MARCH/APRIL 1981
Volume 9/Number 2

I.P. Sharp
newsletter

LOCAL SERVICE IN THE FAR EAST

Last October at the APL users meeting, we announced that we had plans to open offices in the Far East during 1981. The reason behind our plans was, of course, the increasing demands of multi-national customers for access to SHARP APL from this part of the world.

On May 1 we will be opening an office in Singapore, and on July 1 another office in Hong Kong. Both offices will provide local communications, APL terminals, programming support services, and courses.

We expect to open our first office in the Middle East before the end of 1981, and it will be located in Bahrain. All of these locations will be served by the I.P. Sharp private packet-switched network linking users directly to the main data centre in Toronto and also to private SHARP APL systems located on customers' premises.

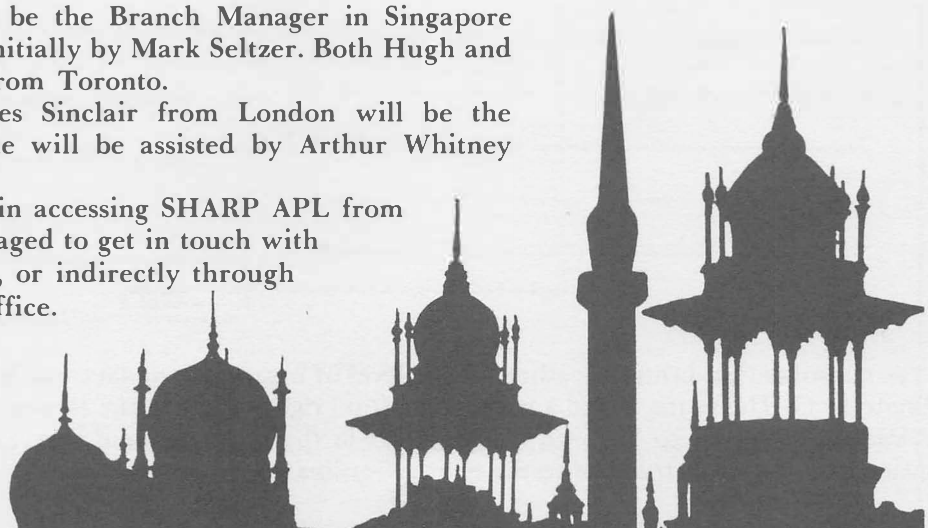
Users of SHARP APL will incur no long distance charges from these locations, and the charges for SHARP APL service itself will be similar to the rate structures in effect in other parts of the world.

Singapore will be the headquarters of our Far East operations and Walter Keirstead, the Branch Manager in Montreal since 1974, will be in charge.

Hugh Hyndman will be the Branch Manager in Singapore and he will be assisted initially by Mark Seltzer. Both Hugh and Mark will be moving from Toronto.

In Hong Kong, James Sinclair from London will be the Branch Manager and he will be assisted by Arthur Whitney from Toronto.

Customers interested in accessing SHARP APL from the Far East are encouraged to get in touch with Hugh or James directly, or indirectly through your local I.P. Sharp office.



CONTENTS

CONSOL

Margaret Reilly, Toronto

For the modern corporation, there is often a need to analyze a problem at a remote location, and to then pass the information on to a higher level of organization for consolidation and further analysis. Data occurs as a consequence of information requirements and legal or social organization. CONSOL is a system specifically designed to handle information requirements according to the structure of a particular organization.

