Place and Role of Mathematics in Society

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Mathematics has its own intrinsic beauty and aesthetic appeal, but its cultural role is determined mainly by its perceived educational qualities. The achievements and structures of mathematics are recognized as being among the greatest intellectual attainments of the human species and, therefore, are seen as being worthy of study in their own right, while the heavy reliance of mathematics on logical reasoning is seen to have educational merit in a world where rational thought and behavior are highly valued. Furthermore, the potential for sharpening the wit and problem-solving abilities fostered by the study of mathematics is also seen as contributing significantly to the general objectives of acquiring wisdom and intellectual capabilities. These cultural aspects affect all Canadians to some degree through our formal educational processes, reflecting the degree to which Canadian society is committed to "liberal" or "humanist" education. In particular, it is a point of view adopted by many professional mathematicians in their teaching and research activities.

Is society in general aware of the importance of mathematics? How does it treat the practitioner of mathematics? Western society seems to have had a good appreciation of the importance of science at large, and mathematics in particular, at least in the modern period. Till the advent of the 19th century, there were very few people who made mathematics their exclusive pursuit, but since that time, mathematicians, even those pursuing mathematics for its own sake have been reasonably well supported in the West. The creation of many universities and other centers of learning and the support extended by the nobility to individual mathematicians bear ample witness to this. There have of course been instances (Abel and Galois, two of the all-time greats in mathematics are the most striking cases) when outstanding men did not get the support they needed, but by and large, the tremendous progress made in mathematics in Europe and America is in itself evidence of Western societies' support for science. The erstwhile Soviet Union deliberately set out to promote science in general and mathematics in particular; and this policy had a resounding impact. Moscow produced a great mathematics school with an amazingly large number of gifted mathematicians whose creative achievements as well as scholarship were stupendous. Unfortunately, this wonderful school has virtually disintegrated since, thanks to the political upheavals there. The Americans were paying relatively little attention to mathematics in the first half of the twentieth century, but the Soviet space programmer's first Sputnik jolted them from their benign indifference into eager support for mathematics. Through the sixties and seventies and even into the eighties, support for mathematics was available on a very generous scale in the US and this had indeed a tremendous effect. It produced an array of brilliant mathematicians and much of the most exciting mathematical developments. It would appear that in recent times however, the US is reverting to its old attitudes towards mathematics.

In any country, the place of mathematics in society depends on the nature of society and its ambitions. Canadian society has inherited the European traditions of cultural and scientific freedoms, and it is reasonable to assume that these will be maintained. Also, from prosperity based on the extraction of primary resources, Canada aspires to a leading role on the international scene as an industrialized nation and as a producer of consumer goods and HIGH TECHNOLOGY products. These aspirations are

strongly influenced by the proximity of the US and, in particular, by Canadian economic dependence on that country. The role of mathematics in Canada, and of all the basic sciences, depends partly on the degree of economic independence chosen by Canadians now and for the future. Intellectual activity had certainly taken a back seat for centuries in our country and its first stirrings after the long period of dormancy are to be seen in the Bengal renaissance of the 19th century. At the beginning of the reawakening, it was the pursuit of humanities that dominated the scene, but in the early twentieth century, the twin figures of Raman and Ramanujan blazed new trails in science. Raman was an outstanding communicator and his leadership provided the immense impetus for the development of physics. Mathematics did not have this advantage: Ramanujan's brilliant career was tragically cut short in its prime. Nevertheless, his example inspired a good many people to pursue mathematics. A career in mathematics was of course unattractive in comparison with many others when viewed in terms of the creature comforts that one could command, but in the first half of the twentieth century, there was compensation in the kind of respect that the man of learning was accorded. It must be said that both Raman and Ramanujan received reasonable support from the colonial institutions of that period; in the case of Ramanujan, once the people with the requisite powers were convinced of his extraordinary talent, they acted with an alacrity that today's bureaucrats would do well to emulate. Of course, Britain was not interested in promoting intellectual activity in this country, but there was some response to sporadic individual achievements. In any event, whatever the rulers thought, Indian society did not have a strong awareness of the importance of science, much less that of mathematics during the colonial days.

There is a general feeling that unlike physics or other sciences, mathematics is a somewhat otherworldly pursuit. Few realize that esoteric problems of cosmology pursued by astrophysicists or the frontier areas of particle physics are as meaningful to the practical everyday world as Fermat's last theorem. As a mathematician, I have come across many people who wonder what there was left in mathematics to discover, an experience that I am sure the physicist does not share. But mathematics has an added disadvantage vis-à-vis some other subjects like physics or chemistry or commerce: these latter are seen as potentially prepare you for a wide range of careers compared to mathematics. This results in fewer bright people specializing in mathematics than in many of these other subjects and the pool available to draw competent mathematics teachers (especially at levels beyond the school) from, is very small indeed.

It is necessary to recognize difficulties with the development of skills in mathematics and of awareness of the importance of mathematics in Indian society so that mathematics can have a respected place in the Indian cultural and educational spectrum.

(The author has prepared the article from the materials available on the internet)

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