



I. P. Sharp

newsletter

*Courtesy of the New York Stock Exchange*

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On 13 July 1984, I. P. Sharp Associates completed the installation of the world's largest commercial APL system for Morgan Stanley & Company. Headquartered in New York City, Morgan Stanley is a leading investment banking and brokerage firm with branch offices in the U.S., Canada, Europe, and the Far East. I. P. Sharp developed this SHARP APL system under a custom contract with Morgan Stanley to allow them to exploit IBM's Extended Architecture, supported by the IBM MVS/XA operating system.

The system runs on an IBM 3084 processor complex with 96-million bytes of storage and four central processing units. The SHARP APL configuration comprises 17 1.5-megabyte workspace slots, 17 0.3-megabyte workspace slots, and 6-megabytes for shared-variable storage. Altogether, there are approximately 45-million bytes of real storage dedicated to SHARP APL. This represents a significant increase from the maximum of approximately 7 megabytes previously possible. The current SHARP APL system products use 24-bit addressing, which allows them to address about 16-million bytes in main storage. Now under

... Morgan Stanley

MVS/XA, the 31-bit version of SHARP APL addresses approximately two billion bytes.

The experimental SHARP APL system was developed using an IBM 4381 running MVS/XA and a version of the I. P. Sharp System/370 emulator for the IBM Personal Computer, which was modified to emulate the IBM extended storage architecture. The final test of the system was conducted during its installation at Morgan Stanley.

Tony Lantz, Morgan Stanley's manager of Systems Programming and User Services, says, "The installation of 31-bit SHARP APL went very smoothly for such a major change in production software, and I was particularly pleased with the on-site assistance that I. P. Sharp provided. SHARP APL for XA is the first product we have installed that takes full advantage of the extended addressing available with MVS/XA, and it allows us to use the hardware resources of the 3084 mainframe effectively. The result has been substantially better response time for our end users. In addition, we have been able to combine two separate APL systems into one, which simplifies system maintenance and reduces support requirements by about 30 per cent."

Using APL at Morgan Stanley

Morgan Stanley's offices world wide are connected to the firm's mainframe computers in New York, and run a variety of applications. Here are a few APL-based applications in use at Morgan Stanley.

The business units within the investment bank—the primary users of APL—run analytical applications written in APL which help them make business decisions. These users have access to tens of billions of bytes of industry and corporate data stored in APL or in a data base management system. They get analytical results on full-screen devices, or as graphics output or printed reports.

The Equities Trading Department uses APL to evaluate quickly the risks in complicated trading strategies. The Mergers and Acquisitions Department analyses investment opportunities for clients, while the Investment Banking Department establishes the pricing and timing

for new issues coming to market, all with the help of APL.

APL is also used successfully in Morgan Stanley's technical services area to prototype and experiment with new technologies. A recent task group prototyped the access to some new minicomputers which provide real-time stock exchange price data. Morgan Stanley now has some APL applications that make buy/sell recommendations based on market movements in real time.

With applications such as these plus many others, it's clear that Morgan Stanley has to use their hardware resources effectively and provide support quickly to their end users. Now it's possible with the installation of the largest commercial APL system in the world. ■

application software

Midland Bank Improves Foreign Exchange Services with DORIS

The Dealing Operations Rate Information System (DORIS), developed jointly by I. P. Sharp Associates and Midland Bank, delivers foreign exchange services through a widely distributed branch banking network. Now DORIS is available to other financial institutions with similar branch banking requirements.

Midland Bank, headquartered in London, England, is one of the world's largest international trading banks. Through over 2000 branches in the United Kingdom, it services many thousands of customers—retail as well as corporate—who require foreign exchange and Eurocurrency rates as part of their day-to-day business. About 20 branches act as focal points for this information. They, in turn, get their rate information from the central dealing room through DORIS.

DORIS provides online two-way communications between Midland's Group Treasury in head office and the bank's branches. Exchange rates are transmitted continuously to the branch network, and transactions are booked using those rates on the same terminal. Deal information is electronically delivered into the

... Midland Bank

central dealing room in an aggregated form suitable for the interbank position dealers.

DORIS is clearly a major advance over conventional means of providing information to geographically distant branches, such as daily rate sheets, which specify one exchange rate for the day to the branches, or one-way communications, which broadcast changing rates without feedback from the trading branches.

