was and other details. I did not give any value to those items. We need to get going with solving the real problems. We cannot afford to get diverted by the side issues of local nebulous value but no permanent virtue.

Now, that I think about it, I was given Assistant Professorship and Director of Graduate Studies, starting with January 1, 1960 and with tenure guaranteed as of September 1960.

Now that I think about it, the Board of Curator was a very wise man. He knew that, without tenure, the local people with their racism and all would throw me out at the first opportunity. I did not know that the appointment was made by the Curator and not by Ralph Bradley who was made the ‘Director of Statistics’ some four months earlier. It was agreed without great discussion and debate that Dr. Bradley would handle all of the financial details and I will handle all of the subject matter details including getting the Graduate program approved, hiring doctoral level faculty & students, guiding the theses and dissertations and the rest. We were two faculty members. Three faculty members were loaned by the Mathematics Department to cover the basic ‘bone head’ probability and statistical computing.

I did not associate any great value to position, power etc.

Two weeks after I had been at the FSU, the Curator came to my room, took me to the local cafeteria and said, “How do you plan to organize the Graduate Program?” I said, “I was going to ask you how you wanted me to organize it. North Carolina has a Statistics Department. Iowa State has a Statistics Department. So do Berkeley and Stanford – though they are called Statistical Laboratories inside the Mathematics Departments. We can make a mix of them.”

The Curator spoke with some roughness, “If I wanted a program similar to those, I would have hired one of them. I have hired you because you are the one with the new ideas!” I said, in a matter of fact way, “That is true. All those programs are pre-war. The problems that they are solving do not have much merit. We need to develop new methods for the new society that is emerging.” The Curator and I agreed that I will send him a brochure with the courses neatly organized, with a recommended textbook.

We agreed that the text book will be covered in half the quarter and the work of the Graduate Faculty will be the topic in the second half.

The Head of the Curators and I agreed that making a vast number of laws to govern a research program is waste of effort.

It is the enthusiastic few with unusual talent who get the work done. We agreed that each student will be hired / admitted with the enthusiastic welcome of a faculty member. **A committee will be there to help the student and the professor who is guiding the student.**

The committee is not set up for giving secret votes to the faculty so that they can do harm to the student in the darkness of anonymity.

In May 1960, a few months after my joining the FSU, I found that Dr. Frank Wilcoxon, father of non-parametric statistics, was retiring and would be leaving for Ireland. I asked him if he would like to join FSU. He put his arm on my shoulder and said, "You need a job and you have one. I came here for the war effort. Now that it is over, it is time for me to leave." I tried to argue in a child-like way, "The war is nowhere close to over. The fact that somebody signs a document does not mean that the war has ended. Wars create losses of many kinds and we need all the good minds to make up and move forward."

Dr. Wilcoxon was not to be convinced. I called Dr. Bradley. He was not too positive. He thought that Wilcoxon was too old; he comes from an industry which is not compatible with the workings of a university etc. He knew that my next step would be: call the Head of the Curators.

Dr. Bradley called the Curator himself. The Head called Dr. Wilcoxon and spoke to him with much respect and affinity. Dr. Wilcoxon accepted our offer and was with us till he died of heart attack – I forget the date.

We admitted two students, I guided one and Dr. Bradley guided the other. My student finished his Ph.D., went to California and developed a computer center. Dr. Bradley's student had some health problems. In the course of time the student dropped out.

It is only recently that it dawned on me that Dr. Bradley, who was hired to start a new Department at FSU never showed admiration for this mile stone.

In 1964, our Statistics Department was rated the 'best' by the American Statistical Association. Professor Neyman, who had now become a member of some major national entities wanted to know how we are able to operate a successful department in the backwoods of Tallahassee, which was called 'South Georgia' by some in a derogatory way. He came for a whole week. He interviewed the students, faculty, administrators and everybody whom he could find. He wanted me to take him to the airport. At the airport he said, "It is all you. **Over a short period, may be five years, Tallahassee will take over.** When that happens, do not get discouraged. Move on in peace. **It is a matter of great shame that none of us are in a position to help you. You will have to struggle the way I did when I was in your shoes."**

It was most consoling. It put reality in my head.

There is a macroeconomic equilibrium in force. None of us can change it.

That equilibrium is not a happy place. The amount of daily scrapping is unbelievable. The equilibrium keeps every one busy 24/7. If you are not already gotten caught up with it, live your life your way – but make sure that you are fully self sufficient.

