BOOK REVIEW

Wolfgang H. Janko. APL I--Eine Einführung in die Elemente der Sprache und des Systems, Athenäum Verlag GmbH, Königstein/Taunus, Germany (1980) xx+173 pp.

Wolfgang H. Janko. APL II/1 und APL II/2--Eine weiterführende Darstellung der Sprache und des Systems mit Anwendungen, Athenäum Verlag GmbH, Königstein/Taunus, Germany (1981) xx+526 pp. (2 volumes)

Until recently most of the APL manuals and textbooks were written in English. With the constant spread of the language outside of the English-speaking countries, especially in Continental Europe, the situation has been changing fast.

Besides IBM's original APL User's Manual, which was translated into at least French and German, the APL\360 Reference Manual by Sandra Pakin (Science Research Associates, Chicago, 2nd edition 1972) was turned into German a few years ago in a greatly revised form by Hans Lochner (APL-Handbuch, Science Research Associates GmbH, Stuttgart, 1975), treating in detail the APLSV and APL/CMS implementations, which were absent from the original text. The classic by Leonard Gilman and Allen Rose, APL--An Interactive Approach (Wiley, New York, 2nd. rev. edition, 1976) was also translated into German and Spanish.

For the last several years, however, authors in French-, German-, and Portuguese-speaking countries, and possibly many others, have written books on APL, both with teaching purposes and with applications in mind. A list is given in the bibliography below, but most likely it is far from being exhaustive. Unfortunately most of these books have not been reviewed or even mentioned in this journal, with the exception of those by Pommier (reviewed by DeKerf in issue 9 3, pp. 62-63) and by Giloi (reviewed by Itzinger in 10 2, pp. 11-12).

We have under review here a set of three excellent books on APL by Wolfgang Janko. Volume I has the subtitle "an introduction to the elements of the language and the system", while Vol. II has the subtitle "a more detailed description of the language and the system, with applications". All together, with a total of about 700 pages, these books build an extensive and brilliant discussion of the language, from a very elementary introduction through a study of advanced topics and some open questions in today's APL.

Vol. I gives an overview of APL's development and goes into some elementary aspects such as sign-on, character set, constants, variables, scalar functions, and the most common system commands. There is a brief introduction to the writing of defined functions. In our opinion the latter is probably the least interesting of all chapters, using an APL-alien approach of structured programming with the IF-THEN-ELSE, DO-WHILE, REPEAT-UNTIL, and CASE concepts. (This same topic is retained in Vol. II/2.) There is an appendix with solutions to the exercises in this volume.

Vol. II/1 superbly handles arrays, structural and numerical primitive functions (with special emphasis on matrix inversion and matrix division), and the classical operators (reduction, scan axis, inner and outer products). System commands, system variables, and system functions are also discussed in detail in this volume.

Finally, Vol. II/2 deals in more detail with the mechanics of writing defined functions, as well as recursion, idioms, and the direct definition of functions, and goes deeply into shared variables with the APLSV and APL\5100 versions in mind. This volume closes with a prospective of APL developments: generalized arrays (along the lines of the 1979 Comm. ACM paper by Gull and Jenkins) and operators (following closely the 1978 Operators and Functions IBM Research Report and the APL76 and APL79 papers on operators, all by Iverson), and several appendices on APL syntax, direct function-definition translation (the original Iverson-Orth proposal), internal representations on byte computers, and several tables, as well as solutions to the exercises in both Vols. II/1 and II/2.

As it stands, this work is a kind of handy encyclopedia or syntopicon on APL. There is practically no APL concept that is not rigorously discussed or dealt with. There are many exercises, and the solutions are an important help to APL apprentices.

