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

Yuan Longping

Rice fields that are luxuriantly verdant in early spring and glittering gold in late autumn form an ideal picture that has recurred in the Chinese mind since ancient times, as it augurs well for the healthy growth of crops and a rich harvest of grain. Today, the dream of bygone millenniums has come true, and the one who has realized this green dream by creating the magical rice of the East is Professor Yuan Longping, the "Father of Hybrid Rice".

Professor Yuan Longping's family came from Dean in Jiangxi Province, and he himself was born in the Peking Union Medical College Hospital in 1930, the second of five boys. His father worked for the Beijing-Wuhan Railway and his mother attended a church-run secondary school. It was a warm and enlightened family, and his mother was the young Longping's first teacher of English. She also made sure that traditional values such as "to study more, to make progress and to do good to others" were effectively implanted in his young mind. Thus Professor Yuan has cultivated a studious disposition and a deep concern for the public good since an early age.

It was during an outing to the countryside, while at primary school in Wuhan, that he became impressed by what he saw in a horticultural farm. The trees, flowers and fruit fascinated his young mind and kindled his interest in gardening and agriculture. He made a promise to himself, there and then, that he would make agriculture his lifelong pursuit, and to this day he has not deviated from that course.

In 1949 Yuan Longping went to Chongqing and enrolled at Shuanghui College. In 1950, with the restructuring of institutions of tertiary education all over the country, Shuanghui College was annexed by Southwestern Agricultural College which subsequently became Southwestern Agricultural University. He graduated in the summer of 1953 and was assigned teaching responsibilities in an agricultural school in Anjiang, Hunan. In this part of the country, known for being uncouth since ancient times, Yuan Longping began his career, quietly tilling the land and teaching his students.

During the early 1960s the country was suffering from exceptionally poor spring harvests. Yuan Longping was much upset by the acute shortage of food. In China food has always been regarded as important as heaven itself, and now that there was a rent in the firmament it had to be mended by someone like the goddess Nuwa of old, who laboured hard for the relief of mankind. At this point Yuan Longping reaffirmed his youthful resolve, and began his research on raising crop production through the study of heredity and breeding.

Professor Yuan's research on heredity began on the basis of I.V. Michurin and T.D. Lysenko's theories. With his extraordinary diligence, he was able to access information from various authoritative sources and soon developed a profound understanding of G. Mendel and T.H. Morgan's principles. In July 1961 a plant was found of irregular shape and bearing many ears of enormous grains. Professor Yuan nurtured this plant with parental care in an experimental paddy

field. However, the following year, after the plant had flowered, it was found to have borne only a few weak ears varying in quality but all of an inferior standard. This disappointment did not daunt Yuan Longping, but prompted him to analyse his crops more carefully based on Mendel's Law of Segregation. He found out that the plant identified the previous year had regressed because it was a natural hybrid, and hypothesised that artificially induced hybrids, properly nurtured, would yield much better grain. So, from 1964, he formally launched a new project on the creation of hybrid rice plants. The project sought to identify the factors conducive to the growth of the hybrid paddy plant and his studies centred around three lines, namely, the sterile line, the maintainer line and the restorer line.

Professor Yuan's research did not progress without impediments, especially at the time of the Cultural Revolution. Natural disasters, human errors and other undesirable happenings had their impact on his work, but they had not discouraged the determined and optimistic Yuan Longping, whose willpower had been the sustaining force behind the project. In the 1970s Professor Yuan, accompanied by his assistants, came to Yayuan in Hainan Province (now Sanya), a place known as the end of the earth. In November 1970, he discovered a male sterile wild rice which brought about a breakthrough in the development of a three lines hybridization system. In 1972, the first male sterile line was cultivated together with the corresponding maintainer line, and the first hybrid rice with strong heterosis was created in 1973. In 1975 Professor Yuan and his research team successfully planted the fruit of their research in the field and extensive production began in 1976. Research on the hybrid paddy in China thus took a gigantic step forward from that time, ushering in a new era that was to astound the world.

