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ADDRESS BY

GUEST-IN-CHIEF

PROFESSOR ASIS DATTA

Professor of Eminence

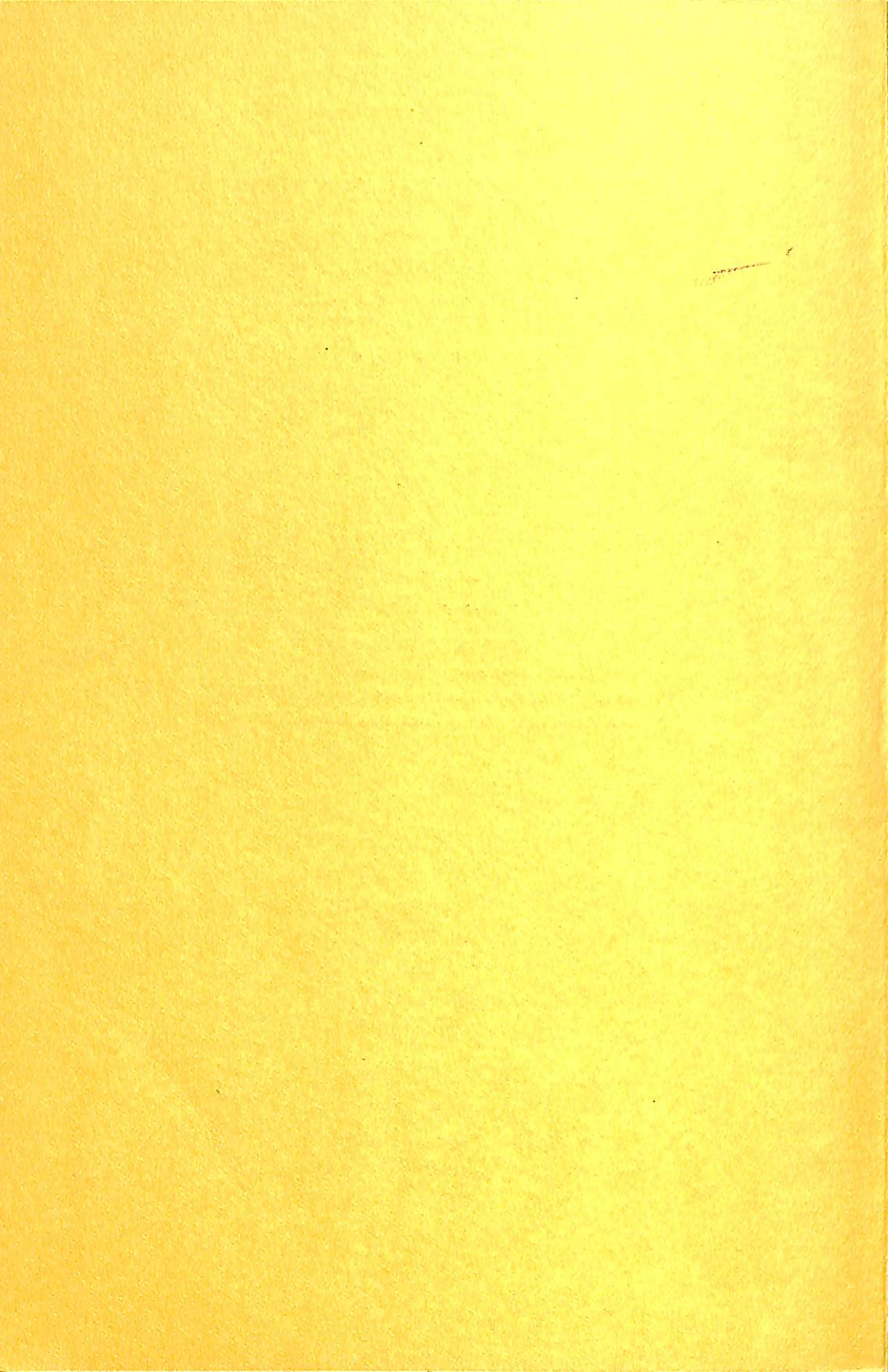
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Professor Asis Datta*

His Excellency the Governor of West Bengal and Chancellor of the University, Vice-Chancellor Prof. Pradip Narayan Ghosh, faculty members, dear graduating students, ladies and gentlemen.