CONSOL's way of recording information can mirror the structure of almost any organization. The following example of I.P. Sharp Associates offices illustrates how our geographic structure would be represented by CONSOL.

```
                                                                                ┌-270-----AUSTRIA
                                                                                |-230-----BELGIUM
                                                                                |-240-----DENMARK
                                                                                |-310-----FRANCE
                                                                                |-320-----IRELAND
                                                                                |-290-----ITALY
                                        ┌-200-----EUROPE------------------------|-220-----THE-NETHERLANDS
                                        |                                       |-300-----NORWAY
                                        |                                       |-330-----SPAIN
                                        |                                       |-260-----SWEDEN
                                        |                                       |-280-----SWITZERLAND                   ┌-211-----ABERDEEN
                                        |                                       |                                       |-212-----COVENTRY
                                        |                                       |-210-----UNITED-KINGDOM----------------|-213-----GLOUCESTER
                                        |                                       |                                       |-214-----LONDON
                                        |                                       |                                       └-215-----MANCHESTER
                                        |                                       |
                                        |                                       └-250-----WEST-GERMANY------------------┌-251-----DUESSELDORF
                                        |                                                                               |
                                        |                                                                               └-252-----STUTTGART/BOEBLINGEN
                                        |
                                        |                                                                               ┌-551-----CALGARY
                                        |                                                                               |-552-----EDMONTON
                                        |                                                                               |-561-----HAMILTON
                                        |                                                                               |-553-----LONDON
                                        |                                                                               |-554-----MONTREAL
                                        |                                       ┌-550-----CANADA------------------------|-555-----OTTAWA
                                        |                                       |                                       |-556-----SASKATOON
                                        |                                       |                                       |-557-----TORONTO
                                        |                                       |                                       |-558-----VANCOUVER
                                        |                                       |                                       |-559-----VICTORIA
-1-------I.P.-SHARP-ASSOCIATES----------|-500-----NORTH-AMERICA-----------------|-920-----MEXICO                        └-560-----WINNIPEG
                                        |                                       |
                                        |                                       |                                       ┌-511-----ATLANTA
                                        |                                       |                                       |-512-----BOSTON
                                        |                                       |                                       |-513-----CHICAGO
                                        |                                       |                                       |-514-----CLEVELAND
                                        |                                       |                                       |-515-----DALLAS
                                        |                                       |                                       |-529-----DENVER
                                        |                                       |                                       |-516-----HOUSTON
                                        |                                       |                                       |-518-----MIAMI-LAKES
                                        |                                       |                                       |-520-----NEW-YORK-CITY
                                        |                                       └-510-----UNITED-STATES-----------------|-521-----NEWPORT-BEACH
                                        |                                                                               |-522-----PALO-ALTO
                                        |                                                                               |-523-----PHILADELPHIA
                                        |                                                                               |-524-----PHOENIX
                                        |                                                                               |-525-----ROCHESTER
                                        |                                                                               |-526-----SAN-FRANCISCO
                                        |                                                                               |-530-----SAN-JOSE
                                        |                                                                               |-527-----SEATTLE
                                        |                                                                               |-528-----WASHINGTON
                                        |                                                                               └-531-----WHITE-PLAINS
                                        |
                                        |                                       ┌-910-----AUSTRALIA---------------------┌-911-----MELBOURNE
                                        |                                       |                                       |
                                        └-900-----ASIA-AND-AUSTRALIA------------|-930-----HONG-KONG                     └-912-----SYDNEY
                                                                                └-940-----SINGAPORE
```

A consolidation brings together, at one level of organization, data which originates in the next subordinate level. The route, called a **path**, reads from right to left in the example above: from branch offices in various countries to Toronto headquarters in the organizational tree. Data at one level of an organization can also be distributed to the next subordinate level.

CONSOL is flexible and easy to use. The command language was expressly designed to handle the needs of a corporate application. The number and types of forms, the timeframes for which data will be collected, and the number and types of paths by which data is consolidated, distributed or reported, are entirely at the discretion of the user.

CONSOL was designed to operate in a dynamic environment. The application can change as the organization does. Forms can be added, timeframes changed, organizational details adjusted (such as adding new I.P. Sharp offices in Singapore and Hong Kong), all without the aid of a programmer.

CONSOL allows each operating level to use the power of the system in a manner relevant to its environment. For instance, each of I.P. Sharp's subsidiaries can create and analyze data in its own currency, using the information to satisfy local requirements. When consolidating, data in various local currencies is translated to a single currency according to rules specified by the user. The original data remains unchanged, available for currency exposure analysis or inflation analysis. Reports can be printed in either local currency or in the 'consolidated currency'.

In short, CONSOL provides the individual unit with the freedom to create and analyze data, and also provides a powerful means of communicating private financial data in a consistent format with branches or subsidiaries located anywhere throughout the I.P. Sharp communications network.

CONSOL is designed to handle business reports that require data repeatedly, on a monthly, quarterly, semi-annual or annual basis, or for a 13-period year. Each item in a CONSOL data base can be used with other I.P. Sharp packages, such as MAGIC or SUPERPLOT, that have been developed for time series analysis. MAGIC can also be used to integrate information from a private CONSOL data base with that taken from the extensive public data bases for special studies.

Typical CONSOL applications are multinational financial consolidations, sales forecasting by product, acquisition analysis, inflation analysis, and currency exposure analysis.

Case Study 1: Modelling
John Bassingthwaighte, Vancouver

Deloitte Haskins and Sells and I.P. Sharp's Vancouver office co-operated in building a financial model of a multi-branch trust company about 18 months ago. The exercise was to project the financial results of a new venture proposed by a large Canadian corporation. Each of approximately two dozen branches of varying sizes were modelled over a monthly five year time horizon, then consolidated with a head office cost centre to simulate the results of the proposed financial organization. Various growth patterns were applied to the branches, and various sizes of branches were projected, then consolidated in scenarios which scheduled new branch introduction in different patterns over the time horizon.