In 1986 Professor Yuan further developed his research and proposed that rice hybridization might be effected using three lines to two lines and eventually in a single line. This became a key study in "Project 863" of 1987, an important research project on a national scale. In 1995, the two-line hybrid rice was successfully produced. This provided paddy farmers with ample opportunities for restructuring farming activities in compliance with national policy, as yield was increasing despite reduction in arable land. More recently he commenced his research on "super hybrid rice" and has made tremendous progress. The first generation of super hybrid rice already met a yield target of 700 kilograms per mu in extensive production in 2000, and it is anticipated that, by 2005, the extensive production yield will reach the 800 kilogram mark, and 900 kilograms when the third generation is in production. This, if achieved will contribute significantly to the safeguard of food safety in our country in the new century.

At present Professor Yuan is working closely with Professor Samuel Sun of the Centre of Plant and Fungal Biotechnology at The Chinese University of Hong Kong and Professor Maurice Ku, a Chinese scientist at Washington State University on the cultivation of hybrid rice of a superior quality. This is one of the beautiful visions dearly cherished by Professor Yuan, who said that he had two great wishes in life. The first was the speedy realisation of the third generation of hybrid rice, and the second was the promotion of hybrid rice worldwide as an effective means to solve the food problem and eliminate starvation. Estimates have it that world population will be double by the year 2030, and Professor Yuan's research efforts are daily becoming more relevant as a

solution to the problem of global food shortage.

Today the farming of hybrid rice in China takes up about 230 million mu of the country's cultivated land, which represents half of the land devoted to paddy farming. Since 1976, the hybridization of rice has raised the national grain yield by nearly 400 billion kilograms. Furthermore, the National Hybrid Rice Research and Development Centre of China, of which Professor Yuan is Director General, has initiated research on super rice, and test cultivation in Yunnan has produced a yield as high as 1,137 kilograms per mu, being the world record for single crop paddy farming. Over the years China has produced remarkable results in the cultivation of short-stalk rice, hybrid rice and super hybrid rice that have been internationally acclaimed, and Professor Yuan's role in all these undertakings is very significant.

Professor Yuan has had a worldwide reputation since the 1970s, and requests for technology transfer have come from Britain, the United States, Australia, Japan, Italy and Egypt. In 1979 he was given the accolade of being named the "Father of Hybrid Rice" at an international conference on the subject, and he is the recipient of nine important international awards. These include the WIPO Gold Medal for the Outstanding Inventor (1985), the UNESCO Science Prize (1987), the Rank Prize for Agronomy and Nutrition (1988, Britain), the Alan Shawn Feinstein World Hunger Award for Research and Education (1993, United States), the FAO Medal of Honour for Food Security and Sustainable Development (1995, Canada), the first Nikkei Asia Prize Award (1996, Japan), the Distinguished Pioneer Scientist in Crop Heterosis Exploitation Award (1997, Mexico), the Fukui International Koshihikari Rice Prize (1998, Japan), and the "Magsaysay Prize" (2001, the Philippines). Furthermore, Professor Yuan had the distinguished honour of being the first scientist to receive, in 1981, the Special Class Invention Prize of the People's Republic of China. In 1989 he was titled a National Progressive Worker, and in 1992 was named a "Meritorious Scientist". In 1995 he received the Biology Prize awarded by the Ho-Leung-Ho-Lee Foundation and, in 2001, he received the first State Supreme Science and Technology Award of China.

Fame came to Professor Yuan as recognition of his genius and hard work. According to Professor Yuan himself, scientific research, and in particular research in the applied sciences, must be based on solid groundwork, and this is "knowledge". Secondly, there must be a lot of hard work, part of which may be undertaken in harsh weather and with extreme urgency, and this is "sweat". Thirdly, one must be good at searching for new information and in analysing data, for this is how wisdom and inspiration come into play. And, for Professor Yuan, knowledge + sweat + inspiration + opportunity make up the formula for success. The French bacteriologist Louis Pasteur rightly observed that opportunity favours only those who have the will to succeed, and Professor Yuan did spend years in the field for the screening of tens of thousands of plants. His effort was, of course, rewarded by the discovery of the male sterile plant. "He had looked for it thousands of times, searching high and low. And, all of a sudden, as he turned back, it was there in the bright sunshine." For the successful cultivation of hybrid rice Professor Yuan has traversed the country many times, from north to south and from Yunnan to Hainan. Ancient legend has it that the Emperor Yu, in carrying out flood control works, had passed his home three times without stopping by. Professor Yuan, on the other hand, had the record of not going home for Lunar New

