

APL Around the Clock

NEW BACKUP PROCEDURES

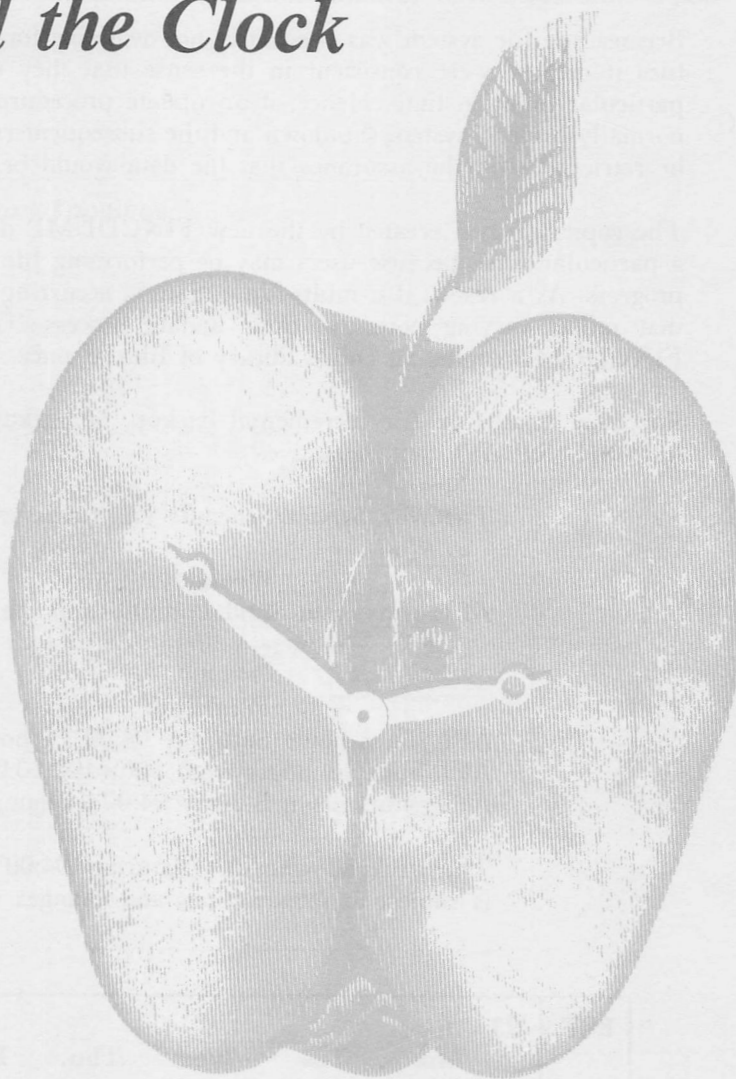
Eric Iverson

On 11 December, 1978, a new incremental backup mechanism came into effect to archive SHARP APL files. Data in the file system is currently backed up using two related mechanisms. The first of these, the file full dump, is run every Friday night at system shut-down. A full dump has the effect of creating an off-line copy of all file system data that has been modified at any time since the last full dump.

Both types of file dumps are used to provide the computer centre with a backup copy of the system, thus making it possible to perform file retrieves for user data that may be inadvertently lost or damaged.

The new incremental backup mechanism differs from the old one in several ways. FINCDUMPS will now be performed with the system running, so that there will be effectively no interruption in SHARP APL service during the week. The system will continue to shut down on Fridays, so that full file dumps may be performed.

(continued)



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SYSTEM BACKUP

FINCDUMPS will be run at approximately 04:00 UTC each morning. The file system will remain available while FINCDUMP is in operation; in particular, `AVAIL ''` will continue to return 1. However, the response time of the file system may, at certain times, appear somewhat degraded if an attempt is made to alter data that is in the process of being backed up. `READ`, `SIZE`, `APPEND` and other file operations that do not change existing data in a file are not affected by this.

Issuing a strong attention signal (by pressing the `ATTN` or `BREAK` key on the terminal three times) may produce the message `INTERRUPT, FILE BACKUP IN PROGRESS`. This message is similar to the ordinary `INTERRUPT` message, except that it indicates that `FINCDUMP` is in operation. Any related delays are transitory, and should not last more than a few minutes.

Because the file system was previously not available for use during `FINCDUMPS`, the copies of the files it created were consistent in the sense that they represented the state of the file system at a particular point in time. Hence, if an update procedure that involved a number of files, terminated normally prior to system shutdown and the subsequent running of `FINCDUMP`, all of the files could be retrieved with the assurance that the data would be self-consistent.

The copies of data created by the new `FINCDUMP` do not necessarily represent the file system at a particular time, because users may be performing file operations while the backup procedure is in progress. As a result, if a multi-file update is occurring, `FINCDUMP` may dump the files in states that reflect varying points in their update process. To minimize the chances of this happening, `FINCDUMP` copies an entire library of files at once, rather than just a single file at a time.

For more details on file incremental backup, or backup procedures in general, please contact your local SHARP APL representative.

The new Service Schedule (all times are in UTC):

Weekdays:

APL runs from Sunday 10:00 until the next Saturday 04:00

Weekend:



APL shuts down Saturday 04:00 (6 hours) to 10:00

APL runs 18 hours from Saturday 10:00 to Sunday 04:00

APL shuts down Sunday 04:00 (6 hours) to 10:00

The weekend schedule (Saturday 04:00 until Monday 04:00) is subject to interruptions and changes without notice.

						Weekend			
EST	23					23	5	23	5
	Mon.	Tue	Wed.	Thu.	Fri.	Sat.		Sun.	
UTC	4					4	10	4	10
	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.		Sun.	Mon.
AUS	14					14	20	14	20
		Tue.	Wed.	Thu.	Fri.	Sat.	Sun.		