Unfortunately, in a text of this extent a few topics could have been corrected or improved and we hope that they will be in future editions. We mentioned the APL-foreign control structures in two of the volumes. There are also a few inconsistencies in the notations used--in Vol. I, p. 70, in the definition of distributive functions, f and g are used as generic
functions and $x$ and $y$ as generic scalars, while in Vol. II/1, p. 3, in the definition of scalar functions, the generic functions are called $\alpha$ and $\omega$ and the generic arrays (vectors) $A$ and $B$. Later on p. 81, for the definition of the inner- and outer-product operators, $f$ and $g$ denote primitive dyadic functions (in fact they have to be primitive scalar dyadic, as pointed out correctly on p. 87) and $A$ and $B$ are scalars. On p. 44 of Vol. II/1, $A$ and $B$ are vectors and $f$ is scalar dyadic. There are, as can be expected, some misprints, particularly misspellings of "McIntyre" and "McDonnell" in Vol. II/2. Also, among others, in Vol. I, p. 43, $\theta 314$ is, obviously, not $314$, as claimed.

Readers familiar with strand notation will probably be upset by the message on p. 6, Vol. II/1:

VECTOR A B C
SYNTAX ERROR

Moreover, the fact that Janko has chosen to follow the APLSV and APL/5100 implementations is debatable, especially his describing the details of tape input and output on the IBM 5100.

Nevertheless, as a whole, these should be taken as minor criticisms. Professor Janko has to be commended by all those who read German for his outstanding work, and this reviewer is one of those who have to thank him for having done such a wonderful job. It is to be expected that in a future edition the small mistakes will be cleaned up and more up-to-date versions of APL be used. Among the plusses of the books, besides the rigorous treatment of the language, is the wealth of exercises, extensive bibliography, and discussions of all sorts of applications—one example is the decision-theoretic model for quantitative economics with mathematical proofs, Vol. II/2 pp. 288-297.

We look forward to seeing these books translated into English, and eventually other languages, for the benefit of the APL community.

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Textbooks in French, German, or Portuguese

Philip S. Abrams et Gérard Lacourly.  
Informatique par Téléphone—Langage de Programmation APL, Hermann, Paris (1972).

Maurice Dalois. APL—Une Approche Practique (seconde édition), Gouvernement du Québec, Ministère de l'Éducation du Québec, Québec (1981).

Daniel-Jean David. Informatique: Hardware, Fortran, APL, Cartes Controles, Éditions Techniques et Scientifiques Françaises, Paris (1974).

Daniel-Jean David. Programmer in APL, Éditions du P.S.I., Paris (1987).

G. Demars, J.-C. Rault, et G. Ruggiu. Le Langage et les Systèmes APL, Masson et Cie., Paris (1974).

Ernst Dotzauer. Einführung in APL, Bibliographisches Institut, Mannheim-Wien-Zürich (1978).

P. Dupont et Y. Tallineau. Les Langages de Programmation en Parallèle: Fortran, Cobol, PL/1 et APL, Masson et Cie., Paris (1974).

Wolfgang K. Gilo. Programmieren in APL, Walter de Gruyter, Berlin-New York (1977).

Rolland Hurtubise et Yves Poulin. APL et les Cadres, Les Presses de l'Université du Québec, Québec (1973).

Dieter Lattermann. APL in Beispielen, Oldenbourg Verlag, München-Wien (1978).

B. Legrand. Apprendre et Appliquer le Langage APL, Masson et Cie., Paris (1979).

B. Legrand. APL—Problèmes de Gestion Corrigés et Bases à Outils, Masson et Cie., Paris (1982).

S. Pommier. Introduction à APL, Dunod, Paris (1978).

B. Robinet. Le Langage APL (2ème édition), Éditions Technip, Paris (1980).

D.M. Sieber und N.M. Urmes. APL, Science Research Associates GmbH, Stuttgart (1977).

Ottmar Stötzer. APL: Zwischenbilanz der Praxis. Erfahrungsberichte von APL-Benutzern, IBM Beiträge zur Datenverarbeitung, Heft 4, IBM-Deutschland GmbH, Stuttgart (1974).

Carlos Jorge Zimmermann. Processamento Interativo: a Linguagem de Programação APL, Livros Técnicos e Científicos Editora, Rio de Janeiro (1981).