THE CHINESE UNIVERSITY OF HONG KONG

THIRTY-SIXTH CONGREGATION

Conferment of the Degree of Doctor of Science, *honoris causa*

A Citation

Professor Ching-Wu Chu, BS, MS, PhD, DSc (Fordham), DSc (Northwestern)

About six months ago, the American academic world was electrified to learn that the University of Houston had raised US$1.5 million to endow the T.L.L. Temple Chair in Science for a young Chinese scientist. The *University of Houston Strides Research Magazine* described the chair as "one of the largest of its kind in the nation". The idea that some chairs are larger than others is baffling to local academics, but we are amused and encouraged by the fact that even the New York Times Service reported the news and went on to talk about raids on faculty ranks resulting in the bidding up of the price of academic chairs, almost in the style of land auctions in Hong Kong.

The beneficiary of this latest round of talent chasing among American universities is Professor Ching-Wu Chu, a native of Hunan Province who received his first degree at the age of twenty-one from the National Cheng-Kung University in Taiwan in 1962, but who has since been conferred degrees and honours by Fordham University, Northwestern University and the University of California, San Diego. Professor Chu has been wooed by many universities and laboratories because he is one of the world's leading researchers on superconductivity.

To find a superconductor, a compound which will conduct electric currents with no power losses from electrical resistance, has been the dream of many physicists. But until Professor Chu's revolutionary discovery on January 29th last year, superconductivity had only been possible at temperatures close to absolute zero, or minus 273 degrees Celsius, which rendered the concept relatively useless for technological applications. Such an ultra-cold temperature can only be produced with the use of liquid helium, which is both expensive and rare. Professor Chu's genius is in having put together a compound of yttrium-barium-copper-oxygen that will superconduct at minus 180 degrees Celsius, which puts it within the temperature range of liquid nitrogen, a coolant that is both inexpensive and more readily available.

Professor Chu's discovery has been hailed as "the greatest scientific development since the invention of the transistor". It has opened up the possibility of energy efficient satellites, high-speed levitated trains, compact supercomputers, more powerful medical imaging machines, non-polluting electric automobiles, and power lines that do not overheat and lose absolutely no electrical energy. This last possibility, the super-efficient transmission of electricity is of particular interest to many people in Hong Kong, because if Professor Chu is able to find a material that superconducts at room

temperature, which is the current focus of his research, the nuclear power station at Daya Bay may be moved further north without any loss of efficiency in transmission.

Mr. Chancellor, it has taken scientists all of seventy-five years, from 1911 to 1986, to raise the threshold of superconductivity from near absolute zero (minus 273°C) to minus 238° Celsius. Then in only one year since Professor Chu's break-through, raising this to minus 180° Celsius, we have heard reports of feverish activity and simultaneous discoveries. It is as if the scientific world has become superconductive itself. The work of this scientist then has obviously caught the imagination of the world, and for a very good reason, because if he succeeds in raising the threshold of superconductivity to room temperature, the result will benefit many people in many industrial concerns in many lands. The city of Houston where he works and which houses his laboratories could conceivably overtake San Francisco and the Silicon Valley as a centre of high technology. Those city elders who put up the endowment to keep Professor Chu in Houston certainly know the true significance of his research - that it could provide the vital transition for something which is scientifically possible to something that is commercially viable. The prospects look very exciting indeed.

Professor Chu is now a national figure in the United States, having recently been honoured by President Ronald Reagan with the award of the National Medal of Science given only to those "individuals who have made outstanding contributions to the sciences that have the potential to further advance scientific thought". He is the youngest of twenty recipients this year. Since leaving the University of California, San Diego with a doctorate in 1968, Professor Chu has published 125 major scientific papers, co-edited a book entitled *High Pressure and Low Temperature Physics*, and received numerous awards including the NASA Achievement Award and Sigma Xi Research Excellence Award. He has also consulted for Bell Laboratory, Los Alamos, NASA and DuPont, received two honorary Doctor of Science degrees, and is currently the director of four research centres and holder of two chairs. This last distinction - holding down two chairs, both of them large - is the subject of great envy in academia.

Mr. Chancellor, for his ground-breaking research in the field of superconductivity, for his scientific vision and imagination, for his ability to work well with many research teams all at the same time, for what he has done and for what he promises to do to change mankind's way of life, I present Professor Ching-Wu Chu, physicist, scientist, educationist, possibly contortionist, and eternal optimist about the future of China, for the award of the degree of Doctor of Science, *honoris causa*.

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