Symposium Comments

May 15, 2015

I would like to make some thankyous and a few comments.

I want to thank Sid Nagel and the organizing committee for all the work they put in in making this event a success.

I also thank the staff who worked on this event.

Thank you all for coming. I am particularly thankful for those of you who traveled to be here.

I wanted to make a few comments about the incongruity of me standing here with

40 years as a physics professor at the University of Chicago.

My path was a bit unusual.

I was born in the coal fields of Pennsylvania to parents who never graduated from high school.

My family moved to Los Angeles when I was 8 years old.

I had two older brothers and a younger sister.

My family was mostly about sports.

My oldest brother played professional baseball, the next oldest brother was one of the best basketball players in the history of his high school in Pennsylvania. My sister Debbie owns and rides horses.

I played baseball (3rd base) and football (QB) in high school and was named Bell high school's athlete of the year my senior year.

I was captain of both the football and baseball teams.

Academically I graduated first in my class, and yes I was a member of the Math Club.

I accepted an academic scholarship to Stanford.

Surprisingly, although I had not yet met a physicist, I declared my self a

physics major at Stanford before arriving for my freshman year.

I went out for the freshman football team but found I was more interested in studying physics so I told the freshman coach that I was going to concentrate on my studies.

He by the way was Bill Walsh who would go on to be one of the greatest coaches in the NFL with the 49ers.

I enjoyed my time at Stanford. I was President of my fraternity, Phi Sigma Kappa, and also QB of its intramural football team.

A high light of my time as fraternity president was caught by a photo of me dancing on stage with a San Francisco GoGo girl as part of the entertainment we provided to the University community after a Stanford football game.

Academically I progressed from struggling to compete with the prep school guys and Stanford women in English,the humanities and social sciences.

I did not know any of my high school buddies who got an A in Freshman English.

My high school was poor in these areas. But they were much stronger in math and science.

In physics I held my own at first at Stanford and got better. By my senior year I was one of the strongest undergraduate physics majors at Stanford.

I went off to physics graduate school at MIT with a load of confidence.

The first thing I did there was to meet my wife Judy, the love of my life. We have been married 46 years.

In graduate school things were chaotic. It was the middle of the Viet Nam war.

While I had presented myself as an experimentalist in my applications to grad school,

I knew theory was my strength so I had to find a professor who would support me to do theory. Professor Uno Ingard, an acoustition, offered to support me and allowed me to do theory.

Then I had a bit of good luck. In my second year of grad school I heard about a course in condensed matter physics given by Harvard Professor Paul Martin. I attended his year-long course religiously.

As I attended this class I read the related book "Quantum Statistical Mechanics" by Kadanoff and Baym.

As I read the book I started formulating a calculation. I studied the problem of sound attenuation in a dilute gas. This was a topic of interest to Professor Ingard.

Using the methods of many body theory I carried out the derivation of the kinetic equation valid at low-densities. The new element was that it was valid at high frquencies and short wavelengths.

I had effectively generalized the Boltzmann equation to include all wavenumbers and frequencies.

After class nearing the end of my second year of grad school, I approached Professor Martin and explained the calculation I was working on. He encouraged me to do the calculation. I responded that I had already done the calculation. From that time on he treated me like one of his students.

I finished writing this work up by the end of my third year in grad school and then concentrated on not being drafted and finding a job.

I was pleased to find a post-doctoral position at Brandeis which was

productive for me.

I developed a modern approach to kinetic theory using operator methods. This Fully Renormalized Kinetic Theory (FRKT) was used to successfully describe neutron scattering experiments at Argonne .

I then had the good fortune to meet Professor Sydney Yip at MIT. Sid was one of my most important mentors. He was collaborating with Paul Martin and set up a one-year post doc for me at Harvard and MIT. Sid and I wrote a number of papers during this period on FRKT.

I also became aware of the revolution in critical phenomena being driven by the development of the renormalization group.

It was during thus time that I met Harvey Gould who had just moved to New England. Harvey then introduced me to his close friend Sheng-keng Ma.

I was also able to finagle an invitation thru Martin to attend the famous Temple University conference on critical phenomena. This conference was mostly Ken Wilson explaining to the world's most famous field theorists why they are dufuses.

Getting involved in the field of dynamical critical phenomena was unavoidable.