Year for seven years, being detained by fieldwork. During the course of his research he had experienced more than his fair share of frustration and hardship, but with unbending will he persevered and went from strength to strength. He has fought valiantly for his cause, and his achievements certainly did not come to him easily.

Despite his great reputation and exalted position, Yuan Longping has a most amiable personality and is much loved by his colleagues and subordinates. He is a scientist but his prose reads extremely well, as the fluent style and clear argument in his letters and articles adequately testify. He is fond of music and is an accomplished violinist. He is also a swimmer who has won a good number of prizes. While never fastidious about minor details, his thinking in scientific matters is extremely well structured and disciplined. He has a strong curiosity which frees him from the confines of tradition and encourages him to innovate. He has very little regard for the material life and his views on money are these: first, it has to come from proper sources, second, it has to be spent properly, third, both extravagance and meanness are to be avoided. True to the belief that we do not bring money with us into this world nor take it with us when we die, he continues his frugal and carefree lifestyle despite owning equities worth in excess of hundred million yuan after the listing of the national enterprise Longping Agricultural High Technology in 2000.

Professor Yuan has a good family and a perfect marriage. Madam Teng Zhe, his wife, is an outstanding woman who supports her husband throughout his long research career, sharing with him the vicissitudes of life and partaking of his strenuous fieldwork. For a long while, when Professor Yuan worked away from home, she ran the household entirely on her own and managed to keep both her children and mother-in-law comfortable. The three sons of Professor and Mrs Yuan are now of age and doing well, and the youngest of them is following his father's footsteps, being a doctoral student in Biology at the Chinese University. His research is, understandably, in rice genetic engineering, as it is his intention to help solve the global problem of food shortage.

Professor Yuan is an Academician of the Chinese Academy of Engineering, the Director-General of the China National Hybrid Rice Research and Development Centre and the Hunan Hybrid Rice Research Centre, a research fellow at the Hunan Academy of Agricultural Sciences, and a Principal Scientist of Hunan Province. His public offices include membership on the Standing Committee of the Chinese People's Political Consultative Conference, Vice-Chairmanship of the Hunan Province People's Political Consultative Conference and the Science and Technology Association of Hunan Province, Honorary Presidency of the Hunan Academy of Agricultural Sciences, and the Chairmanship of the Hunan Agronomy Society. He has published over 60 scientific papers, of which 17 featured in international journals, and three of his biographies have appeared.

Professor Yuan Longping is a remarkable teacher on top of his great contributions to agricultural science. Apart from supervising postgraduate students and establishing foundations to support young scientists, he has conducted twelve international training courses on rice hybridization. As a senior scientist he undertook research at the International Institute on Hybrid

Rice on seven occasions and, in the capacity of Principal Consultant to the FAO, he visited India and Cambodia six times to give advice on the development of hybrid rice plantation. At the moment, over 20 countries and regions the world over are introducing and carrying out trials of hybrid rice. In recent years, Vietnam and India are engaging in large-scale production of hybrid rice and, in 2001, plantation of hybrid rice has significantly increased to 450,000 and 200,000 hectares of land respectively. Trials in the Philippines, Bangladesh, Thailand and Burma, etc. have also achieved remarkable success. Professor Yuan is an outstanding individual in the promotion of academic research, national economic development, as well as in the broader field of combating the global food shortage. His achievements are acknowledged worldwide, and his merit will be cherished in our annals. Mr Vice-Chancellor, it is now my great pleasure to present Yuan Longping for the award of the degree of Doctor of Science, *honoris causa*.