

History of Programming Languages

Edited by
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Editor's Introduction

These proceedings of the ACM SIGPLAN History of Programming Languages (HOPL) conference are a record, in the words of those who helped make the history, of a baker's dozen of the languages that set the tone of most of today's programming. It is difficult to describe the feeling that prevailed at the conference. There were no parallel sessions. Some attendees were graduate students, some pioneers, many were practitioners, and there seemed roughly an even division between industrial and academic affiliation. It was the first conference I attended where virtually everyone attended every session.

The Conference General Chairman's introduction (page xvii) provides a rationale for the languages chosen and what the speakers were asked to prepare. There was an official Conference Historian. (How can you have a "History of . . ." conference without a historian?) His introduction (page xxi) attempts to present the conference in the perspective of modern history-of-science scholarship.

The Keynote Address (page 7) was given by Grace Murray Hopper, Captain, USN, who was present at the birth of the industry and has remained an active participant. Her remarks indicate that a lot of what is considered novel and innovative today may well have first been done by her Remington-Rand Univac crew back in the 1950s.

The largest part of this volume is taken up with the languages themselves, in chapters each assembled in the following way:

- The formal paper from the preprints (with some modifications by the authors).

- A transcript of the formal conference presentation.

- A transcript of the discussant's presentation. (There were discussants for APL, COBOL, FORTRAN, LISP, PL/1, and SIMULA only.)

- A transcript of the question and answer session.

- The full text of questions submitted in writing by the attendees (some with additional answers provided by the author).

- Authors' biographies.

- Summaries of the languages appear in Appendix A.

The order of the languages in this book is the order of the talks given at the conference.

With the exception of JOSS, the formal papers were published as preprints in *ACM SIGPLAN Notices*, Vol. 13, No. 8 (August 1978). The papers are reprinted here with the permission of ACM and of the authors. In some cases, changes to the preprints have been made by the authors to correct typographical or factual errors. In a few cases, additional material was added.

Editor's Introduction

For ALGOL, two speakers were chosen initially to reflect the European and American points of view. An additional "short note" from another ALGOL pioneer has also been included.

The section on JOSS has a slightly different format since, due to a change in planned speaker, no paper for JOSS appeared in the preprints. To provide a broad historical outlook, the speaker was requested to make major revisions, expanding his talk into a formal paper.

No two speakers are alike and the transcripts of the talks reflect the differences. Some tended to repeat in the oral presentation the material in the formal preprint; others gave almost completely independent talks. In editing the transcripts, no attempt was made to remove redundancy. As far as possible, all that was said is included here. Editing has removed false starts and hesitations; punctuation has been added to try to clarify involved, run-on sentences. Interpolations are, for the most part, enclosed in brackets. Most sessions began and ended with administrative announcements which are omitted here.

Some of the talks were followed by formal presentations by discussants, and the transcripts of these are presented with the same type of editing as was used with the talks.

The question and answer sessions were handled at the conference by having written questions submitted to the session chairman during the talk. The chairman selected some of them to ask the speaker: the editing of the speakers' replies is similar to that indicated above.

The full text of all questions submitted is included and, in several cases, the authors have annotated this list, either keying the questions to the place in the transcript or the paper where it is answered or answering a question not covered at the conference.

Authors were asked to provide a brief biography highlighting their activities before the time period covered by the paper and their more recent work. For the most part, the biographies are the author's own words. In a few cases, the editor had to create a narrative biography from a terse *curriculum vitae*. If editorial license was carried too far in any case, my apologies. The pictures that accompany the biographies are candid photographs taken during the conference, and the subjects did not have a chance to select which pictures they preferred.

The after-dinner speeches at the conference banquet were devoted to humorous reminiscences and anecdotes about the languages and events during their development. The banquet anecdotes are not included in this volume because, although they are humorous to hear, the voice inflections make a big difference, and they are not necessarily amusing to read.

Audio and video tapes of the entire conference are available from ACM Headquarters: 1133 Avenue of the Americas. New York, New York 10036.

ACKNOWLEDGMENTS

Many people worked many hours to make the conference a success. The following is reprinted from the preprints:

It is . . . appropriate to acknowledge those who offered their time and energy.