Benefits of using DORIS

Midland Bank has been using DORIS for several years. The prime benefit has been enhanced customer service, particularly in providing prompt rate quotations in a wide range of currencies. However, the benefits extend beyond the improvements in customer services. By linking DORIS with its data processing activities, Midland has realized major operational savings. This significant reduction in operational expenses, while maintaining a full audit trail both centrally and in the branches, has continued as DORIS has been further integrated into the back-office systems.

DORIS is ideal for any organization which has to provide a wide range of rate information in a number of branches. The system quotes as many currencies as required, and holds spot and forward rates. DORIS updates these rates in real time. Cross rates and non-standard forward rates are automatically calculated either for quotations or for transactions. As DORIS captures information it can be used to create management information: analysing turnover, currency usage, and branch activity.

DORIS is complementary to I. P. Sharp's other products, particularly the Global Limits Control System which monitors the real-time exposure of a bank's international network. As with all of I. P. Sharp's services, DORIS is hardware-independent; it can be run on any video display terminal-based system with hard copy available on line. ■

Woods Gordon Economic Data Goes On Line

Woods Gordon Management Consultants is one of Canada's oldest and largest management consulting firms and a member of Arthur Young International. The firm is based in Toronto, with 22 offices across Canada. Woods Gordon's Marketing and Economics Group has made its Canadian quarterly economic forecast and its *Business Conditions* bulletin available on line exclusively from I. P. Sharp Associates.

For many years Woods Gordon has used SHARP APL to extract and manipulate data from I. P. Sharp's economic data bases, such as Statistics Canada's CANSIM, to generate the quarterly economic forecast. This forecast provides a base for evaluations which the consulting firm uses to advise clients. For example, Woods Gordon has published a very useful study for marketers titled "Tomorrow's Customers in Canada". This study, based on demographic data, analyzes society's values and lifestyles, and points the way for companies to respond to market changes and to take advantage of them. Some of the forecasts that appear in the study have been retrieved from the quarterly economic forecast.

Through its association with Arthur Young International, Woods Gordon is frequently called on to provide expert advice regarding the Canadian economic environment to firms wishing to invest in Canada, or to transnational corporations wishing an evaluation of their Canadian market. Now Woods Gordon's expertise and private data base are more widely available to business planners and economists in any country.

The Woods Gordon Canadian Economic Forecast (WGFORECAST) data base is an important planning tool for:

- Decision makers who wish to get a broad picture of the short-term Canadian economic outlook quickly
- Planners who wish to obtain specific forecast variables for comparison with their own company outlook
- Economists who wish to build a consensus view of the economy with the outlooks of various forecasters
- Statisticians who need exogenous-variable

... Woods Gordon Economic Data

forecasts for their own mathematical business models

- Researchers who need to be familiar with the background economic environment in order to evaluate business conditions on both the microeconomic and macroeconomic levels

Online economic data

The WGFORECAST data base contains more than 80 variables, each with forecasts extending five to eight quarters into the future. Most of the variables are extensions of the data found in Statistics Canada's System of National Accounts; for example, gross national expenditure, personal expenditure by consumption category, exports, imports, and corporation profits. The remaining forecast variables are the most commonly used indicators when describing economic conditions; for example, index of industrial production, consumer price index, labour force data, housing starts, and interest rates.

Together with the numerical forecast, Woods Gordon also provides on line its *Business Conditions* bulletin, a quarterly commentary on recent trends and current prospects seen for the Canadian economy. The bulletin provides WGFORECAST users with the main assumptions behind the Woods Gordon data base as well as highlighting specific developments that may not be clearly defined by any of the forecast variables. This bulletin is available to all users of the I. P. Sharp Online Service free of surcharge.

For additional information about the Woods Gordon Canadian Economic Forecast, its assumptions and methodology, or about the firm's general consulting services, contact:

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New Data Bases Update

Here are highlights of recently announced data bases available on the I. P. Sharp Online Service. For more information, contact your nearest branch office.

Energy Data Bases

Austrian Energy Consumption Statistics (OEES)

Comprises yearly energy consumption statistics by sector and source of energy as reported by Oesterreichisches Statistisches Zentralamt (Austrian Central Statistical Office). Covers more than 2000 time series with figures in traditional units and terajoules. All labels and the directory are in German.

Lundberg Survey Energy Détente International Price and Tax Series (EDPRICE)

Contains average prices and taxes for 24 petroleum and energy-related products in 69 countries as collected monthly by Lundberg Survey Inc. Lundberg also provides extensive footnotes to aid in the interpretation of the data.