 APL Down  APL Running

ENHANCEMENTS TO THE SHARP APL STATISTICAL LIBRARIES

Andrew North, Ottawa

The continuing development of the SHARP APL statistical libraries has produced two entirely new workspaces and affected important changes to a third existing workspace. The new workspaces, called 39 *TRANSFERFNS* and 35 *DISCRIMINANT*, are now accessible to all users. In addition, the workspace 39 *BOXJENKINS* has been revised, particularly with a view to increasing computational efficiency, thereby decreasing expense. Such revisions are largely transparent to the user; however, modifications have been made to the interactive input prompting procedure as well, hopefully making the specification of a model easier. All existing users of the workspace 39 *BOXJENKINS* are referred to the revised manual, "Box-Jenkins in SHARP APL", available from your local SHARP APL representative. A brief description of the two new workspaces and of the revised 39 *BOXJENKINS* follows.

The Box-Jenkins Technique

The workspace 39 *BOXJENKINS* performs the analysis and forecasting of time series according to the Box-Jenkins Technique. This technique is a sound analytical means of achieving forecasts in various areas of planning, as well as in purchasing, marketing and on-line process control. Common examples of its use include applications in sales forecasting and production planning, as well as in the design of optimal control schemes for which the system must first be analysed and modelled. Using a logical succession of three stages, a comprehensive analysis is performed on a time series which has been sampled at discrete equally spaced time intervals. The fundamental assumption underlying the technique is that future values for a given time series can be determined using the mathematical formulation (stochastic model) which has been shown to describe the behaviour of the series in the past. Given this assumption, the primary objective in any time series forecasting analysis is to obtain a stochastic model which can be demonstrated to have generated the existing observations. As mentioned above, the Box-Jenkins procedure can be categorized into a logical succession of three distinct stages:

- Model identification (and preliminary estimation)
- Model estimation
- Forecasting

The first stage assists in the identification and preliminary estimation of an entire class of models, one of which is assumed to have generated the series. This model is estimated quantitatively in the second stage. Forecasts are finally generated, based upon this model, in the third stage. The SHARP APL implementation of the Box-Jenkins technique guides the user through the entire process, from the model identification stage to the generation of forecast sets. Upon the completion of the model identification, preliminary estimation and model estimation stages of the procedure, the functions ask whether or not the user is ready to go on to the next stage in the analysis. If an affirmative response is given, the package continues with its direct execution. As an alternative to this comprehensive analytical process, any or all of the three stages can be accessed directly by executing the functions

IDENTIFY, *ESTIMATE* or *FORECAST*, respectively. For example, this alternative approach might be taken if an analyst is confident that the model which generated the original series is known beforehand. In this case, only the resulting forecasts would be of interest, and only the function forecast need be executed.

Reference: 'Box-Jenkins in SHARP APL' manual.

Transfer Function Models

The workspace 39 *TRANSFERFNS* performs the analysis and forecasting of transfer function models. Representing in effect the bivariate (multivariate) extension to univariate Box-Jenkins ARIMA models, transfer function models are useful in describing the behaviour of industrial processes and of economic and business systems. Such models reflect a dynamic response in a system. For example, consider a series X which measures the level of input to a system. Suppose that the level of X influences the level of a system output Y. It is often the case that, because of the inertia of the system, a change in X from one level to another will have no immediate effect on the output, but will instead produce a delayed response with Y eventually attaining equilibrium at a new level. Such a change is referred to as a dynamic response, and a model which describes this response is called a transfer function model. Under the assumption that input and output observations are made at equispaced time intervals, the associated model is called a discrete transfer function model. 39 *TRANSFERFNS* contains functions to perform the analysis of such models. The structure of the workspace is identical to that of the workspace 39 *BOXJENKINS*, the procedure being separated into the following three distinct stages:

- Model identification and preliminary estimation
- Model estimation and diagnostic checking
- Forecasting

As is the case with the univariate analysis routines in 39 *BOXJENKINS*, there are three functions (called *IDENTIFY*, *ESTIMATE* and *FORECAST*) which can be executed by the user.

The three functions in this workspace, however, are dyadic rather than monadic, the left argument representing the input series and the right argument the output series. Again, the user can execute any of these directly, or, alternatively, be led conversationally through the entire procedure, beginning with the function *IDENTIFY*.

Reference: 'Box-Jenkins in SHARP APL' manual.

Discriminant Analysis

The workspace 35 *DISCRIMINANT* contains functions which perform a discriminant analysis. The functions construct a framework by which multivariate observations can be classified into one of a set of pre-specified populations. The variables to be used in the analysis can be specified directly by the user or selected in a stepwise manner. For both of these variable selection methods, two approaches may be taken to define the discriminating framework:

- Minimizing the mean probability of misclassification, or
- A 'canonical variables' approach.

An additional feature of the workspace allows the classification of any number of multivariate observations (of unknown origin) into one of the populations, once the discriminating framework has been established.

Reference: on-line *DESCRIBE*.

AVIATION DATA BASE SEMINAR

A very successful seminar was held in Washington D.C. on November 2. Over 150 people attended, and it was gratifying that, as well as good attendance from U.S. organizations, several Canadian and European representatives, from a cross-section of users that included government, airlines, airplane manufacturers, transportation consultants and financial consultants, were also there. The conference was extremely well run, and special thanks for a job well done go to Peggy Davison and Tina Seri. Attendees were presented with a copy of the proceedings; those interested may request a copy from their local I.P. Sharp branch office.

The first speaker was Ed Greenslet, Vice President, Merrill Lynch Pierce Fenner and Smith, Inc. Ed discussed several programs he has developed using CAB Form 41 data which help him and his clients make better informed investment decisions. His speech included illustrations of several reports produced on the Sharp system: quarterly financial and operating data; quarterly forecasting; and monthly yield and fuel costs. The next speaker was Ted Shown, Manager of Economic Planning at Air California. Ted's speech was particularly interesting in that he presented the decision process that led the Air California Marketing Department to choose timesharing, and in particular SHARP APL, as the primary means of automating most of their statistical functions. He explained how, after this decision had been made, they were able to make significant progress in the relatively short timespan of a few months. Not many companies can make the claim, as Air California did, that their first experience with automated computer systems has been an unqualified success.