I am really very happy to be here in the 54th Annual Convocation of the University. I would like to thank Hon'ble Chancellor and Vice-Chancellor for inviting me as Chief Guest and take this opportunity to congratulate them in promoting good education standards in this University of national importance. I would also congratulate graduating students for their performance and faculty members for shaping the future of students. I wish the students all success in their careers and wish them prosperity and happiness forever in future. The faculty members of Jadavpur University are equipped with many national/international awards. These are, no doubt, the efforts of its faculty and other staff who have put the University on the peak of glory. I believe the University will soon be a "Centre of Excellence". The University is situated in Kolkata, a land of human talent, a land of people empowered by knowledge and learning. In fact, the State is progressing in high-technology scientific research, development and education.

In my address today, I would like to focus on science and technology on the theme *Science in the Twenty First Century : Quest for Excellence*.

Science means the triumph of human mind over matter, there are therefore no limits to the excellence to which human mind

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can develop. Excellence of course can never be parameterized, bound down, or codified to measurable standards. Even so, the quest for excellence is the driving force of human societies and civilizations as much as it is for human individuals and institutions. It is in the attainment of excellence that the solutions to the societal problems lie.

The new century's opportunities in research should be focused on agricultural, medical, environmental biotechnology with a focus on bio-remediation, manufacturing / bio-processing, including energy research, and marine biotechnology and aquaculture. The plans were developed with input from the private sector. Such research is aimed at understanding the social, cultural, ethical, economical, and legal implications of biotechnology research and its applications. A coordinated effort is needed to pursue these priorities to provide, over the next decade, the leverage needed to fulfill the broad promise of biotechnology, which may well play as pivotal a role in social and industrial advancement over the next 10 to 20 years.

A complete value-based education can help restrain the senses, the mind, the intellect and imagination from going astray and help inculcate scientific temper and a sense of social responsibilities among students. It is only the blending of this rich experience with modern scientific research that is at the base prosperity. That in some way is more important, as this energy has enabled the whole nation to dream of the future, where poverty will only be an alien and hunger, a subject of historical significance. Great strides have been promised for humankind by the recent advances in biotechnology. It is now possible through biotechnological interventions to imagine and ensure great strides in agriculture and to provide higher quality diet for the people of the world.

India's economy may have shown dramatic growth but the data from the third National Family Health Survey released recently is a poor snapshot of the health of its citizens. As many as 45.9% of children are underweight, 38.4% stunted and 19.1% wasted... this even before they turn three. Contrast

this with China, where only 8% are underweight. The figures for anaemic are even more alarming, with 79% of kids aged between 6 and 35 months are anaemic. Science, though provides a solution, cannot solve the problem of food availability and malnutrition alone. A combination of agricultural technology, political and economic reforms can increase crop productivity and improve the nutritional content of crops in developing countries. However, I am confident that dedicated efforts of our researchers and technologists would alleviate this problem. **This solution also demands a strong, vibrant and innovative basic research, which could seed the development of technologies that can be applied to benefit our people.** Across the world, improving health is not merely an academic exercise; it is of utmost importance. Through the actions of government and other organizations, our work has a large impact on the health of the nation and of the world. A useful step in alleviating health and nutritional problems in India shall be achieved by deciphering the genome sequence of organisms of importance to our country, like cereals, medicinal plants and tropical pathogens. This knowledge, in combination with gene transfer technologies can generate plants with better nutritional value and yield.