If this is happening at the level of Ph.D.s, what do you think is happening at the eighth grade level where the median is? What is happening in areas such as politics, art etc. where subjectivism rules the day?

Note that people have guns.

My travel through the wonderland, starting with 1942 when I saw my mother telling me to validate everything, followed by a society encouraging me to do what is right – is it ending? Even if it does not end sharply on a given day, its phasing out was made clear by Professor Neyman.

Phase 7, My First Job At Florida State University, Part II of 2, Aug 1964 – August 1969:

- Dr. Wilcoxon died.
- The Head of the Board of Curators retired. These were honorary jobs, given to active patriotic members of the community. People got off after four to six years. This Head did not take the bother to settle/protect the program that he started with me.
- I noticed that Dr. Bradley made two appointments of his family friends, one at the visitor level and one at a Professorial level. Neither of them had any aptitude towards a Graduate Program or research. I talked to the Dean.
 - The Dean was most explicit. He said, “You are doing good work in your career. It is a full time job. Working on Departmental Politics is also a full time job, leaving no time for your self-work. You have to pick between the two. There is no way to make a combination.” I agreed with him. I told him what Professor Neyman had told me. I agreed that I have been given full freedom to work on my topics. I will continue with that.”
 - While the Head of the Curators and I had an operative style, it was never codified, because of our feeling that anything that is codified can be taken over by a dumb group and it will have the format of legalizing the Ku Klux Klan. So, when Bradley would discuss his ideas with his confidantes and make decisions without informing me or asking for my advice/consent, **I let them go, though the precedence all along was that Dr. Bradley was the book keeper and I was the Director of Graduate studies in charge of the course program and research.** I let the Dean know what is happening. We both let it go.
 - In 1968, my student Bill Warde and I were reading the literature and found an open topic on ‘Infinite divisibility’. For discrete distributions, the conditions could be written in formats that could be used to test for independence of longitudinal data. We did the usual research and submitted it to the Annals of Mathematical Statistics, a prestigious statistics journal. We got a call from Professor F. J. Anscombe. He said, “This is an interesting paper. Who in Tallahassee is interested in a topic like this?” I laughed and said, “It is just me.” He said, “It needs some rewriting to put it in the proper format for a mathematics paper. I will do it and publish it under your name if you permit me.” I had no difficulty so permitting. It was published.
 - Tallahassee was taking over. You can call it ‘creeping Tallahassism’. One of the faculty members, with much detailed discussion with the other faculty members in their cabals, came and told me, “You have hogged the position of Director of Graduate Studies. Others would like to have their turn.” He was most explicit

that it takes power politics to get anything done. Probability theorists wanted their share of power, away from the power block of applied statisticians and away from the forthcoming power block of computer personnel.

- In 1964, we were still working with Monroe and Marchant machines that weighed a few hundred pounds and were based on rotating wheels with teeth. They could do the basic additions, subtractions, multiplications and division. We got one machine which could do square root.
 - I had a friend who was working in his garage on an electronics based central processor which had a baud rate of some 600. The central processor could be connected to a dozen keyboards with an accumulator. He gave it to me for a trivial price. During that period, Bradley had gone to visit Egypt. When he came back, he saw his trusty Monroe machine replaced by this quiet keyboard which could do a lot more functions and I was set to put $\sin(x)$ and area under the normal curve on it. Bradley was truly 'pissed off'. His confidantes agreed with him in the background, in silence.
 - **Tallahassee was taking over.**
- I openly started looking for a new job. Bradley could not be more pleased. At that time I did not know. But on hind sight, I have figured out this.
 - His promotion to full professorship had been blocked at the Virginia Polytechnic Institute, not one of the big ten Universities. Bradley was given a full professorship at Tallahassee. He was not that thrilled. FSU at Tallahassee was a beginning program, requiring an unknown amount of unknown work. So, he had settled down on getting to Tallahassee, getting a friends' circle, buy a boat and spend the rest of his life in Sunny Florida.
 - My appointment by the Head of the Board of Curators and my enthusiasm in research was disturbing.
 - He would submit papers but almost all of them were returned with serious remarks and suggestions for additional work. My papers were published as is.
 - His wife was active in the 'Faculty Wives Club' and brought much background information. I got my wife to work in a chemistry lab, pay her taxes, her retirement benefits and bring some money home. By the local standards of the time, she gave America two children. Most of her salary went into baby-sitting and the like.
- In June 1969, I got a job with the University of Missouri, Columbia. The salary was \$3000 per month. Bradley's salary was \$2300 per month,
 - The Dean called me and said, "I am asking for the resignation of Richard Savage. I can make you the chairman of the Department, of course as a Full Professor. Salary will be matched." I thought for a minute and said, "You just increased my self confidence by a big margin. If I stay here, I will be looking over my shoulder for ever to see who is gaining on me. So, it is better that I go to a new place and start again." The Dean agreed.
- **Now fifty years have passed. Most of the new comers of the 1960 period are alive and are muddling through the equilibrium just like everybody else. So, all**

of the problems of USA apply. I will make some summary comments at the end.

