Reflections on an Asymmetry on the Occasion of Arnold's Passing Away ...

Elemér E Rosinger

Department of Mathematics
and Applied Mathematics
University of Pretoria
Pretoria
0002 South Africa
eerosinger@hotmail.com

Dedicated to Marie-Louise Nykamp

Abstract

Keeping silent by authorities in science about breakthroughs made by less well known scientists creates a massively asymmetric situation which is to the detriment of science.

The Asymmetry ...

It is indeed a major shock when a scientist of the standing of V I Arnold passes away at what nowadays is in fact a rather young age. What remains for one to do in such a situation is once again to recall his work, once again ponder about its highlights, once again to see how one can be helped by it in the further pursuit of science.

As always, however, there are also personal aspects involved in such a legacy which may be useful to know about, even if rather for their avoidance, than pursuit. Indeed, everyone comes with personality fea-

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tures which seem not to be always in close enough relationship and harmony with one's more truly exceptional traits. And in the pursuit of science, such dichotomies can have their own effect, not always commendable.

One such short story may, perhaps, be of a wider interest and relevance, and I try to recall it here.

In the 2004 edition of his Springer Universitext book "Lectures on PDEs", see [3], V I Arnold, starts up front on page 1 with the statement :

> "In contrast to ordinary differential equations, there is *no unified theory* of partial differential equations. Some equations have their own theories, while others have no theory at all. The reason for this complexity is a more complicated geometry ..." (italics added)

It appears, therefore, that quite unknown to him, during the 1990s, no less than two such unified, or more precisely, type independent theories for very general classes of nonlinear systems of PDEs, with possibly associated initial and/or boundary value problems, have in fact been introduced and developed, see [5,6], and [1,2,8-14] for more recent further contributions. In this regard, however, Arnold seemed not to be alone. Indeed, the 1998 edition of the book "Partial Differential Equations", [4], by L C Evans, starts his Examples on page 3, with the statement :

> "There is no general theory known concerning the solvability of all partial differential equations. Such a theory is *extremely unlikely* to exist, given the rich variety of physical, geometric, and probabilistic phenomena which can be modeled by PDE. Instead, research focuses on various particular partial differential equations ..." (italics added)

Regarding Arnold, soon after the publication of his mentioned 2004 book, I sent him an email mentioning the above. Not getting any reply, I sent him several other similar emails, with the same effect. It is, of course, possible that none of those emails managed to reach

him. And it is also possible, and quite a bit more so, that the emails reached him, and he may have found them rather challenging ...

By the way, the editors of the Mathematical Intelligencer were sent a related paper back in 2004, [7], and still did not manage to make a decision about it ...
To their excuse, however, one may note that [5] got published ...

And as it seems, keeping silent by an authority in science about some breakthroughs made by others less well known is considered to be a considerably less of a visible offense, than trying to publicize such breakthroughs by those who made them. After all, keeping silent does make such a behaviour quite invisible, indeed ...

Here therefore, we face what may be a rather consequential asymmetry in the everyday development of science ...

And it is precisely this kind of asymmetry which is actually the intended main subject of this note. And as such, it had, has, and will continue to have its relevance and importance in the development of science for as long as human nature is what it is, even in the case of persons endowed with extraordinary gifts.
And needless to say, that asymmetry is particularly detrimental in the case it involves young researchers ...
As for those involved in [3,4], no matter how they may regret it, they all happen to be passed their, let us say, first youth ...

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