Petroleum Intelligence Weekly Official Crude Prices (PIWOCP)

Offers daily crude oil selling prices for most of the world oil supply moving in international trade. Official government selling prices set by producer nations and the term contract prices set by both state-owned and private oil companies are listed for 114 key crude types.

Economic Data Bases

Austrian Economic Outlook (OEKON)

Gives the Austrian economic outlook based on a survey of Austrian industry by Vereinigung Oesterreichischer Industrieller (Federation of Austrian Industrialists). Covers four ratings for each of the following facts: orders, foreign orders, production, sales prices, and employment. Contains index data only.

... New Data Bases Update

Citicorp Economic Report (CER)

Provides forecasts and immediate analysis and commentary on the economic forces that move markets. Updated continuously throughout the business day. More than 40 Citicorp economists contribute their expertise to this economic information service. Covers U.S. general reserve policy, interest rates, industrial production, retail sales, foreign exchange, and federal budget surplus/deficit.

Organisation for Economic Co-operation and Development Economic Outlook (OECDEOL)

Includes macroeconomic statistics and forecasts for 24 OECD member countries, OECD area aggregations and other non-OECD zones. Data is published twice a year by the Organisation for Economic Co-operation and Development (Paris). Contains approximately 2300 time series of data reported annually and semi-annually.

U.S. Producer Price Index Revision (USPPIR)

Contains price indices for the net output of selected industries and their products as calculated according to the Producer Price Index Revision. Indices are published monthly in table 4 of the Producer Prices and Price Indices from the U.S. Bureau of Labor Statistics. Industries are classified according to the standard industrial classification. Contains indices for all primary and secondary products plus miscellaneous receipts.

Financial Data Base

Financial Post Bonds (FPBOND)

Offers weekly closing prices and yields on more than 1500 Canadian bonds. Of interest to brokerage houses, financial institutions, banks and other investment organizations. Current and historical data includes all publicly-issued Canada, provincial, provincially guaranteed, and corporate bonds, as well as many private placements. ■

The Union Keyboard and Union Character Set

With SHARP APL for the IBM Personal Computer, I. P. Sharp Associates introduced a new arrangement of the APL keyboard: the **union keyboard**. It combines in a single layout all the characters of an ordinary typewriter or ASCII terminal and all the additional characters used in APL programs.

For people who know how to type but haven't used APL previously, the new keyboard is a great deal easier to use. It also enables natural-language text and APL to be intermixed without having to switch out of one character set into another.

At present, the new keyboard is only available on devices which have "soft" (that is, programmable) keyboards and displays, such as the IBM PC. However, union keyboards will likely become available for a variety of terminals, as well as for standalone APL systems.

The change to the keyboard—merging APL characters into a single expanded set—is complemented by a parallel change to the set of characters recognized by the APL system. In APL, the set of all possible characters is called $\square av$. It now contains a distinct position dedicated to each of the standard ASCII characters and APL symbols.

Why the change? And why now?

Two separate keyboards—one for APL and a different one for everything else—has long been a nuisance, especially for people who must regularly switch back and forth between them. Moreover, the APL keyboard lacked many characters needed to process ordinary text. For years this has complicated programs that dealt with text, and made it harder to set up displays intended for ordinary terminals.

Consequently, I. P. Sharp has changed the keyboard now that the technology is available to combine APL and ASCII displays easily. APL developers would have preferred to have done this all along: to integrate APL with standard characters and keyboards. But until recently, it wasn't possible to do this.

So the real issue is not "Why the change?" but "Why not sooner?"

... The Union Keyboard

Early hardware limitations

APL was first used on a timesharing system in 1965. Adin Falkoff and Ken Iverson at the IBM Thomas J. Watson Research Center designed an APL print element for the terminals then available. Its mechanism was based on the IBM Selectric typewriter. The print element could accommodate 88 characters (the base and the shift positions of each of the 44 keys). But to merge APL with the existing typewriter characters would have taken well over 150 characters. How was it possible to squeeze them all in? They managed to get everything they needed for APL onto the print element by the following economies:

1. They constructed many of the APL characters by overstriking pairs of characters already there. This permitted \otimes to be formed from \circ and $*$. (Overstriking had another long-term benefit: it was possible to add new characters later without building a new print element.)
2. They left out all the special characters found on a conventional typewriter but not used in APL programming. That freed the spaces ordinarily used for such characters as $!$ $*$ $\$$ $\%$ $\&$. (Leaving them off the print element meant leaving them out of $\square av$ as well.) Although you could manually replace one print element with another, the terminal could not tell the computer which one was in use. It transmitted a code to the computer describing only which *key* you pressed, so there was no way of saying "This key now means APL =", or "This key now means ASCII %".
3. They saved 26 positions by electing to have only one position for each letter of the alphabet, instead of two. Ordinarily, a print element would have both a minuscule (lower case) and a majuscule (upper case) form for each letter. They decided instead to have just one form, and to obtain a second by overstriking.