David Keith of I.P.Sharp Associates reviewed the history of the Sharp Aviation Data Base. He presented several examples of the use of MAGIC with some of the new data bases and techniques developed over the past year. These included: city pair rankings for 1977; group aircraft type codes; the T3.1 traffic schedule for supplemented air carriers; a single access function for the P5, P6, P7, and P8 schedules of Form 41 (P5678); downline (multiple-stop) service segment data; the new aviation application library (LIB 703); the T6 Charter Traffic data base; and the U.S. World International Air Travel data base (INS). David gave a summary of the possible directions of the Sharp Aviation data base for the future, and announced that the Civil Aeronautics Board have given I.P. Sharp Associates permission to act as agents for those wishing to access international service segment and international origin-destination data on the Sharp system. Only those granted a waiver by the CAB will be given access to this restricted file.

After lunch, Bob Dabrowski of I.P.S.A. presented a close look at our latest big data base. This data, which is the property of the Reuben H. Donnelly Corporation in Chicago, is expected to be very useful to those in the analytical side of the airline industry. Bob pointed out several applications, the most obvious of which is that data can be extracted from the file for any scheduled flight in the world in any desired order and format. Historical data is being retained, facilitating projects which might involve history of service.

Steven Gordon, one of the early users of the Sharp Aviation data base, spoke about how his firm, Simat, Helliesen and Eichner, Inc. use the system to perform the varied studies requested by their clients. S.H. 'E have probably used every data base on the system at least once, as he illustrated most graphically during his speech. Our last speaker of the day was Michael Philburn, Director, Route Development at Trans World Airlines, Inc. Mike pointed out that an airline cannot permit one of their competitors to gain a sustained competitive edge in the market-place. The leverage of one percentage point share change in a single city-pair market (for instance, New York to Los Angeles), can be valued at approximately \$2.4 million dollars annually.

AVIATION

In his words:

"A major factor that has contributed to this intense level of competition is the increasing wealth of market information that has been disclosed under regulation. I know of no other industry where there is such an extensive amount of detailed market information made available on the operations of each of the individual competing companies, as there is today in the airline industry."

I.P. Sharp Aviation seminars have proven so useful that more are likely to be held in the future. We thank all of those who participated in and attended this one.

APL79

The conference APL79 will be held in Rochester, New York, from May 30 through June 1, 1979. You can obtain your badge and proceedings as early as noon on Tuesday May 29. Exhibits will open a few hours later, and on Wednesday morning the technical sessions will begin. The conference, including a gala banquet Thursday evening, will continue right through lunch on Friday, June 1.

At APL79, which is the eleventh conference in a series sponsored by STAPL, you will hear contributed papers on all aspects of APL. You will also hear a series of invited papers that have been chosen to help enlarge your professional perspective, and to let you see APL from different points of view. The invited speakers and their topics are:

- E.F. Codd, IBM, 'Relational Data Base Management and APL'
- A.D. Falkoff and D.L. Orth, IBM, 'Development of an APL Standard'
- K.E. Iverson, IBM, 'The Role of Operators in APL'
- A. Kay, XEROX Parc, 'Smalltalk'
- T. More, IBM, 'The Nested Rectangular Array as a Model of Data'
- J. Moses, M.I.T., 'The MACSYMA System for Formula Manipulation'
- A.J. Perlis, Yale U., 'APL and LISP ... should they be combined and if so, how?'
- G.J. Sussman, M.I.T., 'Constraints'
- W.H. Burge, IBM, J. Moses, M.I.T., and V.R. Pratt, M.I.T.,:

A panel discussion on the relation between APL and LISP.

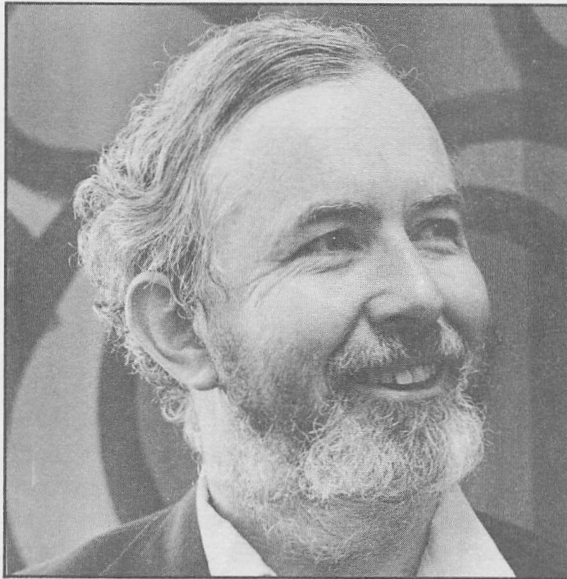
Several workshops and panel discussions are being planned for Wednesday evening, May 30. The details of these sessions will be released shortly before the conference opens. One session has been tentatively set for high performance statistical software, and another is planned on general arrays in APL. The banquet speaker will be Prof. Frederick P. Brooks, Jr. of the University of North Carolina. Prof. Brooks was a member of a three man team (with Eugene Amdahl and Gerritt Blaauw) that led the development of the IBM 360 line of computers. His banquet speech is entitled: 'Q 1 3 p 'APL' A SIDEWAYS VIEW OF APL'.

If you are a member of STAPL you will receive registration information and an advance program well before the registration deadline. If not, you should write to the APL79 registration chairman, Ms. Lynne C. Shaw, P.O. Box 40004, Rochester, N.Y. 14604 to request this material. A large response is expected, and capacity is limited, so early registration is advised. Firms interested in exhibiting at APL79 may contact Don Porto at APL79, P.O. Box 40311, Rochester, N.Y. 14604 for further information.

SHARP NEWS

PALO ALTO

Gene McDonnell



Gene McDonnell has joined I.P. Sharp Associates and is located in the office in Palo Alto. He will be working on APL language design, writing on APL language matters and providing customer support.

Gene spent the last 17 years at IBM, most recently at the new Santa Teresa laboratory as part of the APL Design Group. He started using Iverson notation in 1961, just after he joined IBM, using hectographed notes which were to drive a printer in Ireland berserk when he had to set them in type for Wiley's 1962 book, **A Programming Language**. Gene was one of a handful of people to design and implement IBM's first experimental general-purpose timesharing system, called TSM, which ran on a 7090 computer modified to provide relocation hardware on CPU and channels. This system was the first timesharing host (in 1965) for what was then called IVSYS, but which later became APL.