In the mean time I arranged another post doctoral position back at Stanford with Seb Doniach in Applied Physics. Fortuitously Professor Ma, permanently at UCSD, was taking a year's sabbatical at Berkley. Since both of us were in the Bay area Sheng asked me if I wanted to collaborate on a problem in dynamic critical phenomena. I enthusiastically agreed.

This resulted in the first renormalization group treatment of the critical

dynamics of isotropic ferromagnets. This lead to fundamental work on the critical dynamics of Isotropic Antiferromagnets with Freedman and Nolan.

Judy and I enjoyed our time at Stanford but our time there was limited.

Not very long after arriving at Stanford I received a letter from John Hertz inviting me to come and visit Chicago. It was clear that there was more at stake than a JFI talk. This visit resulted in a job offer I could not turn down.

And on January 6 , 1975 we drove our Mustang up to the front of the 1700 building where Randall, the door man, cheerfully opened the car door. Just as he will if I drive to the front of our building tonight.

It was an exciting time at Chicago. I was hired as part of a rebuilding effort in condensed matter physics. The major players are here tonight: John Hertz, Kathy Levin, Sid Nagel, and also Paul Horn and Stuart Solin.

I should point out here the very supportive role played by Stuart Rice.

He has helped me in important ways throughout my career. The senior faculty generally and their spouses in particular made us feel welcome here.

While we were just assistant professors we were encouraged to get involved with the building of our group. We grouped together to encourage the hiring of Leo Kadanoff. Tom Rosenbaum and Albert Lichaber followed later. We had a strong group of post docs: Oriol Valls and Bob Freedman are here tonight. It was a dynamic, productive time.

I worked on the dynamics of glassy systems and liquid crystals.

The next period in my career was in administration. I served two three-year -terms as JFI director.

Over my 6 years as Director we moved from a staff led by one set of

legendary figures running the JFI: Ruth Patterson and Ray Szara to another set: Rosemary Garrison and John Phillips. These four people had more than 160 years of service at the University. Working with this group of people was a pleasure. They were among the finest employees working at the university.

As my second term as director came to a close I got a call from the Provost's office asking if I would agree to be the science guy in the provost's (Ed Laumann and Geof Stone) office.

This evolved into a position as Associate Provost with portfolio consisting of the Library, Computing, Research Adminitration and advising the Provost and President on science promotion cases.

I learned a great deal about how a university works and much of it was fun. I made some new good friends: Pat Swanson and Mary Ellen Sheridan in particular.

When I retired from my position as Associate Provost I was replaced by a guy named Bob Zimmer.

I mentioned my playing football earlier as a lead into the following story:

As Associate Provost I was invited to a retreat for senior officers of the university including Deans. Part of the program was to participate in games: volleyball, basketball, and touch football.

As the senior officers and deans were exiting the retreat center on to the playing fields the Provost jogged up to me and said for all to hear, as he flipped me a football: "I hear you can throw the ball. Lets see what you can do?" At which point Hank Webber, vice-president for Community Affairs, took off running. I delivered a 40 yard tight spiral perfectly into Hanks arms. A miracle! Later, when we played touch football, Hugo asked me to play QB

for both sides.

At my retirement party, from my job as Associate Provost, I was presented with an autographed football and a UofC football helmet. These sit in my office as I speak. All thoughts of my work on Library migration lost in comparison with that one perfect pass.

Back doing research I worked on problems of growth kinetics. The kinetics of the growth of order in quenched systems.

In my spare time I wrote three graduate text books.

Later I was led back to considering kinetics of fluids systems. Starting in 2008 I sought a new fundamental theory of strongly interacting particle systems.

As discussed in the talks earlier today I evolved a new fundamental theory for classical systems which is self-consistent, contains no infinities, and simultaneous treatment of static and dynamic phenomena.

As shown in Dave McCowan's talk, we already have a practical framework for treating glassey dynamics.

Work With Shankar Das has been central in developing these ideas for treating the glass transition.

Work by my remaining student Paul Spyrides shows great promise.

Indeed there is a great deal of work left to explore with this method.

As one aspect of my academic career comes to an end I am thankful to have lived the life of a physics professor.

It is in my mind a perfect fit.

One can work hard on understanding nature without having to beat up on anyone else.

A chance to form a team including young people and go off into battle against a physics problem is a fine thing.

Indeed I have a few more campaigns left in me.

Any students want to join me?

The life of the mind is a wonderfull thing.

So is tenure.