

ICM 2010

February 28 is celebrated as National Science day in our country in commemoration of the discovery of the Raman Effect. Many events with a connection to science are organised country-wide on this day and articles about science appear in magazines and newspapers, the main purpose being to raise public awareness of science. But one finds that one science - mathematics - usually misses the bus. The reasons for this are not far to seek. Other sciences connect readily with every day experiences and concerns of common people. The preoccupation of mathematics, on the other hand, is largely with understanding the structures it has itself created and so it stays remote from the concerns of lay people. Nevertheless mathematics has a profound although indirect influence on practically every human endeavour: it is in fact the intervention of mathematics that confers the title “science” decisively on any discipline.

This year there will be a special mathematical event which the general public too may find interesting to know about. And today, Science Day, is indeed an appropriate day to announce that the “Queen of Sciences” - mathematics - will “hold court” in India: the city of Hyderabad will be hosting the International Congress of Mathematicians (ICM) for the year 2010 during August 19 - 27.

From the point of view of the general public, the most exciting happening at this event would be the Award Ceremony of the Fields Medal marking the inauguration of the congress. This prize for mathematics is equivalent in prestige to the Nobel (which is not given to mathematics). Upto four candidates may be awarded the medal. In monetary terms the prize is a pittance in comparison with the Nobel. Another important difference between the Nobel and the Fields is that only mathematicians under the age of forty (at the time of the congress) are eligible.

Two other prestigious prizes, the Nevanlinna Prize and the Gauss Prize will also awarded on this occasion. The Fields and the Gauss prizes have so far eluded Indian mathematicians. The 2002 Nevanlinna Prize was bagged by Madhu Sudan of Indian origin. There are at least two mathematicians of Indian origin who are considered by many to be serious candidates for the Fields medal this year.

The ICM is a mammoth meeting of mathematicians from all over the world held once every four years: in the last few congresses the attendance has been of the order of 3,500. It is by far the most prestigious international mathematical event. The Congress takes in its ambit every branch of mathematics - from the preoccupations of the ivory tower to areas that address the needs of the factory floor. There is no meeting of such wide scope and participation in any other scientific discipline; nor one with such a long history: the first ICM was held in Zurich in 1897 and the congresses have been held continuously since then, except for breaks caused by the two world wars.

It is for the first time that India is hosting the ICM and only the third time an Asian country is. Japan was the first in 1990 (the venue was Kyoto) and China hosted the 2002 Congress in Beijing. The ICMs are held under the auspices of the International Mathematical Union (IMU). The IMU was first created in 1920 with 11 countries as members, the USA and Japan being the only non-European members. In 1932 however it was practically dissolved as a result of dissonance among the member countries caused by European politics. It was revived (with a new constitution) in 1952 with 10 countries as members. India joined the IMU two years later, in 1954, although it had played an active role in drawing up the new constitution. Currently, IMU has 70 member countries. One of India's distinguished mathematicians, K Chandrasekharan served on the Executive Committee of the IMU for twenty four years (1955 - 78) with great distinction. He was the President of the IMU for four years (1971 - 74).

The ICMs are built around invited talks. There will be some 22 "Plenary" talks and 170 "Sectional" talks at the Hyderabad Congress. A Programme Committee appointed by the Executive Committee of the IMU selected the speakers. The Plenary lectures are meant to be accessible to all delegates: they are supposed to give a broad idea of significant developments in diverse areas of mathematics. The speakers are mathematicians of eminence who have had a big role in the very evolution of the subject in recent years. The Sectional talks are targeted at experts in different areas (there are 20 sections) and are held in parallel sessions. The speakers are outstanding mathematicians whose recent work has had a big impact in their branch. The chair of the Programme Committee for the Hyderabad congress is Hendrik Lenstra, an eminent Dutch mathematician. An invitation to talk at an ICM is a matter of great prestige to the mathematician. Some measure of India's place in the world of mathematics can be gleaned from the fact that from 1954 onwards barring the years 1966 and 1986, there has always been at least one invited speaker from India (working in the country). Two Indians will be giving Plenary addresses at Hyderabad and seven others, Sectional talks (of these six work in India).

At the Congress in Hyderabad, a new prize named Chern Medal, after S S Chern, one of the towering figures of the twentieth century is to be awarded for the first time. Chern was Chinese but worked in Berkeley, California most of his life (In 1949, the Tata Institute of Fundamental Research in Mumbai made a futile effort to get Chern on its faculty). Apart from his research contributions, Chern was an influential teacher and many of his students are among the leading mathematicians of today. The Medal is to be awarded to an individual whose lifelong outstanding achievements in the field of mathematics warrant the highest level of recognition. One novel feature of the prize is that half the prize money (\$500,000) will be given to an institution chosen by the prize winner.

The Committees to choose the prize winners are appointed by the Executive Committee of the IMU. The Fields Medal Committee is chaired by the president of the

IMU. Currently Laszlo Lovasz, a distinguished Hungarian mathematician is the IMU President.

There is a recently-instituted prize called the Abel Prize which is comparable to the Nobel in monetary value and is also administered along similar lines. Abel was a Norwegian mathematician and one of the all-time greats in the history of mathematics and the prize was instituted by the Norwegian government in 2002 as a commemoration of the bicentenary of his birth. S R S Varadhan, a mathematician of Indian origin, won the Prize for 2007. It is a matter for celebration for us that he would be at the Hyderabad Congress to deliver the "Abel" Lecture.

There will also be some cultural events on the sidelines of the conference offering our foreign guests some memorable non-professional experiences. For the lay public of Hyderabad, there will be talks at a popular level on mathematics.

It is indeed a happy coincidence that 2010 is the Centenary Year of the Indian Mathematical Society. It is the oldest scientific society in the country (V Ramaswamy Iyer, a deputy collector in the Madras civil services founded in 1907 "The Analytic Club", which transformed itself into the Indian Mathematical Society in 1910). Another event of which the ICM can be regarded as a commemoration is the publication in 1909 of his paper on the "Four vertex theorem" by Symadas Mukhopadhyay in the Bulletin of The Calcutta Mathematical Society: the paper, perhaps the first work by an Indian in "global differential geometry", attracted considerable international attention.

A third significant mathematical event of which too the ICM may be regarded as a commemoration is the International Colloquium" on "Contributions to Function Theory" held at the Tata Institute of Fundamental Research (TIFR) 50 years ago - in 1960. Atle Selberg one of the great names of the 20th century announced at this conference a remarkable discovery of his. His "rigidity theorem" triggered off new and exciting developments in the interface between number theory and geometry which are continuing to this day. Indian mathematicians have made substantial contributions to these developments. Also at that conference a very young Raghavan Narasimhan (who is one of the finest mathematicians to emerge out of this country) spoke on "Embedding of open Riemann surfaces", his solution of a long standing important problem; it was a superb achievement and big news in the mathematical community at that time.

The IMU accepting India's bid to hold the IMU, amounts to a recognition of India as an important international player in mathematics by the international mathematical community. The Congress affords the Indian mathematicians a rare opportunity to interact with the finest mathematical minds in the world. Our scholars and researchers would benefit immensely from the lectures which will help them to expand their horizon.