He joined the Iverson/Falkoff team at Yorktown Heights Research in 1968, went with it to become part of IBM's Philadelphia Scientific Center in 1970, and when this closed in 1974 came to Palo Alto to join the IBM APL Design Group there. Subsequently, the Group moved to the new IBM plant in Coyote, California, nestled in the Santa Teresa hills.

He designed the notation for the circular functions and signum, and designed the first APL trains which were built for the 1403 printer.

He has contributed extensively to the APL literature, having written articles for recent APL congresses on complex floor, the caret functions, notations for the *GCD* and *LCM* functions, and zero divided by zero. He was program chairman for the 1978 IBM internal APL Symposium, is a member of the STAPL executive committee, and is Recreational APL Editor of **APL Quote Quad**.

Gene is a 1949 graduate of the University of Kentucky, where he was elected Phi Beta Kappa. He was a first year graduate fellow of the American Council of Learned Societies in the department of Comparative Literature at Harvard University.

He is married to Jeanne Farr, A Fulbright scholar who attended the University of Brussels, and has five children, three of them in college, one in Palo Alto High School, and one in Jordan Middle School in Palo Alto. He enjoys reading, listening to chamber music, walking and, one month a year, the Dictionary Rally.

"I have admired the I.P. Sharp organization since encountering Roger Moore in 1966, and am looking forward to sharing in the IPSA contributions to APL."

The following was written as a tribute to Gene when he left IBM, and we thank M. Montalbano for permission to print it.

McDonnell in APLdom

Santa Teresa,[◇] forgive us our sins.

Help us remember the light that wins.[‡]

Console us and guide us this fateful day,

For Gene McDonnell is going away.

When lapses in logic bedevil your traces,
The father of sticks[☆] will lighten your strain
By helping you master the wide open spaces
That fill up the place where you should have a brain.
With a quick, deft mastery logical
And a manner serene, pedagogical,
He cleans out the colons and mops up the commas
And clears up the thinking and eases the pain.

Santa Teresa, forgive us our sins.

Help us remember the light that wins.

Console us and guide us this fateful day,

For Gene McDonnell is going away.

Keeper of consoles, time-sharing master,[†]
Leader of fights for the good and the true,
Help us to face our appalling disaster:
A world without logic, a world without you.
Stay us[†] with carets,[☆] stay us with APL.
Help us to think in the Iverson way:
You, who survived in the city of scrapple,
Help us survive in the deep, dark, South Bay.

Santa Teresa, forgive us our sins.

Help us remember the light that wins.

Console us and guide us this fateful day,

For Gene McDonnell is going away.

Sharper than serpent's tooth, Sharper than swords,
Sharp is the pain that we feel in our hearts.
Sharp his associates, Sharp his rewards,
Dull is our prospect when he departs.
Our blessings go with thee, O friend tried and true.
May the path that you take lead to happier scenes,
But I know that we all will be thinking of you,

The APL Crew,
Itty Bitty Machines.

(Mike Montalbano, 16 November, 1978)

Notes

◇ Santa Theresa Programming Laboratory, IBM Corp., San Jose, Ca.

‡ Atalanta in Calydon, Swinburne:

For winter's rains and ruins are over,
And all the season of snows and sins;
The days dividing lover and lover,
The light that loses, the night that wins;
And time remembered is grief forgotten,
And frosts are slain and flowers begotten,
And in green underwood and cover,
Blossom by blossom the spring begins.

☆ Gene uses the term Caret and Stick functions to describe the ten non-trivial Boolean functions of two variables. See "The Caret Functions" in APL74 (Anaheim, Ca.) and "The Caret and Stick Functions" in APL Quote Quad, June 1978.

† Song of Solomon

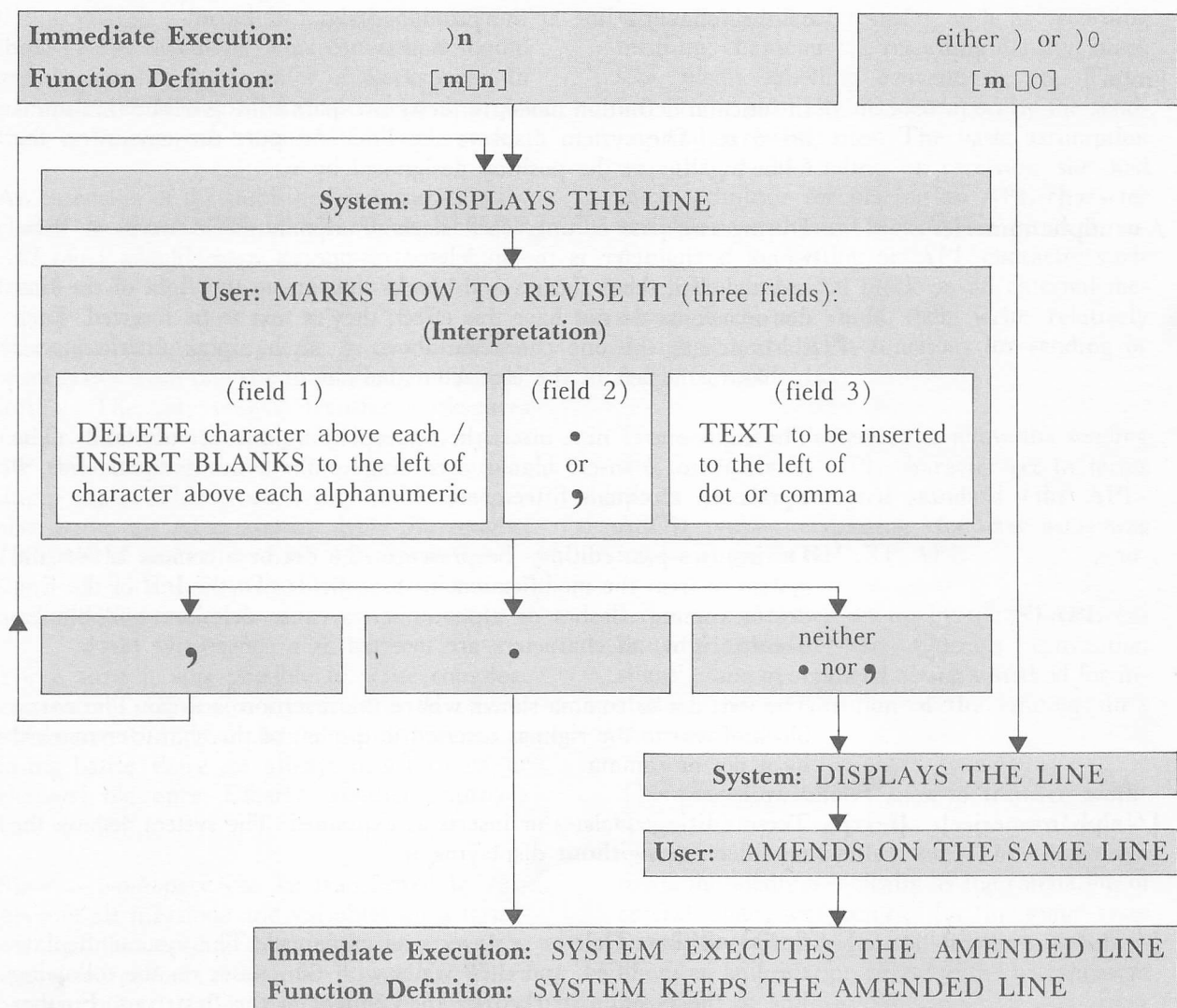
† Gene designed some of the very first time-sharing systems (see preceding page).