In 2000, the world's population was about 6 billion. It is expected to increase to 9 billion by 2050. As a result, there will be more people to feed on an increasingly crowded planet. Food production will have to increase, albeit in an environmentally sustainable way. The world's ability to maintain food supplies through rapid demand, changing climate, declining natural resources and trade liberalization policies is a crucial issue. Since 1980, 50 percent of the increased agricultural productivity in the developing world came through improved seed technology. Better seeds can be generated through improvement in traditional methods, development of conventional hybrids, and through biotechnology. Biotechnology, though not a panacea, can make significant contributions for the importance of products of nutrition quality. The year 2008 marked the 13-year of use of genetically modified food crops with more than 13.3

million farmers in 25 countries planting more than 125 million hectares. India needs to do radically better on the agricultural front.

Agricultural biotechnology achieves enhanced crop productivity in a more environmentally sustainable way. It offers an additional tool for increasing crop productivity, especially when conventional methods cannot deliver on breeding targets. In the United States, the growing use of agricultural biotechnology is resulting in reduced use of pesticides and increased adoption of environmentally friendly farming practices such as "no-till" farming, which reduces soil erosion and fertilizer run-off. Our goal should be to promote access to the tools of biotechnology by scientists and by smallholder farmers around the world. Improved access will increase productivity, and reduce economic and social risks due to pest, disease, and natural resource fluctuations and constraints. Enhanced productivity means that more food can be raised on the same area of land. **The challenge is to make tried and tested varieties of biotechnology-derived crops available to more developing countries and to help develop new varieties specifically adapted for their conditions.** I believe that agricultural biotechnology can help both the developing and developed nations to enhance productivity while preserving the environment. Science-based regulation of agricultural biotechnology contributes to the free trade of safe biotech applications and to the appropriate use of this technology to promote development. **Recent advances in biotechnology opens a new window of opportunity to deal with the issue of food security and human nutrition.** The genetic improvements in crop plants are needed not only for more food, but also for a greater diversity, higher quality and nutritious food. Modifying the nutritional composition of food crops is an urgent health issue, as the basic nutritional needs for much of world's population is still not met. Till date, most of the progress through biotechnology has been made in improving the agronomic traits of crops like resistance to disease and insects and herbicide tolerance. More recently, emphasis has been upon improving the nutritive value of food

crops. The best example is the development of protein-rich potato by a team of scientists headed by me at the National Institute of Plant Genome Research, New Delhi. Indeed, such programmes are now widely accepted as being at the core of sustainable agriculture. Producing nutritionally enhanced properties in staple crops eaten by the poor could reduce the burden of disease in many developing countries. There is a need to direct research efforts to areas which are able to generate sustainable and long term solutions to food problems and which are not governed by the considerations of only pure commercial interests.

Genomics is changing the face of biology. The genome sequences of several organisms have been deciphered by the coordinated efforts of several international laboratories. The focus now is on functional genomics, wherein the function of every gene needs to be established by high-throughput technologies covering the microarray and proteomics. Since all changes in gene expression ultimately manifest as changes in the cognate protein levels and in their function, the field of proteomics is rapidly growing.

Science and research is a very vast field and no single approach or solution can be universal. It must be looked at in a decentralized manner and encouraged with a holistic approach – not in a sectoral manner. The interdependency of many sciences needs to be recognized. Existing research based institutions need to be urgently restructured to current and future trends. But we are here to discuss the broader outline of human knowledge that science encapsulates. Science indeed provides an endless frontier. Advancing that frontier and exploring the cosmos we live in helps to feed our sense of adventure and our passion of discovery. Science is also an endless resource in advancing the frontier of our knowledge of the physical and living world.

One of the cardinal principles of economic growth in Indian civilization has come with awareness of environmental responsibility. **Environmental responsibility requires much better understanding of the complex inter-relationships**

among components of the biosphere and among human activities and the world around us. We must build upon our strengths and carry out fundamental research to develop appropriate technologies to detect and rectify environmental problems, to manage natural resources and to sustain the environment. The projected growth of population, economy, and industrial production revealed an urgent need to improve industrial processes and products and to provide food and energy with least impact on the environment.