Phase 8, My Next Job At University of Missouri, Aug 1969 – August 1995:

I was made a quick offer of a Professorship. I was to work on the Doctoral Program. There were two people who had the background for a Graduate Program: One was Dr. William Thompson who was with me at FSU and who left before I did. The other was Dr. David Lee Hanson, a true blue Mathematician who had slipped into the statistics sector, mostly because statisticians made more money than the corresponding mathematicians. My job was to get my own additional Graduate Faculty. With the experience at FSU, I knew better than to high light the differences between them and me. This group was in the equilibrium to be expected in the Missouri/Iowa area. Their hero was a man named 'Hogg' who had no particular standing in statistics. He was an actuary man. They had their farms and interests in their churches. If anyone deserved the sign 'Don't tread on me', it was this group. They had set up their schedules so that they could teach one Tuesdays and Thursdays, hold student help sessions on Wednesdays and work on their farms for the remaining four days.

You might ask, "How could they get away working only three days a week?" The answer is that the upper level people who should have caught this were farmers themselves and they were just as surprised that I was there from 8-5, M-F. They never figured out that I was 24/7.

There was a bright mathematician who was deeply interested in matrix algebra and had gotten the matrix based software called APL (A Programming Language) on the central computer.

The central computer people were trying to make a living and enjoying a good life. So, any demands had to be submitted through channels with two days of turn around.

I found that the Radio Shack had a machine which had this software. It was built in. So, it was much faster. So, a variety of computing that I had not gotten done at FSU was finished quickly at UMC.

No one else had any interest in what I was doing. Their plates were full. They were playing both the offense and defense to the maximum to maximize their self benefit. **That is a fair in the US Culture.** I had brought a student from FSU. She finished her dissertation. She took her defense of dissertation at FSU and got her degree there. She was given a Graduate Assistantship at UMC that we all appreciated. Credit goes to Fred Williams who was an economist, and more importantly, a thorough gentleman.

It was about 1975 when IBM put out a 'PC' which could take APL and which was self standing. Cost: \$2800 per unit. I asked the Dean through proper channels that they buy me three PCs, one for my use and two for student use, one in student room and one in my room for students who needed continuing support. I was told that it takes some five years for a new request to come to the surface. My request is too personal. It is not about more space for the Department or walls needing a new coat of paint. They are easier to get approved. The Dean said, "You may wish to apply to NSF or something."

I went to the local store and bought three machines using my own money and the students started working in my room at the start and in the general room when they became sufficiently independent.

Somebody on the faculty complained about my conducting a private business on the University Campus! **It is easy to guess the name. There was only one faculty member who was loud and did not mind public discourse. The rest were the quiet souls, seeking peace on earth. Let me get on.**

The Dean called me. He said, “After I told you to apply to NSF, you went ahead and bought them any way. How do you justify that?”

I said, “I am using my personal funds in a licensed store to speed up students’ theses / dissertations. How could I have done something wrong?” The Dean said, “OK. Good luck with the machines – though I have no idea what one does with them.” So, the problem was solved.

There were many similar situations.

Now that our children have gone through the school system, I can understand our faculty better.

When you want to do something, it is **improper** to go and start doing it. It is **worse yet** to get it done and finished. Nobody pays for work done without a prior agreement to pay if and when the project is finished. So, here are the steps:

1. First formulate the problem that needs solving in great generality. There are many role models.
2. Then make a budget that is needed to solve the problem. Make sure that you put in a 60% overhead. Clerical staff and others do not work for free.
3. Submit it to the grants department. Make an appointment to discuss to whom to send. They might have better ideas and formats to send the application than the one you have figured out.
4. **It takes six months to two years. When you get paid by the month, what do you care!**

I kept track of one of the faculty members who had gotten proficient in grantsmanship. My computing showed that **he would have made more money if, instead of doing the proposal writing, he had painted garage doors.** I did not tell him.

