

Now, Dr. Chien-Shiung Wu, a nuclear physicist, is perhaps best known for her study of the beta decay of radioactive atomic nuclei. She's made other landmark experiments as well. She is, I think, well called, as Margaret Lewis termed her last night in her introduction, "the first lady of experimental physics."

Professor Wu.

CHIEN-SHIUNG WU: Ladies and gentlemen, it is a great honor to receive the Lifetime Achievement Award on the 40th anniversary of the Arthur and Elizabeth Schlesinger Library at Radcliffe College.

It was exactly 40 years ago, in 1943, that I received an invitation from Professor Smyth of Princeton University to teach physics there. Of course, I was overwhelmed and accepted the offer with great joy. However, he did not answer me until several weeks later. Then, in his letter, he mentioned that he had not realized it would be so difficult to appoint a woman to the faculty of Princeton. However, he overcame the obstacle because he had some very strong support from several professors in the Department of Physics. Now, exactly 40 years later, after we have undergone a very broad women's movement, how far have we advanced as far as academic women are concerned? The Ivy League colleges have almost all converted into co-educational institutions. Even Columbia College, where I come from, finally adopted the co-educational system this year, even without the consent of Barnard

College. The high percentage of women students accepted in the first year of Columbia co-ed was up to nearly 45 percent, which was very encouraging and probably broke records for all time.

Senior women faculty

Yet, on the other hand, the academic women in various universities are undeniably still clustered in the lower ranks, in administration and in teaching.

The statistics <sup>on</sup> of academic women in universities are not much improved as compared with those of a decade ago. Women with full professorships in prestigious universities are as rare as morning stars. In the fall of 1981, women comprised 27 percent of all full-time faculty. (It) Superficially sounded encouraging. But if one examines women's share of faculty positions by rank, the women were sadly concentrated at the lower levels:

Professor	10%
Assoc. Professor	21%
Assistant Professor	36%
Instructor	52%
Lecturer	47%

(Source, National Center for Education Statistics)

On the other hand, the enrollments and earned degrees of women students in the last few years are rather encouraging and impressive. In 1982, women comprised 52 percent of all college students and in 1981, equal proportions of women and men were enrolled in graduate school (source: ACE FACT Book

1984-85). Particularly, in 1980-81, women received 48.2 percent of <sup>all</sup> the earned degrees, ~~all levels combined~~, or *as follows:*

BA and BS	50.0%
MA	50.3
First Professional Degrees	27.0
Doctorates	31.8%

Source: NCES 1980-81

This clearly indicates that the pool of qualified academic women is being adequately replenished all the time. Then why do so many universities have so few senior women on the faculty? The presence of so few senior women has a profoundly negative influence on the education of both women and men at the institutions. When a university obstinately refuses to consider how to increase the presence of senior women faculty to a number comparable to the number of women in the pool, the true meaning of coeducation is sadly lost.

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Nevertheless, I am incorrigibly optimistic, because of the recent general awakening to this problem in this country. A gradual change in attitude, although slow, does seem to be underway. Women will work for their rights and responsibilities and will be more confident and independent. We all hope to see more academic women occupy responsible and tenured positions.

### Born and brought up in China

I was told when I was notified of this award that this short panel talk should be limited to fifteen or twenty minutes and be more or less autobiographical, so now let me change the subject and ~~let me~~ begin at the beginning.

I would like to tell you that I was born and brought up in China and came to this country in 1936 after completing my college education. Therefore, I had a totally different family upbringing, educational background, and concept of responsibility and commitment to society from that of young girls brought up in this advanced and affluent society. I had a wonderful family environment. Although my father was educated in the old Chinese tutorial system, he was greatly influenced by the new ideas from the West. He taught himself mathematics and the general sciences, and also became interested in Western culture by reading and studying. He particularly believed in democratic systems and women's emancipation. I was, fortunately, brought up in that

favorable atmosphere and never was exposed to any prejudice or discrimination against girls in my early years. My father encouraged his children to ask questions and taught us to solve problems, to develop deductive thinking, and to form good working habits. Those were the very early lessons in my young years and they have helped me a great deal all through my life. This shows that family education really is the most important thing.

When I was ten I had to leave my hometown and travel a long distance to attend a girls' school in Suchow, which is one of the two most beautiful cities in China. There is a saying in China: "In the heaven, there is paradise, and on the earth, you have Suchow and Hangchow." The girls' school was famous not only for its high scholastic standing but also for its modern methods of teaching. Because of this, our school was frequently visited by famous educators and philosophers from the United States. For example, when I was in the fifth grade, I met Professor John Dewey, Professor <sup>William Heard</sup> Kilpatrick and Professor <sup>Paul</sup> Monroe, all of Teachers' College, Columbia University. They all came to our girls' school and, in fact, to our home economics class, where we entertained them and cooked for them. Because of these contacts, we had wonderful impressions of American educators.

I spent my senior high years in a normal school. Its aim was to prepare us to be teachers in elementary school or junior high. Very little advanced science or higher mathematics was then taught in the normal schools. Fortunately, in that school,<sup>o</sup> the normal school and the high school were on the same campus and shared the same dormitory, dining hall and library, so if you were anxious to learn, you could learn from your schoolmates. I often took advantage of this privilege.