Two forms of the alphabet

Since the Middle Ages, European languages have used two forms of each letter: minuscule,

in the body of a document, and majuscule, for emphasis. Because the emphasis alphabet is used less frequently, typewriters (and ASCII terminals) have minuscule in the base position, and majuscule in the shift position, which requires pressing an additional key. There is a clear tradition that minuscule is the work-horse and majuscule is for special effect. (High-school algebra uses minuscule letters for the names of variables, and so did Iverson's book *A Programming Language*.)

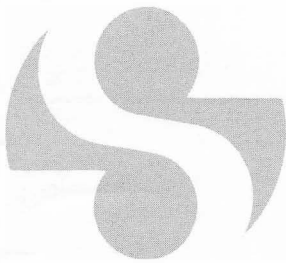
However, there is also the tradition that when you can write a letter only one way, you use the majuscule (which was the form the Romans gave us, before each letter had two forms). So you see majuscule-only in telegrams. Falkoff and Iverson's print element adopted as its primary alphabet (keyed in the base position) the majuscule letters rather than the minuscules that those keys ordinarily produce. For emphasis, you could underline them to form the characters A B C D E F etc.

Smart terminals and three-case keyboards

A microcomputer (which may be used as a standalone terminal, or as a terminal to a host system) usually has what amounts to a third case, labelled $\langle \text{Alt} \rangle$. (ASCII terminals also have a special shift called $\langle \text{Ctrl} \rangle$; but, as its name implies, it is used for control signals. Moreover, it wasn't available for all keys because there weren't enough distinct codes in the seven-bit transmission normally used for ASCII.)

But on a micro and other ASCII terminals, $\langle \text{Alt} \rangle$ case can be available for every key (and so can $\langle \text{Ctrl} \rangle$, if need be) and the number of keys is 47 instead of 44. So there are at least 141 distinct characters possible, not to mention those that can still be formed by overstriking. APL no longer need be confined within the 88 positions of the Selectric print element! The union keyboard and union character set are therefore based on the following reforms:

1. Restore the missing ASCII characters $!$ $*$ $\$$ $\%$ $\&$ etc. to $\square av$. This has already been done in both the System/370 and PC versions of SHARP APL.
2. Keep the existing ASCII significance of every key on the keyboard. This means



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The Domino Function

The domino function (\boxdot) can be used in two ways. Used monadically, it determines the inverse of a matrix. Used dyadically, it yields the solution to a set of simultaneous linear equations. The domino function can also solve **over-determined** systems in which the simultaneous equations have more constants than unknowns. This makes \boxdot useful for solving problems in polynomial curve fitting and linear regressions.

A rudimentary knowledge of simultaneous equations is necessary for understanding how \boxdot works. The following example will illustrate some of the concepts involved.

Given the following two equations:

$$\begin{aligned} 7 &= s + 2t \\ 4 &= 3s + t \end{aligned}$$

solve for s and t .

$$s = .2 \quad t = 3.4$$

We can represent this in APL by:

```
A←2 2p1 2 3 1
A A Coefficients
```

```
1 2
3 1
```

```
Y←7 4 A Contains the constants
```

The two equations can be expressed by the following APL identity:

$Y \leftarrow A \cdot X$ A X represents the vector of unknowns s and t

The above can be represented pictorially this way:

$$\begin{pmatrix} 7 \\ 4 \end{pmatrix} = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix} \begin{pmatrix} s \\ t \end{pmatrix}$$

We want to solve for X , so we "divide" both sides by A .

$$Y \boxdot A \leftrightarrow X$$

Then we reverse the sides of the identity.

$$X \leftrightarrow Y \boxdot A$$

This is similar to solving for x in the algebraic expression $y = ax$. One ends up with $x = y/a$. Now let's evaluate x in APL.

$$X \leftarrow \boxdot A \cdot Y$$

```
0.2 3.4
```

$\boxdot A$ is called the **matrix-inverse** of A . The expression $X \leftarrow Y \boxdot A$ is equivalent to $X \leftarrow (\boxdot A) \cdot Y$. That is, matrix-dividing by A is equivalent to matrix-multiplication by the matrix-inverse of A . This shows the relationship between the monadic and dyadic uses of \boxdot . The solution to $\boxdot A$ is key to solving $Y \boxdot A$. Let's evaluate $\boxdot A$.

$$\boxdot A = \begin{pmatrix} 0.2 & 0.4 \\ 0.6 & -0.2 \end{pmatrix}$$

Matrix multiply $\boxdot A$ by Y and we get the same result as $Y \boxdot A$.

