

INTRODUCTION

A Personal Tribute to Peter Freyd and Bill Lawvere

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The idea of a dedication to my advisors Peter Freyd¹ and Bill Lawvere² on the occasion of their 80th birthdays, having both of them taken place recently and just a year apart, has as main purpose to emphasize how influential they have been and how it is important to help to acquaint junior researchers with their work. The unanimous response that was received from those who were invited to serve as guest editors in this enterprise indicated that there was ample support for it. That this idea was met with approval from Hvedri Inassaridze, the chief editor of the Tbilisi Mathematical Journal, was not too surprising either, taking into account that category theory is well represented in Georgia.

Although Peter Freyd and Bill Lawvere shared Sammy Eilenberg as an ancestor, they each had different original interests. Whereas Peter had started out with a 1960 Princeton dissertation [1] on a general theory of categories and functors in addition to his contributions to stable homotopy theory [3], followed by his highly original book on abelian categories [2] influenced by Alexander Grothendieck and Peter Gabriel, Bill did so motivated instead by the work of Clifford Truesdell and Walter Noll on continuum mechanics, a subject which he postponed to deal with until later [22, 28, 30, 34] while coming up in the meantime with a novel concept of algebraic theory for his 1963 Columbia dissertation [20]. In both cases, their wide knowledge of mathematics became an important factor in their ability to grasp important concepts from various sources some of which had been previously unrelated, while doing so with rigour and precision not to speak of elegance.

In their current research programs, Lawvere and Freyd hardly overlap. Indeed, Bill Lawvere has of late been mostly pursuing his ambitious program on axiomatic cohesion [31, 32, 35, 37, 38], motivated by his initial interest on classical analysis and continuum physics. In his view, the latter requires more than just the partial invariants of locales and characteristic rings for its description. He thus proposed the study of different categories of space, all of which share a certain feature of cohesion. Envisaged, among other goals, are applications to the theory of distributions in a cohesive topos, needed for continuum physics. As for Peter Freyd, he has during the last few years dealt instead with matters of interest to computer science [13, 14, 15, 17] without however abandoning other projects, as his intriguing and ongoing program on algebraic real analysis [19] indicates. In his view, the existence of injective extensions in its category of models strongly limits an equational theory; in particular, it prohibits the possibility of a ‘compactness theorem’ for solving sets of equations and that prohibition has limited the usefulness of nonstandard analysis. He contends that by switching from Euclidean spaces to cubes one can avoid the problem and that a remarkably large part of traditional analysis can be made entirely equational so that, for instance, if one sticks

¹<http://www.genealogy.ams.org/id.php?id=23200>

²<http://www.genealogy.ams.org/id.php?id=18947>