

Notes on Improving Lisp¹

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I understand that there is considerable tension between the goal of standardizing Common Lisp and the idea, prominent in Europe, that major improvements should be made in the course of creating an international standard. I agree with the idea that Common Lisp should be standardized as a consolidation of existing practice, and that innovations should be avoided in this process. My experience with the Algol 60 meetings led me to the opinion that innovation and standardization do not mix well. The trading involved in compromising interests in existing ways of doing things is only too compatible with what might be called implicit academic log rolling. "I'll agree that your new idea is great if you'll agree with mine." The result is an unimplementable monstrosity.

The enormous effort that has already been put into making a standard Lisp needs only a small amount of consolidation, but I suppose that this will still involve a very large amount of work. The standardization process has its costs. Some good ideas entirely compatible with how Common Lisp is developing will be ruled out on the grounds that they aren't present in existing implementations of Lisp. I must admit being disappointed that my proposals of a few years ago for including some kind of arbitrary precision floating point numbers, exemplified by MACSYMA's "big floats," got nowhere. I thought it would supplement the existing BIGNUMs and make Lisp really suitable for numerical computations in pure mathematics.

However, the ideas of Lisp have not reached a final form, and there is plenty of room for innovation. New ideas appear all the time, and Scheme, T, Tao and Seus all have ideas that are improvements over those embodied in Common Lisp. Someday it will be time to combine the best of them in a new language that will compete with Common Lisp and hopefully displace it. The main proper vehicle for advancing new ideas is individual and small group research and the the publication of the results and their presentation at conferences such as the biennial Lisp conferences sponsored by ACM.

Perhaps there is room for yet another medium for advancing improvements to Lisp. I have in mind a Lisp improvement conference, the object of which is presentation of ideas of a variety of magnitudes ranging from modifications of individual functions to advocacy of

¹ **Editor's note:** This is an expanded version of some remarks delivered by the author to the ANSI X3J13 meeting held in Palo Alto, on March 16, 1986. X3J13 is concerned with the standardization of Common Lisp.

completely new systems (but with the emphasis on features rather than complete systems). The idea of putting big floats into the language itself would be in order at such a conference.

Another important direction for improving the utility of Lisp is making a good library. At some stage of the Common Lisp meetings, there was talk of Yellow Pages. The ball was dropped, and I fear it was dropped at Stanford. The library might well be modelled on the LINPACK and EISPACK libraries for numerical analysis maintained at Argonne National Laboratories, with both the catalog and the programs themselves accessible via electronic network.

In this connection, at some time it might be worthwhile for those involved in the Common Lisp effort to consider the standardization of some function names, and descriptions of some Lisp functions, that are not required for all implementations of Common Lisp. The idea is that whoever implements these functions, whether a supplier of Common Lisp or a user, should use these function names and order of arguments in order to make his main program more portable and combinable with other programs.