... The Domino Function

The \boxplus function will yield a domain error if the matrix it inverts is not invertible. (In the expression $X\boxplus A$, \boxplus inverts A .) A matrix which is not invertible is said to be singular. This is analogous to saying that $1/a$ will not work for $a = 0$.

Some systems of equations contain insufficient information to determine a result, for example:

$$\begin{aligned} 7 &= s + 2t \\ 7 &= s + 2t \end{aligned}$$

Or they may contain contradictory information, for example:

$$\begin{aligned} 7 &= s + 2t \\ 4 &= s + 2t \end{aligned}$$

\boxplus returns a domain error when asked to invert such a system.

```

 $\boxplus$   $\boxleftarrow{2}$  2p1 2
1 2
1 2
DOMAIN ERROR
 $\boxplus$   $\boxleftarrow{2}$  2p1 2
^

```

So far we have only discussed the theoretical side of the domino function. In applications we often deal with nonsquare matrices. A typical application will involve a coefficient matrix with more rows than columns. The simultaneous equations it represents will be over-determined. A system of equations like this will yield approximate solutions. We can see this by adding another equation to our original set of equations.

$$\begin{aligned} 7 &= s + 2t \\ 4 &= 3s + t \\ 10 &= 5s + t \end{aligned}$$

This set of equations does not have an exact solution. But one can find a solution that "fits" the equations in a reasonable manner. A common method for estimating this is called the *least-squares* method. This is the method

that the domino function uses. The best estimate will minimize the sum of the squares of the differences between the actual constants (7 4 10) and the estimated constants. For $s = .2$ and $t = 3.4$ in the original solutions, the sum of the squares of the differences is:

$$\begin{aligned} &((.2 + 2 \cdot 3.4) - 7)^2 \\ &+ ((3 \cdot .2 + 3.4) - 4)^2 \\ &+ ((5 \cdot .2 + 3.4) - 10)^2 = 31.36 \end{aligned}$$

An improvement can be made by changing t to be $t = 4$ (and leaving $s = .2$). If we plug in these two numbers and do the calculations, we get 25. But the best solution is arrived at by solving the set of equations using \boxplus :

$$Y \leftarrow 7 \ 4 \ 10 \ \diamond \ A \leftarrow 3 \ 2p1 \ 2 \ 3 \ 1 \ 5 \ 1$$

$$X \leftarrow Y\boxplus A$$

$$X$$

The estimated constants are:

$$\begin{aligned} A + . \times X \\ 6.491 \\ 6.291 \\ 8.727 \end{aligned}$$

The least squares value is:

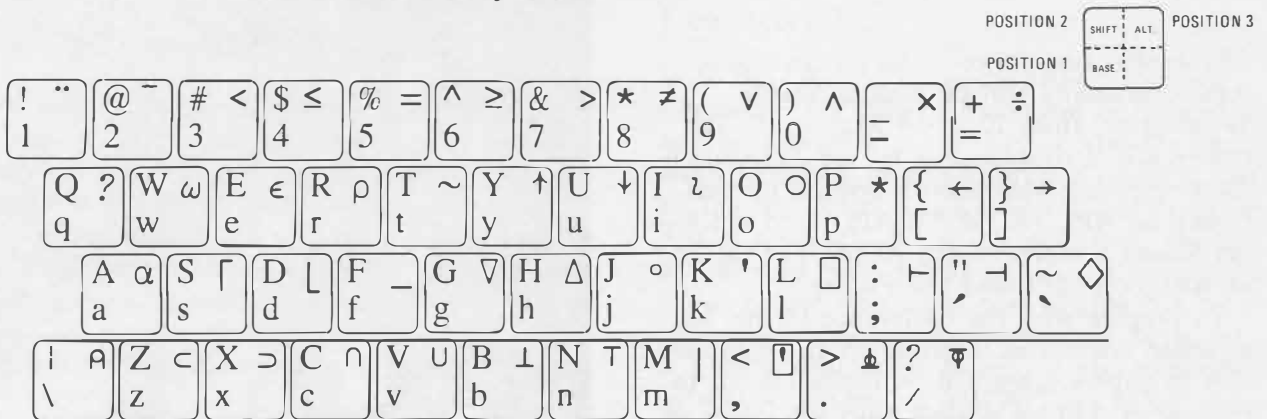
$$\begin{aligned} &+ / ((A + . \times X) - Y)^2 \\ 7.127 \end{aligned}$$

Reference: For further information on the applications of the domino function, see the article "The Domino Operator", *The I. P. Sharp Newsletter*, May 1973.