As a scientist, I am fairly aware of the parameters of my discipline. However, I also realize the fundamental principle that in the end all knowledge is indivisible. Thus all branches of knowledge must converge to enrich human life not merely in terms of life's amenities but culturally, aesthetically and in terms of human qualities and in terms of human aspirations. Improving the quality of life of our citizens involves all these elements and more. **Science is a critical investment in the national interest. Science and technology are tightly coupled, for they both drive and benefit one another.** To sustain the development of science, we must improve the conditions, capabilities, and opportunities for well-trained scientists and engineers to pursue innovative research, to educate the next generation and to apply science in areas of importance for the health, prosperity and security of the nation. **In order to achieve these goals we need a good leadership, enhancement of relations between fundamental research and national target, promotion of investments in fundamental science and engineering, effective use of human and financial resources and emergence of good scientists and engineers for the twenty-first century.**

Several scientific and technological achievements in India go on to demonstrate how science has improved and enriched our lives, often in ways that were not predicted. This was achieved by support from a multiplicity of institutions. The frequent and free communication and coordination among the premier scientific and technological institutions must complement the quality, innovation, and competitiveness into the research process of the Government and private sector

laboratories. This process can encourage technology transfer from fundamental research institutes to the marketplace.

Today, on the threshold of 60 momentous years of independence, the nation is justifiably proud of its myriad achievements. Nonetheless, there is a long road to be travelled before the vision of a truly food secure India is achieved. The new century's opportunities in research should be focused on agricultural biotechnology, environmental biotechnology with a focus on bio-remediation, manufacturing / bio-processing, including energy research, and marine biotechnology and aquaculture. Science means the triumph of human mind over matter; there are therefore no limits to the excellence to which human mind can develop. **Excellence needs to be achieved both at individual and institutional levels.** Each one of us seeks excellence in our daily endeavour and in some cases, through exceptional ability of some individuals in selected spheres. At the institutional level, education and research are the best guarantee for success in the quest for excellence. *One never notices what has been done, one can only see what remains to be done.*

The 21st century will be marked by a rapidly aging society and revolutionary advancements in science and technology. Technology and management practices are undergoing change at an increasingly rapid pace, while the economically active population now includes an expanding share of older individuals. Continuous employment can be assured in this era of an aging society only when individuals, even though they might frequently change workplaces, are equipped with skills required by employers

A university should fulfill three roles. **First, it should serve as a venue where people can develop their intellectual, moral and personal character.** Second, it should provide the specialized training needed to produce the variety of academic and technical professionals who are required by contemporary society. And third, a university should serve as an institution that provides lifelong education. Such education is an indispensable element in the development of individuals with a proper character and civic-minded values.

First of all, I come to the question of university education and basic research which are closest to my heart. The challenges of the twenty-first century will place a high premium on sustained excellence in scientific research and education. We approach the future with a strong foundation, built by the wise and successful stewardship of this enterprise over many decades and with leadership in basic science, mathematics, and engineering, coupled to investment strategy on economic growth that creates jobs and protect our environment. There should be greater linkages between the different facets of science. The area that needs attention is the empowerment of young scientists working in the universities and in national institutes. Government may take more steps in strengthening of universities and institutions of higher learning. A lot of emphasis has to be given for creating an interface between research and technology, technology and business, science and arts and so on. Scientists need to be more aware about what is needed in India's conditions. If the corporate world can have young CEOs why should Science be far away? Scientists should be encouraged to engage in joint ventures with private sector companies to form commercial spin-offs from their research. Give freedom to the young ones and they will do wonders. Teachers should be trained to encourage a questioning mind. If the teacher himself or herself is confident about their knowledge base, then he/she does not feel at a loss. Thus, there should a continuous up-gradation of the teacher's knowledge base.

At last, I would again like to congratulate all the graduating students and best wishes to all the members of the University success in their education mission.