LINE EDITING

Paul Berry and Arlene Azzarello, Palo Alto

Line editing in SHARP APL has been extended recently (by Peter Wooster). It provides a built-in mechanism to edit and re-execute your last APL entry -- with or without display. You can use the same mechanism to edit a line of a defined function.

The diagram below illustrates the options available in both immediate-execution mode and in function-definition mode.



LF	Before pressing RETURN, LINEFEED deletes characters (including blanks) above and to the right of the cursor. Position the cursor with SPACE or BACKSPACE.
) or)0	In immediate execution mode, requests one-pass editing of the previous APL line. The system displays the last line of APL and leaves the cursor at the end of it.
[m□0]	In function definition mode, requests one-pass editing of the line numbered m . The system displays the line and leaves the cursor at the end of it.
)n	In immediate execution mode, requests two-pass editing of the previous APL line. The system displays the last APL line and puts the cursor on the following line at the position designated by n .
[m□n]	In function definition mode, requests two-pass editing of the line numbered m . The system displays the line and puts the cursor on the following line at the position designated by n .
/ or alphanumerics	<p>During two-pass editing, each slash or alphanumeric serves to show where a character is to be deleted or one or more blanks is to be inserted. But those slashes and blanks that are to the right of the first dot or comma do not have this effect; they're text to be inserted. Each slash deletes the one character above it. Each alphanumeric inserts blanks to the left of the character above it.</p> <p>The digits one to nine insert the corresponding number of blanks. The letters A to Z insert blanks according to the code: A equals five, B equals ten, C equals fifteen, etc.</p>
. or ,	<p>During two-pass editing, the presence of a dot or a comma causes the system to treat the modification in three fields. To the left of the first dot or comma, slashes or alphanumerics cause deletions and blanks. To the right, all characters are inserted as a consecutive block.</p> <p>The first dot or comma shows where the insertion is to go. The entire block of text to the right is inserted to the left of the character marked by a dot or comma.</p>
[/ alphanumerics] . [text]	Terse editing: Deletes or inserts as explained. The system acts on the modified line without displaying it.
[/ alphanumerics] , [text]	Serial editing: Deletes or inserts as explained. The system displays the line as modified, and then waits with the cursor on the following line at the position marked by the comma on the first pass. Further changes can be made with comma, dot, or neither.
O BS U BS T	<p>O BACKSPACE U BACKSPACE T:</p> <p>Consecutive keystrokes requesting an exit from editing. The line is saved unchanged even if characters have already been typed.</p>

WORKSPACE TRANSFER STANDARD

Historically the transfer of workspaces between installations with different implementations of APL (or even different release levels of the same implementation) was a difficult, haphazard affair that generally required the careful ministrations of an assembly language system programmer.

SATN-22 (revision 2) details how to transfer workspaces to and from a SHARP APL system in a way which adheres to the proposed "Workspace Interchange Convention (version 0)" - WSIS0 - formulated by a committee of the STAPL executive. This convention should greatly simplify the transfer of workspaces. In particular it allows all transfer-related problems to be resolved by an APL programmer.

An extension of the published convention is included in the SATN which allows SHARP APL files and Package datatypes to be transferred.

Since the dark ages, people have transferred workspaces from one site to another in "dump" format. The only way to transfer workspaces (other than manual display and entry), was to use these mysterious, arcane, internal format dump tapes. This worked fine until someone else wrote an APL system. Now Burroughs, IPSA, IBM and others have APL implementations, all with their own workspace structures, and all different.

For a time it was possible to write complex, customized utilities to convert one flavour of workspace to another, but it rapidly became a losing battle: there are always new formats, or changed old ones. Clearly, another approach was needed.

Since a workspace can be transferred by displaying all functions and variables on a terminal and then typing them back in, it is clear that a source form of transfer is possible. There are exceptions to this (e.g. loss of precision on conversion from internal floating point to decimal and back, inability to transport locked functions, etc.), but the technique is suitable for most purposes.

A standard representation of APL functions and variables in source form on external media allows transfer of workspaces without the delays, system errors and hassles that otherwise result.

Such an APL source level workspace transfer convention was proposed at the APL workshop held at Queen's University in May, 1976. The workshop developed a standard scheme for representing functions and variables as character vectors. The convention did not concern itself with the details of transfer such as recording medium, character set, recording density, block size, media labelling conventions, etc. These were to be mutually decided upon by the sending and receiving sites. The basic assumption was that each sending or receiving site had some technique for placing an APL character variable as a physical block on an external medium, and for getting an APL character variable from a physical block on an external medium. Each site could then write relatively straightforward APL functions for sending or receiving workspaces.

This convention, extended to allow the sending site to specify its APL character set in terms of an already accepted standard (the APL-ASCII typewriter-pairing character set), was implemented in SHARP APL.

