

Mathematicians' Nobel Prize: Fields Medal or Abel Prize

by Manjil Saikia - Sunday, April 17, 2011

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Alfred Nobel (1833-1896) made his fortune through the manufacture of explosives. He was born in Sweden, grew up in Russia, studied chemistry and technology in France and the US, and built up companies in several countries all over the world. In his will, Nobel designated the establishment of annual prizes to be given in five areas: Physics, Chemistry, Physiology or Medicine, Literature, and Peace. The prizes are intended to reward specific discoveries or breakthroughs, and the impact of these on the discipline. The first prizes were awarded in 1901. In 1968, a sixth prize was added, in Economics, donated by the Bank of Sweden to celebrate its tercentenary. Strictly speaking, it is not a Nobel Prize but ["the Prize in Economic Sciences in Memory of Alfred Nobel."](#) The Royal Swedish Academy of Sciences selects the prizewinners for physics, chemistry, medicine, literature, and economics, the Nobel Institute at the Karolinska Institute awards the prize in medicine, and the Norwegian Nobel Institute handles the Peace Prize. The monetary amount of each prize varies from year to year. At present it is around SEK10 million, about \$1.3 million.

A number of theories have been put forward to explain the omission of mathematics from Nobel's original list. One of the oft-cited reasons is that the famous Swedish mathematician Gosta Miagnus Mittag-Leffler had run off with Nobel's wife. But there is no support to this story and in fact Nobel never married. But that does not stop the story as some say the woman was not Nobel's wife but the one he had proposed and so on. Another story is that Mittag-Leffler, in the process of accumulating considerable wealth had antagonized Nobel. Nobel afraid that Mittag-Leffler might win the prize for mathematics did not institute a prize for mathematics. This also seems far-fetched as there were greater mathematicians such as Henri Poincare and David Hilbert around that time. Both the apocryphal stories were debunked in an article by mathematicians Lars Garding and Lars Hormander in the journal *Mathematics Intelligencer* in 1985. According to them for natural reasons, the thought of a prize in mathematics never entered Nobel's mind. They claim that except for medicine all other fields were close to Nobel's interests. He perhaps simply did not care much for mathematics because it was not considered a practical science, which could benefit humanity. His will speaks of prizes for those inventions or discoveries that are of great practical benefit to mankind.

The Fields Medal:

At the 1924 [International Congress of Mathematicians](#) (ICM) in Toronto, a resolution was adopted that at each ICM, two gold medals should be awarded to recognize outstanding mathematical achievement. Professor J. C. Fields, a Canadian mathematician who was Secretary of the 1924 Congress, later donated funds establishing the medals, which were named in his honor. Fields wanted the awards to recognize both existing work and the promise of future achievement, as a result of which it was agreed to restrict the medals to mathematicians not over forty at the year of the Congress. The Fields Medal was first awarded in 1936, to Finnish mathematician Lars Ahlfors and American mathematician Jesse Douglas. The next

time the Fields Medals were awarded was in the year 1950 and has since then been awarded every four years on the occasion of the ICM. In 1966 it was agreed that, in light of the great expansion of mathematical research, up to four medals could be awarded at each Congress.

The Fields Medal Committee is chosen by the Executive Committee of the International Mathematical Union (IMU) and is normally chaired by the IMU President. It is asked to choose at least two, with a strong preference for four, such that it represents the diversity of mathematical fields. The official name of "Fields Medals" is "International medals for outstanding discoveries in mathematics", and at times called as "Nobel prize for Mathematicians". The medal is accompanied by a cash prize of CND\$15,000.

There are some unique characteristics of the Fields Medal that make it different from a Nobel Prize. First it is awarded only every fourth year. Second, it is given for mathematical work done before the recipient is 40 years of age. Third, the monetary prize that goes with the Fields Medal is considerably less than the Nobel Prize. Fourth, the Fields Medal does not come out of Scandinavia. But the Fields Medal carries the same prestige in mathematical community as that of Nobel Prize in other areas since it is awarded by IMU the biggest mathematical association.

When the Norwegian Academy of Science decided to create a prize for mathematics in honor of Abel, they did so with the intention of rectifying what they saw as omission on the part of Nobel.

Abel Prize:

The [Abel Prize](#) is intended to give the mathematicians their own equivalent of a Nobel Prize. Such an award was first proposed in 1902 by King Oscar II of Sweden and Norway, just a year after the award of the first Nobel Prizes. However, plans were dropped as the union between the two countries was dissolved in 1905. As a result, mathematics has never had an international prize of the same dimensions and importance as the Nobel Prize.

Plans for an Abel Prize were revived in 2000, and in 2001 the Norwegian Government granted NOK 200 million (about \$22 million) to create the new award. [Niels Henrik Abel](#) (1802-1829), after whom the prize is named, was a leading 19th-century Norwegian mathematician.

The Abel Prize is presented annually by the King of Norwa to one or more outstanding mathematicians. This is among the most prestigious awards in mathematics. It comes with a monetary award of NOK 200 million. The Norwegian Academy of Science and Letters annually declares the winner of the Abel Prize after selection by a committee of five independent international mathematicians. The amount of money that comes with the prize is usually close to the Nobel Prize. The prize is an attempt at creating publicity for mathematics, making the discipline more prestigious, especially for young people. As a result of Norway's action, made in part to celebrate the 200th anniversary of Abel's birth in 2002, mathematicians now too have an award equivalent to the Nobel Prize.

The question is will the new prize achieve the international luster of a real Nobel? The Nobel Prize in Economics achieved that status after it was introduced in 1968, but in that case the Bank of Sweden attached the magic name Nobel to it. One could hardly expect Norway to name their prize after a famous Swede, especially when they have Abel to recognize.

(The article has been compiled from different sources)

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