Acknowledgement: I would like to thank Doug Forkes for his assistance in writing this article. ■

Gary Gallopin, New York

... The Union Keyboard



The Union Keyboard

- that the APL characters () [] + - = : ; ' are found in the same positions as on the standard ASCII keyboard. For example, <shift slash> (at the bottom right corner of the keyboard) is a question mark in ASCII, and so it is ? in APL also.
- Use the <Alt> case to obtain those APL characters not available in ASCII. As far as possible, locate them in the same position as in the old APL-only keyboard. Thus ρ is formed by <Alt R>, ω by <Alt W>, and so on. Permit overstriking to form APL characters in the same way as before. Thus $\frac{1}{2}$ can still be formed by overstriking $\frac{1}{2}$ and \div .
 - Restore the original use of minuscule and majuscule letters. That is, the minuscules *abcdefghijklmnopqrstuvwxyz* are in the primary alphabet (APL positions 86 to 111), while majuscules *ABCDEFGHIJKLMNOPQRSTUVWXYZ* are in the secondary (or emphasis) alphabet (APL positions 113 to 138). This results in names which formerly appeared as *DATA* and *DATA* now appearing respectively as *data* and *Data*.

Psychological conversion

The new arrangement is a great deal easier for newcomers to APL, since they no longer have to unlearn any typing habits. They only have to learn the locations of the additional characters used in APL.

Users already experienced with the old APL keyboards may find the shift awkward for a while, but not for very long. The only thing they must learn is to revert to the familiar standard keyboard.

The greatest difficulty is experienced by those users who must continue to go back and forth repeatedly between the old and new keyboards. But they are already accustomed to doing this, if they have ever used a typewriter or an ordinary ASCII terminal.

Data conversion

Some users own files containing text data in which someone has carefully supplied the "wrong" APL characters so that they will look reasonable when displayed on a device signed on as an APL terminal, but using a non-APL character set. For example, the stored data might contain the APL characters:

```
oOHN v'ING 1199+1216^[
SON OF ΔENRY 11 > BROTHER OF ρICHARD 1(
```

When transmitted to an ASCII-only device, those APL characters would appear as:

```
John (King 1199-1216);
son of Henry II & brother of Richard I:
```

Writing one set of APL characters in order to elicit different ASCII characters becomes unnecessary once we adopt a union keyboard and union character set. But a one-time conversion of the data is required. Functions to do such conversions will be available in the SHARP APL public libraries for those who wish to take advantage of them. ■

Paul Berry and Joey Tuttle, Palo Alto

APL85: *APL and the Future*

The annual conference of the international APL community will be held in Seattle, Washington, from 12 to 16 May 1985. The conference is co-sponsored by the Association for Computing Machinery's Special Interest Group on APL (ACM SIGAPL) and the Puget Sound Chapter of the ACM. The theme of APL85 is *APL and the Future*.

In keeping with the conference theme, the selection committee is giving special consideration to papers submitted on topics related to the use of APL in dealing with the future or in computing environments of the future. Such topics include the use of APL and:

- Business planning
- Economic forecasts
- Risk analysis
- Decision making
- Supercomputers/parallel processors
- Personal computers
- Telecommunications networks
- Artificial intelligence
- Interactive system prototyping
- Teaching APL to children

For further information on APL85, contact the APL85 Conference Chair:

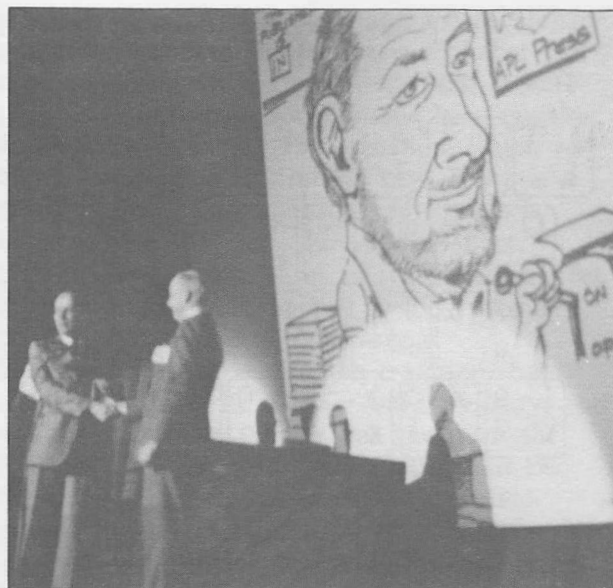
Bob Gailer
Boeing Computer Services 9A-90
Education and Training Division
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Seattle, Washington
U.S.A. 98124

Telephone: 206 575-7476
STSC, Inc./I. P. Sharp MAILBOX code:
APL85

Direct your questions regarding the conference technical program to the APL85 Program Chair:

Robert C. Metzger
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1200 First Federal Plaza
Rochester, New York
U.S.A. 14614

Telephone: 716 546-7270
STSC, Inc./I. P. Sharp MAILBOX code: RCM ■



APL84 Highlight

Recognize the caricature? You won't be able to compare the likeness of Pete McDonnell's drawing of his father to the real specimen, since Eugene had his back to the camera. Eugene, who is with I. P. Sharp's Palo Alto Research Center, was made an honorary member of the Finnish APL Association, FinnAPL, in recognition of his outstanding contribution to the development of APL since its beginning. Sharing the stage with Eugene at APL84 in Espoo, Finland, is Tauno Ylinen of the Finnish Ministry of Finance, who made the presentation on behalf of FinnAPL.

APL in the Soviet Union

On 15 June, the day that APL84 ended, Ken Iverson and I took the train from Helsinki to Moscow. The next morning on our arrival in Moscow, we were met by our host for the visit, Dr. Sergei Prokhorov, senior scientist at the Moscow Academy of Sciences. Dr. Prokhorov is the implementor of an APL system for one of the Soviet series of computers.

On Sunday, Timo Seppala of TMT-Team Oy, I. P. Sharp's representative agency in Finland, and Heikki Auvinen, managing director of Asumer Oy, joined us. Asumer is a consulting firm for Soviet trade.

...APL in the Soviet Union

The next morning, we headed off to the Moscow Academy of Sciences to address a group of about 56 professors, students, and professionals in various disciplines. We lectured in English, with the aid of slides with Russian text and excellent simultaneous translation provided by Professor Edward Gorbатов of the academy.

My talk, "Ideas and their Expression", was an analysis of thought, natural language, programming languages, and machines. I tried to show how a language like APL enhances thought and the performance and design of computers, as well as improving the correctness and portability of programs.

Ken Iverson then talked about his experiences teaching APL to mathematics professors. In his lecture, he reviewed and analysed a week-long math workshop sponsored by the Mathematics Association of America. He and Don Orth of IBM had taught the course a week before APL84, using IBM Personal Computers and SHARP APL.

Our talks were well received, and it was quite clear that the Soviets are very interested in both mainframe and micro-based APL systems.

After additional meetings that day at the Institute for Automated Systems, we boarded an Aeroflot jet to Tallinn, Estonia.

The next morning, at the Institute of Cybernetics of the Estonian Academy of Sciences, we addressed an audience, similar to the one in Moscow, in English. Again, we were well received, and learned that people had come from as far away as Riga, Latvia, to hear about APL. Afterwards, we were the luncheon guests of Dr. Ants Work, the institute's assistant director and his colleagues. Then we sailed back to Helsinki on the *Georg Ots*. ■

Robert Bernecky, Toronto

Raising the APL Standard

During the week preceding APL84, from 4 to 8 June, the International Standards Organization (ISO) working group on APL met in Helsinki. Delegates from Canada, Sweden,

Belgium, United States, Germany, France, Britain, and Finland attended the meeting, which was excellently organized and hosted by Gustav Tollet. The main topic of discussion was the review of the current draft proposal for an APL standard, and the creation of a new draft proposal. Major items of accomplishment at the meeting included:

- simplification of the syntax rules
- definition of $\square TS$ as a 7-element numeric vector
- definition of $\square RL$ as a scalar integer
- a uniform method of formatting numbers
- improved clarity of text versus notes
- correction of a large number of typos and errors

All in all, the meeting was judged by the attendees to be a success. In particular, the member bodies present were unanimous in opinion that all countries would vote *Yes* on the draft proposal resulting from this meeting, thereby opening the way for adoption of an ISO standard for APL. The next draft proposal, N8485, is due to be distributed to member bodies in early August of this year.