Later, a committee set up by the STAPL executive amended the Queen's convention slightly, and generalized Sharp's method for including the specification of the sending site's character set.

The procedure allows sites to transfer workspaces without regard for the internal workspace structure at either site. The convention treats the medium logically as the catenation of several character vectors, (or in some cases simply as a bit stream), physically broken into blocks of length appropriate to the transmission medium.

OPERATORS, FUNCTIONS and DERIVED FUNCTIONS

Paul Berry, Palo Alto

An operator is a primitive which has the power to make a new function from certain primitive functions. Operators got into the language ad hoc, without anyone at first realizing what they were, but it turns out they are very important, and likely to be expanded over the years. At present there are four operators: **reduction**, **scan**, **axis**, and **product**.

Operators are quite unlike other functions in three ways:

1. They take as one or perhaps both arguments not data but another function.
2. They produce not data but a new function.
3. They have higher precedence than functions.

All operators in an expression are evaluated before any functions are evaluated. Each operator applies to the function **immediately to the left**, (whereas a function applies to the entire expression to the right).

The operators **reduce** and **scan** take as argument a dyadic scalar function. Thus $+/$ forms a monadic function **summation**, $\times/$ forms **product** and so on.

The new function produced by an operator is called the **derived function**. There is no single symbol for a derived function, but it's always possible to give the derived function a name, for example

```

      ▽ Z←SUM X
[1]   Z←+/X
      ▽

```

It's important to recognize that $+/$ produces one new derived function, which then can be applied in the usual way to the data to the right of it.

The axis operator transforms a function which usually applies along the last axis to produce a derived function that applies along some other axis. For example, the dyadic function **catenate** or **laminare**, denoted by the comma $\{,\}$, applies along the last axis, but $,[2]$ produces a derived function which is also dyadic and also a form of catenation, but which applies along axis 2. The axis operator applies to ϕ (both monadic and dyadic). It also applies to the derived functions arising from **reduce** or **scan**. The expression $+/[2]$ contains the $/$ operator which forms the derived function **summation** which is then modified by the axis operator to form the derived function **summation along axis 2**.

The remaining operator is $\{.\}$ which is used to form inner and outer product derived functions. (The outer product uses the \circ symbol as a placeholder, to mean that there is no reduction by the function that would otherwise be there).

Iverson's paper 'Operators and Functions' (IBM, Research Division, Report RC 7091, 26 April 1978) includes proposals for a great many more operators that - if and when implemented - would make major extensions to APL.

CONTEST 8

Appears on Page 14

SASKATOON

Allison Atkey



Allison Atkey is the Branch Manager in charge of opening our new office in the prairies, after spending two years in the Ottawa office. Originally from Winnipeg, Allison graduated from the University of Waterloo with a B.Math in '74, and then worked for Dataline in Ottawa for two years. She is offering a seminar on time series forecasting on January 15, and an introductory APL course on February 21-23. She may be reached at: (306) 665-2463

MILAN

New address:

I.P. Sharp Srl.,
Corso Plebisciti 15
20129 Milan
Italy
Telephone: 733 563

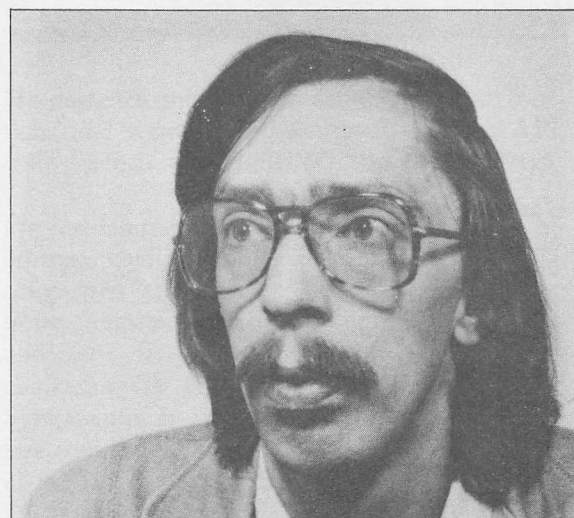
ATLANTA

New address:

I.P. Sharp Associates, Inc.,
5000 Snapfinger Woods Dr.,
Decatur, Georgia 30035
Telephone: (404) 987 2301

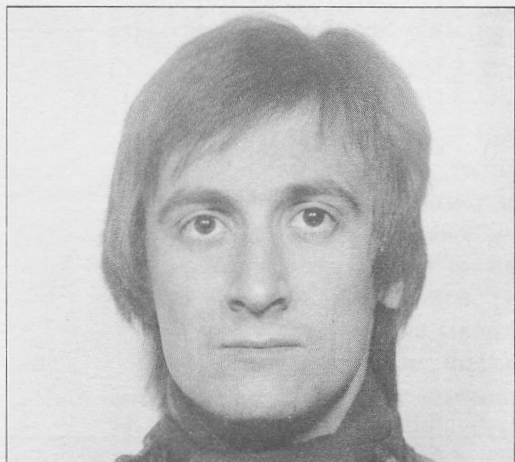
VIENNA

Oskar Itzinger



Oskar Itzinger has joined **Gottfried Bach** in the Vienna office. For the past seven years Oskar, who has a Ph.D from the University of Vienna, was Assistant Professor in the Department of Mathematics and Computer Science of the Institute for Advanced Studies (founded by the Ford Foundation in 1963), in Vienna. His interests include Artificial Intelligence (theorem proving and verification of programs), set systems, games of strategy, and information retrieval. He also collects tapes of live performances of operas (inquiries are welcome).

Tim Cureton



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PARIS

Our presence in Paris is being strengthened by the formation of our new French company, I.P. Sharp SARL. Our arrangement with Sligos, who currently provide room for our concentrator in Paris, is coming to an end during the next year.

Tim Cureton is the new Branch Manager there. He joined the U.K. company in 1974 with experience in the airline industry. Tim has an honours degree in Computer Science, and spent the last three years working on the Sharp Communications system, seeing European communications grow from two people and two nodes, to approximately 40 nodes and five people - with a corresponding increase in involvement with mainland Europe.