Once I had a discussion with the Dean on the general topics. He said, “You have good ideas and you want do them fast and finish off. That will do your career much good. Getting money from the system and so on is a game all by itself. It is a full time job, all by itself. You decide which game you want to play.”

I replied, **“These are things I would do on my own if I was unemployed. Now, I do them and you give me some money. How can I complain? People who suffer when they do statistics have a right to say, ‘I won’t do this if I do not get paid enough for it.’ I cannot say that. This style is good enough for me.”**

I have found since then that people like Professor John Tukey and F. J. Anscombe were treated with dignity because they used their family funds to operate the Department and paid the poor slob who needed to get paid to do statistics. So, asking for money to do some work, also called work ethics, is not very much to be admired. So, my Hindu sect which did public-good without expecting salary has much to be admired. So, you know from where I come.

So, it became customary for me to use my own money and get my work done and not ask for additional funding. The faculty figured it out. They would be way ahead of me in applying for travel money. They would maximize their take home pay. They worked around the clock. Some of them complained, rightfully, that they were working to the bone for such trivial salaries. I never felt that I was working to the bone. I did not have anything better to do.

I would take the expenditure that I made on the computer etc. as business deduction. After a few rounds, the IRS questioned me as to why I spent my own money in a State University. They warned me that they might not permit the deduction on the next round. The fact that a senior faculty spends his own money at a State University did not sit well with the community. At least, it became a matter of some discussion.

My family felt that we should develop an endowment fund for the use of students – the way I had been subsidized.

With Ferrin putting in his money, we quickly got the amount to some \$60,000. In those days, the stocks were rising and the investments paid off.²

The faculty, with the loud member speaking his share, decided that the endowment does not contain the 60% overhead and the administration was not going to work for free. It did not bother me. The end game was in sight. The money that they did not use would be available for future groups.

It did amaze me that the Dean and the Associate Deans would be sitting with a long list of requests. The money approved through the channels would take care of the top ten percent at best. Why would they not like to subsidize the next few using this fund?

I was amazed and astonished at this degeneracy where the administrators wanted to get paid to give money to people who had spent much time to make that request.

It was depressing. My evaluation of the future of America took a deep dive.

In 1990, it was clear that the good money was not in research, whether in medicine or physics or Engineering. There were some administrative changes. So, the administrators at the level of Dean and above could get a percent of the income that they brought.

At the Medical School, an HMO was developed with well defined rules. Through the HMO, UMC started getting patients flown by helicopter. The money that some of them made was unbelievable.

In 1990, all of us got a memo telling us that we can discuss a negotiated retirement before we reach 65. I was only 52 according to my mother and 54 according to the British Raj. Our children had not stabilized. I let it go. Our salaries prior to 1990 were so low that the computed value of retirement was quite minimal for the market basket that was available. A market basket is not the same as inflation. What was available in the market post-1990 was very different from what was available pre-1970.

² Ferrin's role should not be under-estimated. When I was starting in India with \$10 per month and in the USA with \$125 per month, thinking of \$100K looked Quixotic. Without Ferrin butting in, it would never been done. It is the next generation that can become the next stage rocket that flies far and wide.

People want to keep up with the current market basket. The retirement salaries based on the old salaries would make people look very poor in the years 1990, 2000 and up.

By 1995, the industries had changed too. FDA had converted drug development into a more organized statistical algorithm. I could get appointments in some five of the industries for the asking. When the University offered me one year's salary and full benefits, I took it and moved on. I was 59.

FINALE

In the history of the world, 1850 and 1920 are two good markers. In 1850, collecting large scale – sets of thousands – data and making up histograms, fitting gamma distribution, beta distribution etc became common. Computing mean, median and mode was regarded as standard procedure.

In 1920, Ronald Aylmer Fisher brought to the front the topic that large scale data invariably contains too many uncontrolled factors. So, one should work with controlled experiments with relatively small sample size, e.g. 15 per parameter, and account for the smallness of the sample by randomizing and using confidence interval / tests with preset type I and II errors. With controlled experiment, what is lost by the small sample is gained by the decrease in the variance. Every clinical trial lists a vast set of 'inclusion/exclusion' criteria so that you are making inference about a limited group with high accuracy. With the large number of clinical trials made, the total number of issues covered is large. We are now making trials on rare diseases in a separate format.