When I graduated from the normal school I was notified by the principal that based on my excellent record, the school was nominating me to the National Central University without an entrance examination. My feeling about this unusual honor was mixed because, though I was happy to have the opportunity to go to the National Central University, which was the best university in southeastern China, yet on the other hand, because I had graduated from a normal school, I feared that I might be admitted only to the Department of Education, which I was not too interested in.

However, my father differed from my interpretation and encouraged me to catch up on my study of math and sciences during the summer vacation. During that summer, my father brought home some books on higher algebra and college chemistry and

encouraged me to study them by myself. When the fall semester opened, I had no trouble in being admitted into one of the best universities in China and registered as a freshman in mathematics.

In my freshman year, I developed a great interest in physics, so I requested to be transferred to physics in my sophomore year and was accepted at once. Imagine what a near miss it could have been if I had been without the encouragement of my father. I would not have had the courage to select physics as my major field and I would be still teaching grade school somewhere in China today.

After graduating from the National Central University, I did some research in atomic physics for one year in the Academia Sinica with Prof. Z. W. Ku. She <sup>had her</sup> got her Ph.D. from the University of Michigan. I realized that I must improve myself by obtaining advanced studies in the United States; therefore, I applied for admission to the University of Michigan. So I sailed for the United States in August 1936, and more than two weeks later arrived at San Francisco.

Years in Berkeley

After visiting Berkeley, California, I was so much attracted by the many advantages of the Berkeley campus and the Department of Physics, that I changed my application from

the University of Michigan to the University of California. This was a crucial decision, because from 1936 to 1940 was the golden age for the Physics Department at Berkeley. During those years, Professor Ernest <sup>O.</sup> Lawrence, my thesis director, was awarded the Nobel Prize for his invention of the particle accelerator, known as the cyclotron or atom smasher. Physicists from all over the world came to visit the famous cyclotron laboratory. Also, the brilliant and foremost theoretical physicist, Professor Robert Oppenheimer, nicknamed Oppie, headed the theoretical group and gathered around him young and talented theoretical research associates. In fact, at that time, the United States was behind the countries of Europe in having so few first-rate theoretical physicists. So this young man, Robert Oppenheimer, just back from Europe, had to fill professorships at both the University of California and the California Institute of Technology at the same time. He spent one semester in Berkeley and the rest of the year in Pasadena. His students enthusiastically followed him from one place to the other. That was the situation in physics in the United States between 1936 and 1940. Lawrence and Segré were at Berkeley, Oppenheimer was at Berkeley, Schiff and other young scholars were also there. Seminar programs were often full of heated discussions and arguments, and very often students, whether they understood or not, were held completely spellbound. What an exciting time it was!

Emilio  
 (Robert Serber, Julius) Philip  
 Berkeley, Schwinger, Morrison, Leonard I.



I must say that I really enjoyed every minute of my graduate study in Berkeley. Particularly, I benefitted by working very closely with Professor Emilio Segré, the Italian physicist, who later on also won the Nobel prize. He is an old colleague of <sup>Enrico</sup> Fermi and I worked with him on nuclear fission from 1939 to 1942. He has a tremendous knowledge about many things, not only physics but chemistry, biology, and also mushrooms, drugs and old <sup>Western</sup> civilizations.

Came East and joined Columbia

In 1942, the United States was already at war on both fronts. Most physicists were called away from their labs to the east coast for national defense work. Dr. Luke Yuan, a post-doctoral fellow of Prof. Robert <sup>A.</sup> Millikan of Cal Tech, and I had been friends for the last six years. We decided it was time to get married in May of that year (1942). At the end of that summer, we both came east. He went to work on the development of directional finding devices at the RCA laboratory in Princeton and I accepted an appointment to teach at Smith College, in Massachusetts. We met in New York City on weekends. A year later, in 1943, I received the letter from Prof. <sup>Henry de Wolf</sup> Smyth inviting me to teach at Princeton, and a few months later, in 1944, I received a letter from Prof. <sup>John</sup> Dunning of Columbia University asking me to come to be interviewed. Since the war work there was very much in line with what I ~~did~~ <sup>had done</sup> on nuclear fission when I was in Berkeley, naturally, I joined

the war work at Columbia, in the group called the Manhattan Project.

Submerged in nuclear beta decay studies

After the end of the Second World War, to about 1952, I continued working at Columbia, and initiated and concentrated my research on the study of nuclear beta decay, a form of radioactivity in which electrons are emitted from the atomic nucleus. Before I plunged into the investigation of this field, I made a thorough survey of both the theory and the experimental work on nuclear beta decay and compared the theoretical predictions with the experimental results. Therefore, at the outset of my work, I knew what types of experiments on beta decay I should carry out, and what kinds of experimental pitfalls I should carefully avoid. During the period from 1946 to 1952, I was completely submerged in experimental studies of beta decay. It was an exciting period for all who worked in this field. In fact, the whole exuberant mood was quite apparent in several of my review articles and talks on beta decay in that period.