"APL is, of course, well known in France, and with our existing customers and a growing interest from several companies in the Paris area, I have every hope that the Paris office will become very successful."

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GLOUCESTER

The new branch manager of our Gloucester office is **Dinos Appl**, who takes over from **Phil Chastney**. Phil is now free to concentrate wholly on insurance and linear programming.

Dinos, who has an honours degree in mathematics from Oxford, joined the London (UK) branch in July 1977 after teaching Engineering Mathematics on the Trinidad campus of the University of the West Indies. Prior to this he was involved for some time in the study of nonlinear stochastic control systems.

As his programming background was strictly Fortran he feels destiny had a hand in finding I.P. Sharp Associates, for "Appla" is an Anglicised version of the Greek word for "simple", from which Iverson must have derived some inspiration for the acronym APL.

Dinos Appl



APPLICATION LIBRARY UPDATE

- NEW:**
- 2 *PACKAGEFNS* New workspace for defined functions on packages - currently contains two different functions of package equality.
 - 6 *WSTRANSFER* Implementation of the workspace interchange convention WSIS0 - see SATN-22 and page T3.
 - 35 *DISCRIMINANT* See page 4.
 - 39 *BOXJENKINS* See page 3.
 - 39 *TRANSFERFNS* See page 4.
- CHANGED:**
- 1 *HSPRINT* Two groups added: the group *TRANS* for displaying, changing and creating translate tables for *HSPRINT* (see *TRANSDSCRIBE* for an explanation); and the group *NONAPLGRAPHICS* to print on the highspeed printer a set of graphics not available on the terminal. The variable *APLCHARACTERS* contains those graphics available on the terminal via normal APL output.
 - 3 *PLOT* On-line documentation improved.
 - 4 *EDIT* On-line documentation improved.
 - 13 *NATIONS* On-line documentation improved.
 - 44 *RISK* On-line documentation improved.
 - 51 *FPSTOCKLIST* A new function for searching Financial Post Lists interactively, *FINDSEC*, is included, and *STOCKLIST* now submits a highspeed print request.
 - 81 *IFUSAGE* The function *SERIESDIRECTORY* prints a 10-page listing of all series ID's in the IFS data base.
 - 121 *PETROSERIES* Renamed: previously 121 *PETRODATA* - see below.
- MOVED:**
- 9 *SCANDOC* moved to 2 *SCANDOC*
- DROPPED:**
- 6 *WSIN* and 6 *WSOUT*, made obsolete by 6 *WSTRANSFER*.

NOTE: PETROLEUM DATA BASE CHANGES ITS NAME

The new petroleum data base discussed in the last issue has been renamed PETROSERIES, since we inadvertently chose a name that conflicts with the registered trade mark of International Petrodata. The new name is perhaps more apt, because it reflects the time series structure of the petroleum data base. Access functions reside in workspace 121 *PETROSERIES*.

SCHEDULED COURSES

SEMINARS:

Birmingham	Pert (1/2 day)	Jan 29	
	Plotting (1/2 day)	Feb 26	
Edmonton	File Design in SHARP APL	Feb 1	
	Time Series Data Management	Feb 15	
	Statistical Analysis	Mar 15	
Gloucester	Advanced Operators	Jan 15	
	Forecasting	Feb 19	
	Graphics/Plotting	Apr 4	
	News	Apr 30	
	N-task and B-task	Feb 26	
	Regression	Apr 17	
	Word Processing	Mar 12	
Saskatoon	Time Series Forecasting	Jan 15	
Seattle	Forecasting with SHARP APL (1 day)	March 21	
	MAGIC for Time Series Analysis (1 day)	Feb 14	
	MAGIC with the Aviation Data Base (11/2 days)	Jan 16-17	
Toronto	Actuarial APL Techniques (1 day)	Feb 6	
	AIDS - Introduction (2 days)	Feb 7-8	Apr 10-11
	Box-Jenkins (1 day)	Jan 12	Mar 5
	Data Base Design (1/2 day)	Jan 25	Apr 6
	Forecasting Methods (1 day)	Jan 11	Mar 7
	Graphics (1 day)	Feb 5	Apr 6
	MAGIC for Time Series Analysis (1 day)	Jan 15	Mar 9
	Plotting with SHARP APL (1 day)	Jan 16	Mar 16
	Regression Analysis (1 day)	Feb 14	Apr 18
	Report Formatting with SHARP APL (1/2 day)	Feb 15	Apr 20
	Saving Money with N-tasks & B-tasks (1 day)	Feb 12	Apr 17
	Text Editing (3 day)	Jan 17-19	Mar 26-28
	Plotting with Magic, 3 Plot and Grafplot	Jan 18	
	Security - IPSA Standards and Procedures		
	What you can do to make your system secure	Jan 30	
	SNAP - A new CPM/Pert Package	Feb 22	
U.K. (London)	Report Formatting	Mar 6	
	Efficient File Design	Apr 5	Apr 24

SPECIAL COURSES:

Appreciation of APL

Gloucester Jan 8, Mar 5
London U.K. Jan 23, Mar 1
Warrington Feb 19

APL Review (1 day)

London U.K. Jan 24, Feb 19, Mar 26

Use A Terminal (1 day)

LONDON U.K. Jan 19, May 11

INTRODUCTION TO APL:

Edmonton
(5 day)
January 9,10,16,17,23

Ottawa
(5 day)
January 1-5
February 5-9
March 5-9

Rochester
(5 day)
January 22-26
February 19-23
March 19-23

Saskatoon
(3 day)
February 21-23

Seattle
(3 day)
February 6-8
April 10-12

Toronto
(3 day)
January 8-10
January 29-31
February 19-21
March 12-14

U.K. Birmingham
(3 day)
January 10-12
March 12-14

U.K. Gloucester
February 12

U.K. London
(3 day)
January 15-17
February 5-7
March 7-9
April 7-11

U.K. Warrington
(Combined Intro. & Inter.)
January 24,25,26,29,30

Vancouver
(3 day)
January 24-26
February 21-23
March 21-23
April 25-29
May 23-25

Introduction to APL

(in Dutch) **Amsterdam** January 17-19 March 21-23
(In German) **Duesseldorf, Vienna**
(in Swedish) **Stockholm**
(in Danish) **Copenhagen**