Least squares estimates were used in Physics even in the sixteenth century. Maximum likelihood estimate was well studied by 1920 – make it 1924 if you like. If you look at the history of China and India, you will see the astronomers using least square estimates far back, tens of thousands of years ago.

Well defined Statistics Departments meant to develop new statistical methods started with University of North Carolina.

- Most Mathematics Departments in the major Universities developed statistics as a 'computing part' of the mathematic department.
- Medical Schools developed their own statistics groups. Iowa State was among the early full scale Statistics Departments. I was among the first few to say:
 - Statistics is about well defined populations. So, the stress on infinity, Borel measurability etc. is of little value in statistics. One should replace them with other problems that are more pertinent. Note that the old topics are now many centuries old and their marginal utility is dead zero.
 - Asymptotic work has lost its value when we are working with statistical issues. Before continuing with the asymptotic work as a continuation of the momentum of the past, ask if we have new problems and new tools that can serve us better.
 - When I made up a brochure in 1960, it was quickly copied by the many Departments of Statistics that were developed over the next ten years. This included University of Nebraska, Penn State, just to mention a few.

HOW FAR HAS STATISTICS COME TODAY:

Computes have made quickly and easily accessible many tools that would take much time and study in the past. This ease has permitted people who have taken a course in a community college on running a SAS deck to run PROC MIXED. This PROC MIXED uses a combination of least square and maximum likelihood estimation.

In my most recent job, they got a negative value for a 'sum of square' with zero degrees of freedom. They got upset only when an independent reviewer noticed it and rejected the report.

This is just to show how unthinking use of software, not just statistical software, is making deep inroads. It is not promoting people to learn more about the models that underlie the software; use them only when they are appropriate; and extend them as needed.

This is one way to reduce the statistical profession to the clerical level where it was pre-1900.

Notice that SAS, SPSS, MINITAB and all popular software are based on pre-1920 vintage knowledge. We do it fast. When we are involved in approval of new drugs, speed should not trump thoughtful models, knowing the details of the algorithms behind the software and custom making new tools. Let me give a couple of examples to show the need for these.

- Cancer studies involve exponential distributions. To accommodate the linear model, our biostatisticians routinely make logarithmic transformation. With a log-transform, all numbers go down, including the difference to be detected. I worked directly with the exponential distribution and showed that there was a dose response relation in 1997. Much work has been done. Now, we have many cancer survivors.
- Similar case arose with HIV. HIV load is measured by putting fungus in the blood sample. This becomes a two stage model and the normality assumption goes out of the window. It is only when we gave custom made solutions that we could start controlling HIV.

So, people who are tempted to stop with the old technology, speeded up by the computers, should think deeper.

You cannot afford to avoid the painful work that my generation did between 1960 and Y2K.

Just as my work was subsidized by the society which had deeper interest than making a good quick living, I hope that our endowment fund will help some unknown person to widen his horizon and come up with solutions that are being left out by the current culture with its interest in quick and dirty solutions.

This idiom, 'Quick and Dirty Solutions', was created by Dr. John Tukey in the 1940s when people started computing the fairly simplistic formulae without attention to the details. Tukey died only a few years ago. I wonder what he would say about the statistics that is being done under the heading of applied statistics.

STATISTICAL ANALYSIS OF YOUR FUTURE

In this rather long life, I have kept track of some 200 workers closely and some another 300 people in its macro economics.

Among the people who apply for jobs as statisticians, some 80% will thank their stars that they at last got a job.

The next group, (80%, 90%) has to work with whatever is available. There are many managers and heads of establishments i.e. Universities, industries and Governments, who have a shop and they have no enthusiasm in going outside of it. Some are stuck with SAS and talking about even FORTRAN can be dangerous to your health. This group can be supportive of the new group when they make unusual demands.

The group above the 90th percentile is the one who can introduce new methods and promote / formulate new tools. **Currently, this group is not doing it.**

If we could identify which one of you belongs in which category, that would make operating a teaching system infinitely easy. Some people have told me, "I like to learn as I earn." That is a wrong attitude. People are not so generous as to fill you in free of charge on new things that you can use and rise and shine. In some places, I told the manager, "This worker is stuck because he does not know some things. I can fill him in, if you wish. It can take an hour a day for a month." The manager did not approve it. I let it go.

In every place that I have gone in the last ten years, the human resources people tell me quite openly that some 20% of the personnel are fired each year. When one project ends and a new one is obtained the person who brought the new project would like to hire his/her own people; give money to his own people.