Firstly, the chairmen who successfully surmounted a series of tough administrative problems:

Jean E. Sammet	General and Program Committee Chairman
JAN Lee	Administrative Chairman

Next the administrative committee chairmen who have done an excellent job of preparing for the conference:

Erwin Book	Local Arrangements
Billy Claybrook	Publicity
Susan Gerhart	Treasurer
Rorrie Ratkovich	Registrar

Next the "consulting historian" whose advice helped to put the plans for the conference in perspective and who also read and commented on most of the papers:

Henry Tropp

Then the members of the Program Committee who had the difficult task of deciding whom to invite . . . as well as making many decisions on the overall program organization:

Tom Cheatham	Michael Marcotty [replaced Ledgard in Feb. 1978]
John Goodenough	Robert F. Rosin
Henry Ledgard	Jean E. Sammet
JAN Lee	Henry Tropp
Barbara Liskov	

The Language Coordinators who worked to help the authors to get the papers done, done well, and done on time were:

ALGOL 60	David Gries, Tom Cheatham	
APL	Philip S. Abrams, JAN Lee	
APT	John Goodenough, Shizuo Hori	
BASIC	Ted Lewis, Henry Ledgard	
COBOL	Michael Marcotty, Henry Ledgard	
FORTTRAN	Bernard Galler, JAN Lee	
GPSS	Julian Reitman, John Goodenough	
JOSS	Charles Baker, Tom Cheatham	
JOVIAL	Tom Cheatham, Christopher Shaw	
LISP	Carl Hewitt, Barbara Liskov	
PL/I	Robert F. Rosin, Michael Marcotty	
SIMULA	Barbara Liskov, Richard Nance	
SNOBOL	Michael Shapiro, Robert F. Rosin	[end of reprinted material]

An oversight in the *SIGPLAN Notices* preprint volume—remedied here—is acknowledgment of those who prepared language summaries.

ALGOL 60	David Gries
BASIC	Ted G. Lewis
FORTTRAN	Bernard A. Galler
GPSS	Julian Reitman
JOSS	Charles Baker
JOVIAL	Tom Cheatham
PL/I	Robert F. Rosin
SIMULA	W. R. Franta
SNOBOL	Michael Shapiro

APL, LISP, and APT summaries were prepared by the authors of the respective papers, and the COBOL summary was anonymous.

Editor's Introduction

Four students received NSF support to attend the conference.

John Favaro	Helen Gigley
Bruce Galler	Richard Miller

Although not directly related to these proceedings, I wish to acknowledge Bernard A. Galler's contributions as banquet master of ceremonies and in the closing session, both of which helped to establish and maintain the wonderfully supportive atmosphere. He titled the banquet presentations "The way we *really* were." And that was truly the feeling that prevailed.

The HOPL conference was notable not only for the subject matter, but also for the warm sense of shared interest in sharing experiences. The difficult task of converting this material and this feeling to a book was made easier by a diverse group of people.

David Beech, Roger Firestone, Fred Grampp, and C. T. Schlegel did preliminary editing of the transcripts. Three pioneers of the computer field helped in many areas, especially with clarification of early names and events: John Mauchly, Herman Lukoff, and Bill Schmitt. I would like to dedicate my effort in the preparation of this volume to John and Herman, both of whom died recently and both of whom provided so much help and support, even up to the last weeks of their lives.

Mrs. Elizabeth Emory, of Professional Transcription Services, Abington, Pennsylvania, did a magnificent job of transcribing the audio tapes—getting correct many proper names and much specialized jargon despite tape noise, unintelligibility, and a variety of European and American accents.

The authors were generally prompt in responding to my editorial requests, especially Geoff Gordon who had things to do twice due to carelessness in the editorial office.

A helpful editorial board (listed on page ii) was highlighted by the immense effort Jean Sammet put into both the conference and the proceedings and by JAN Lee who was also an infinitely patient advisor and intermediary. I also wish to acknowledge the support and assistance of the ACM Headquarters staff.

Robert M. McClure was "official" conference photographer and most of the photographs reproduced here are his. I also took some of the candid pictures. The video taping was done by a crew from California State University, Long Beach, directed by Dan Baker who is the Coordinator of Instructional Services.

Finally, my family not only tolerated the project, they helped. My son Alan typed most of the questions-submitted sections; my son David assisted with the index; and my wife Geraldine, a professional editor, taught me how to edit.

The National Science Foundation provided support for the conference and for the book preparation under grant MCS77-27208.

September 1980

RICHARD L. WEXELBLAT