INTERMEDIATE:

Gloucester Apr. 2
Seattle (3 day) Jan. 9-11 Mar. 6-8
Toronto Jan.22-24 Mar.19-21
U.K. London (2 days) Jan.25,26 Feb.20,21 Mar. 27,28
Intermediate APL (in Swedish or English) **Stockholm**

ADVANCED:

Toronto Advanced APL and Efficient Coding Techniques, Jan.3 and Apr. 5
U.K. Birmingham APL and System Design, Feb.8,9
U.K. London APL and System Design, Feb. 1,2 and Mar. 29-30

Advanced APL (in Swedish or English) **Stockholm**

*** CONTEST 8 ***

Mike Holloway, Toronto

APL is a powerful tool, and finds application even in the conception and implementation of new features for APL. This contest is about modelling APL in APL, and your mission, should you decide to accept it, is to model a single pass of the SHARP APL system line editor.

Required: An explicit dyadic function of the form:

$$R \leftarrow \text{control EDIT text}$$

where: **text** is a character string to be edited, and
control is a character string specifying the editing required, similar to the control string entered after using)1.

The *EDIT* function must perform all of the editing supported in the current SHARP APL system editor, but may include user-devised extensions. The control characters used by the system editor must retain the same definitions in *EDIT*, i.e.

blank	- copies source to result
/	- deletes character
. and ,	- insert text from the right of . and ,
alphanumerics	- insert blanks

Since this is a model of a single pass of the system editor, both **dot(.)** and **comma(,)** will do the same thing. The model does not require the width restriction of the system editor.

Example: Suppose the last line the user typed was:

THE BROWN DOG ATE THE GREEN APPLE AND DIED.

but it should be:

THE STUPID DOG ATE THE GREEN APPLE AND DIED.

Typing)1 would display the line and the cursor would be in the first position, and the correction made by typing four blanks, followed by five slashes, a dot (or comma), and the word *STUPID*. Alternatively, the *EDIT* function could be used with the arguments:

CONTROL←' / / / / .STUPID'

TEXT←'THE BROWN DOG ATE THE GREEN APPLE AND DIED.'

and the result of the function would be:

R←'THE STUPID DOG ATE THE GREEN APPLE AND DIED.'

Criteria for Evaluation: As usual, both processor and workspace efficiency will be measured, and your entries rated accordingly. Special mention will be made of those who submit entries that are deemed to have made useful extensions to the editor.

Submissions: Packaged entries including the author's name and address, as well as a description of extensions made (if applicable), should be appended to file 999 *CONTEST8* no later than 1 April 1979. Good luck.

Prizes: A prize of \$50 cash (Canadian) will be awarded to the best non-IPSA entry, while the best entry from I.P. Sharp Associates will receive a book of the author's choice.

LETTERS

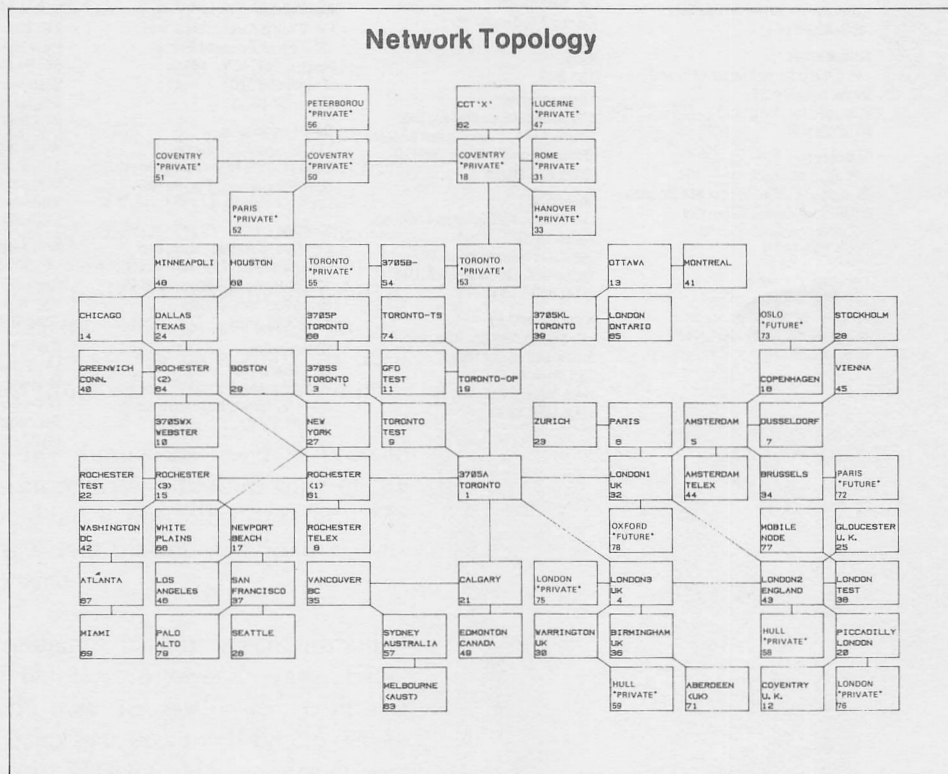
The Front Page

I noticed that in the caption of the photograph of the 'originators of APL', the names were listed from left to right. I suggest that the names should have read from right to left.

Jim Field, London

The photograph on the front page shows the six men facing in slightly different directions. An example of photorealism?

Kevin Weaver, New York City



UPDATE

- ☐ Please amend my mailing address as indicated.
- ☐ Add to your mailing list the following name(s).
- ☐ Send me a SHARP APL publications order form.

Name: _____

Co.: _____

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SHARP APL Communications Network: Local Access Cities

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COMMUNICATIONS (416) 363-1832

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In the United States the SHARP APL Network is interconnected with the networks of TYMNET and TELENET to provide local dial access in more than 100 other cities.

The Newsletter is a regular publication of I.P. Sharp Associates. Contributions and comments are welcome and should be addressed to: Jeanne Gershater, I.P. Sharp Newsletter, 145 King Street West, Toronto, Canada M5H 1J8.

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