While I was writing this piece, I was listening to **President Obama say, "We must divert some 3% of our Gross Domestic Product into innovation."** I hope that it works and the current style of running old software unthinkingly will be a thing of the past.

One thing that one learns as one reviews history, and at my age, I have the time, is that **there is no such thing** called 'business cycles' i.e. thing go up, then go down and then go up. Many cultures have gone down and died out.

So, you do not have the luxury of waiting it out for the times to change.

You have 24 hours a day and seven days a week just as I did. You should not need all of this time to eke out a living. Eight hours a day should be enough. So, spend the 24-8=16 hours per day doing something worthy, something non-trivial, something better than what you have been doing before.

Feel free to contact me and ask questions: my email is: skkatti@comcast.net.

There is a general feeling that one should live for today – and create a history that you can relish.

That is not my view. What is going to happen today, tomorrow or even five years from now, is determined by what you have done in the past. It is only the far distant issues that you can change in any significant way. Starting with 30 rupees per month that my father made in 1942, we have come to a point where we made an endowment contribution of \$100K. It took half a century.

So, when you are thinking about the future, pass your ideas by me. I will give you my views – free of charge.

You will have the option of taking it, rejecting it or making some modification of your own.

You have some very difficult times ahead of you.

I checked on a number of institutions and individuals. It was hard to find one which was 'net positive' i.e. their current liquid assets are exceeded their credits by a big margin. Such economies can collapse most easily. Listening to a person like me, who has come through the difficult times, might have some value.

Good luck to you; and God bless America and the world.

APPENDIX I: WHERE DO I GO FROM HERE?

We get our social security, retirement etc. With our long track, this is substantial money. When we eat rice and pea curry as our main staple, the money goes a long way.

I still get jobs at Pharmaceutical Companies oft and on.

I do some home based business to keep my mind working. It is amazing how terrible the day time TV shows are.

Coming from the old Hindu Culture, I am constantly aware that everything that is born is predestined to die. I have no illusions that millionaires live longer than the rest of the people like me who are not short on daily bread and medical care. Even inanimate objects have their life cycles. I was reading an article on 'metal fatigue'. Societal structures, including industries, highways, universities etc. have their life expectancies. When I was making premium tables for insurance, I brought up this point again and again: how can you make century-long contracts when the systems do not have that large a life expectancy? I was shushed.

So, I am not planning on collecting the maximum amount of money at my death-bed for my inheritors to pick up. As we used to say in the churches, "I aim to give the inheritance with a warm hand, rather than with a cold hand." Some of my old computations showed that resources inherited with a cold hand are cashed in on a dime per cent i.e. 10% of the value.

So, I aim to continue to participate in the society on a continuing basis in one form or the other.

I am so glad that our son and his family are here to see the process. I am taking just our son and his wife to India during the Christmas period so that they can get a correct and clear view of the history – may that help them to set up their lives. We cannot imitate history. But we surely can learn from it.

We have a daughter who is in Chicago. She is in an entirely different phase of life. She could not come here. She is always a part of my thought process.

I used to think that I am the only one who thinks this way. That is not true. Some 'fifteen per million' do it routinely. Thus, in the USA, with its population of 300 million there are some 4500 people running around doing this way.

APPENDIX II: WHERE IS THE REST OF THE FACULTY GOING?

At FSU, UMC as well as the Pharmaceutical Industries and CROs, I have not influenced anybody and nobody has influenced me! People will follow our successes on a 'three generation rule' basis as I spoke above.

It is not a case of their disagreeing with my ideas. Dr. Robert Tsutakawa used to yuck it up about the Bayesian methods. I used Bayesian methods successfully. But he had no interest.

My work on APL, which was stored on a McIntosh Computer, got thrown out when the machine was discarded within a few days of my leaving.

At FSU, the central processor that I wired up was pulled out and stored in a back room within a month of my leaving. They are back to where they would be if I never existed.

What is the problem? Where is the problem?

Each person converges to a life style quite early. In talking to them, I figured out that they think of their life as a picture with puzzle pieces. You might have seen pictures of USA with puzzle pieces and you might have tried to put them together to make the map.

So, these people feel that over their life time, they have put together so many pieces with the picture being still highly complete. To make the puzzle complete, they are looking for some very specific pieces. My Bayesian method did not fit the exact shape and size of the puzzle that he was looking for. Same can be said about the many other incidents.

Now that you know the whole story, you are on your own. I wish you good luck again.