Send your comments of general interest on the draft proposal or queries to the working group (I. P. Sharp MAILBOX code *STD*). Or send them directly to Alex Morrow, the overworked and harried editor of the standard. His I. P. Sharp MAILBOX code is *LAM*. To reduce the time to develop the standard, the I. P. Sharp electronic mail system has been the major form of communication among those working on the standard throughout the standardization effort. ■

Robert Bernecky, Toronto

communication news

New Local Access Number

Frankfurt

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Toronto

Joey Tuttle has been appointed vice-president for Development. He is responsible for coordinating the activities of the following corporate groups: Application Software Development, Research and Development, Network Software Development, Distribution and Support, and Data Base Services.



Joey joined I. P. Sharp Associates in 1977 and has managed the Palo Alto Research Center for the past five years. Before that, he was a member of the APL Design group at IBM. He joined IBM as an instrumentation engineer after obtaining an M.S. degree in engineering physics from the University of Missouri at Rolla.

"For years, my main interest in working with computers has been to make computing power directly available to end users. The advent of microcomputers and desktop machines has greatly increased the availability of computing power to individuals. However, even though usage has changed a great deal, in comparison, the ways in which people program computers has changed very little. APL continues to be almost completely alone among programming languages and systems in its ability to let people succinctly express and test their thoughts using a computer. In my new position, I intend to pursue my goal of improving the computer's ability to help people by providing more consistent and easy-to-use products based on the APL way of thinking." ■

London

Theo Sahlsberg has been appointed European manager of Distributed Systems, based in London, England. In this newly created position, he is responsible for sales and support of software and services to customer sites in Europe.



Theo has been managing director of I. P. Sharp's Swedish subsidiary since July 1980. Prior to joining I. P. Sharp,

he worked for five years as a market research consultant and systems analyst, teaching, demonstrating and developing APL systems.

Raised in Sweden and Japan, Theo graduated with an M.B.A. from the Stockholm School of Economics, where he also taught managerial economics and management control. Outside the office, his interests vary from skiing and sailing to wine-tasting and music. ■

London

Ray Hussey has recently been appointed branch manager in London, Ontario. He previously held this position (*I. P. Sharp Newsletter*, January/February 1982) before the Kitchener-Waterloo and London offices were amalgamated. ■

New York

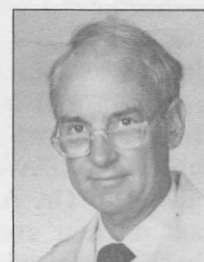
Marguerite Boisvert, formerly branch manager in Wayne, New Jersey, (*I. P. Sharp Newsletter*, November/December 1982) has been appointed manager of the New York office. ■

Palo Alto

Paul Berry is the new manager of the Palo Alto Research Center. He joined I. P. Sharp in 1977 at that location.

Paul started out as a psychologist with a Ph.D. from Yale University. His psychological research included studies of teaching methods in less developed countries, and then methods for the new math curriculum. This led to his interest in APL as "mathematics made visible". In 1966 he joined the APL Development group headed by Adin Falkoff and Ken Iverson at the IBM Thomas J. Watson Research Center, and has been involved with APL ever since.

Paul is an active member of the APL community. He has addressed APL conferences on numerous occasions, discussing the style and



organization of APL programs, and the social consequences of making a tool like APL available.

Paul is also the author of several manuals, including IBM's *APL Primer* back in 1968, and I. P. Sharp's *SHARP APL Reference Manual* and the *SHARP APL Pocket Reference*. ■

Stockholm

Bengt Rubin is the new branch manager in Stockholm. He has a Bachelor of Science degree from the University of Stockholm.



Bengt, a native Swede, comes to I. P. Sharp from the Swedish Trade Council, where he has been manager of Trade Information Systems for the past three years. This organization, affiliated with the Swedish Government, assists Swedish companies with the development of their export markets.

Before this, Bengt was with the Atlas Copco Group of Companies for eight years, where he was promoted to manager of the Market Information Department at the group headquarters. ■

Wayne

Laurin McArthur has been appointed manager of the Wayne, New Jersey, office. Prior to this appointment, he was marketing VIEWPOINT in the mid-Atlantic region and had been branch manager in Philadelphia (*I. P. Sharp Newsletter*, May/June 1983). ■

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We encourage you to write us with comments on this issue and to contribute articles or suggest topics you would like to see covered in future issues.

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