Notices

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AMS President's Address at Abel Celebration

James Arthur

Your Majesty, Your Excellencies, Ladies and Gentlemen.

It is a great honour for me to respond to the address of the minister of education. I would like to express the deep gratitude of mathematicians to the Norwegian government, and to the Norwegian people, for establishing the Abel Prize. The lack of a Nobel Prize in mathematics was long regarded as an anomaly that diminished public perception of the importance of mathematics in society. The vision and generosity that led to the creation of the Abel Prize has now put mathematics on an equal footing with the other sciences.

It is also an honour and a pleasure on this glorious occasion to congratulate Professor Peter Lax. It goes without saying that the Abel Prize is the highest honour a mathematician can achieve. The decision is made by a jury of mathematical peers, who work with a large pool of nominees taken from the greatest mathematicians in the world. The circumstances of the award make the Abel Prize as close as one could imagine to a Nobel Prize in mathematics. However, with laureates of the distinction of Peter Lax, and Jean-Pierre Serre, Sir Michael Atiyah, and Isadore Singer before him, perceptions might change. Perhaps physicists will some day refer to that prize presented in Stockholm as "an analogue for physics of the Abel Prize"!
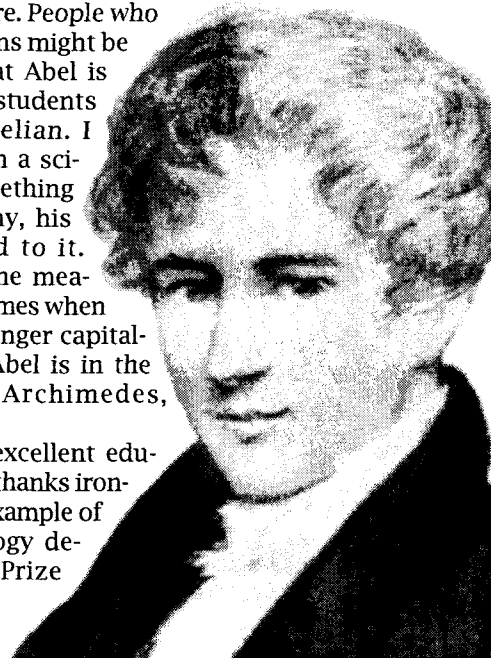
The professional landscape of Peter Lax is the area of differential equations. This is the branch of mathematics that has had the greatest influence on the rest of science. Laws of physics, chemistry, biology, engineering, and medicine are all expressed quantitatively in terms of equations derived from the differential calculus discovered by Leibnitz and Newton. The problem is to solve them! The equations are not of the kind one sees in high school. The unknown quantities are not numbers, but functions which describe the behaviour of physical quantities under fundamental laws of nature.

Peter Lax is perhaps the greatest living mathematician working in this venerable area. He has made extraordinary contributions to our understanding of differential equations and their solutions. These range from the explanation of counterintuitive phenomena in nature, such as supersonic shock waves, to the discovery of completely unexpected relations between basic applied problems and a beautiful part of pure mathematics that goes back to Niels Henrik Abel.

I am sure that the story of Abel is familiar to everyone here. People who are not mathematicians might be surprised to find that Abel is known to countless students as an adjective: abelian. I should say that when a scientist discovers something especially noteworthy, his name gets attached to it. However, the supreme measure of recognition comes when this adjective is no longer capitalized! In this sense, Abel is in the same company as Archimedes, Newton, and Gauss.

Abel received an excellent education in high school, thanks ironically to a horrifying example of mathematical pedagogy described in the Abel Prize

Niels Abel

Photograph from the Abel Prize website.

Peter Lax receiving the Abel Prize from HRH the Crown Prince Regent of Norway.

booklet. At university he studied mathematics on his own, since there was no formal degree in the natural sciences. He then received a government grant to travel to the leading mathematical centres abroad. In six short years Abel made mathematical discoveries that were beyond the imaginings of his contemporaries, and that remain foundations of the mathematics we do today. Who knows what he might have accomplished had his life not been cut short tragically by tuberculosis at the age of twenty-six? We take comfort in the knowledge that he lives today in the enduring vitality of his work.

The Abel Prize stimulates mathematical research at the very highest levels. It is of enormous benefit for other reasons as well. The effective teaching of mathematics is essential for the future well-being of society. Talented students need to be encouraged to pursue the subject. It is equally important that young men and women see the teaching of mathematics as an honourable calling. Public recognition as Abel Laureates for extraordinary leaders such as Peter Lax resonates the world over. It becomes a source of pride and inspiration for students and teachers alike.

I have yet one more reason to express gratitude. The Abel Prize Fund is now supporting the International Mathematical Union in its work of fostering mathematical education and research in developing countries. Such wisdom and foresight is helping to make mathematics a truly global enterprise. It brings us all one step closer to realizing a dream, a wonderful dream, of being able to nurture talent wherever it might be found.

Once again, warmest congratulations to Peter Lax from everyone, and heartfelt thanks from the mathematical community to Norway for the creation of the Abel Prize.