Now, another DHS client already in the trust field is using a slightly modified version of that model to project the profitability of new branches. Using interest rate spread projections, the model develops reserve and capital requirements and assists in the allocation of investment between types. Again, consolidation of many branches' projections is the key factor in a model that is detailed enough to reflect the realities of their business. The ability to model each branch in a number of different situations (what if?...) and then consolidate selected cases to the corporate level is vital to the analysis of the organization's sensitivity to changes in the external environment.

Case Study 2: Multinational Consolidation
Morgan Smyth, Toronto

Moore Corporation is a multinational organization based in Canada, best known over the years as the largest manufacturer of business forms in the world. Moore operates 132 manufacturing plants in 37 countries. Total revenue for the year 1979 exceeded $1.5 billion. Operations of this magnitude and breadth are served best by a computerized financial reporting and consolidation system. In 1980 Moore evaluated several such packages. After extensive examination, they decided to adopt I.P. Sharp's CONSOL package.

To date, Moore has implemented several CONSOL based applications as part of its plan to install a worldwide management reporting and financial consolidation system. While well underway, the system will not be completed for some time.

Currently, data is entered into the system at the corporate head office in Toronto, and at two remote subconsolidation locations primarily reponsible for international operations. One of these latter locations in the United Kingdom has been actively involved in APL for a number of years developing management information systems for its own use.

Two CONSOL applications are used for the financial consolidation, producing a consolidated balance sheet and income statement on a quarterly timeframe, and a summary of consolidated fixed assets and related analyses.

Another CONSOL application provides a data base of management information on a monthly basis, comparing actual operating results to budget, including both financial and other statistical data.

As soon as a definitive Canadian foreign currency translation procedure has been established, the intention is to have each subsidiary enter information in its own currency, and to produce reports in the global U.S. dollar currency.

A further application developed to date has been for the Corporate Tax department to produce summary information for the purposes of completing tax returns.

Applications Library Checklist — Ed Stubbs

1 *DIRECTDEF* - The direct definition mode of defining functions is discussed in SATN-36.

4 *READABILITY* - A new version which allows cheaper text analysis via B-tasks, was installed. A description appeared in the July/80 newsletter. Please check the *DESCRIBE* for a summary of the changes.

87 *CONSOL* - A description of CONSOL appears above.

APL CLUB GERMANY E.V. e.v.

On December 2 1980, a meeting for the foundation of the first German APL club took place. The club was officially registered in January. The chairperson is Professor Dr. Wolfgang Janko, University of Karlsruhe, and co-chairperson is Johann Fruechtenicht, Gruner & Jahr, Hamburg. Questions on membership, fees, etc. should be addressed to them as follows:

Professor Dr. Wolfgang Janko
Institut fuer BWL
Universitaet Karlsruhe
Postfach 6380, 7500 Karlsruhe 1
Tel. 0721-608-3431

Johann Fruechtenicht
Gruner & Jahr AG&Co.
Postfach 30 20 40, 2000 Hamburg 36
Tel. 040-4118-2177

MONTREAL

MONTREAL: **Jacques Paradis** is the new Branch Manager of the Montreal office. Jacques is a graduate of Laval University in Quebec City (M.Sc. Comm., 66), and started at I.P. Sharp in September 1980 with 14 years experience in cost control, financial planning, and the design of financial systems. For the three years prior to joining I.P. Sharp, he was the Director of Budget and Financial Planning at Sidbec Normines, Inc., and a customer of SHARP APL. He built several financial models for mining, manufacturing and service industries as a consultant.

technical supplement 31

PRACTICAL COMBINATORICS PART II

Robert Metzger, Rochester

In the first part of this series we discussed the combinatoric concept of permutations. We presented some functions for generating permutations. These functions were written in the Direct Definition notation. In this article we discuss combinations and tuples in a similar fashion. We start by learning how to count combinations.

The dyadic function represented by ! is called *BINOMIAL*. It is a scalar dyadic function, like addition or maximum. Its definition is given below.

```
BINOMIAL: (!ω)÷(!α)×!ω-α
```

Obviously, the definition of *BINOMIAL* depends on *FACTORIAL*. This function is named *BINOMIAL* because 'the result of *I*!*N* is equivalent to coefficient *I* in the binomial expansion (*X*+1)⋆*N*' [**APL Language**, IBM, p.39]. The expression (0,ι*N*)!*N* gives you all of the coefficients of this expansion of order N.

This function counts the number of unique ways you can choose some or all of the elements from a set. When you count the number of possible subsets, the order of the elements is irrelevant. If you would like to know how many subsets containing 2 elements can be created from a set having 5 elements, you say 2!5, which yields 10. The 10 subsets of 2 elements each chosen from the set containing the letters *A*,*B*,*C*,*D*,*E* are listed below.

AB *AC* *AD* *AE* *BC* *BD* *BE* *CD*

CE *DE*

Like the monadic use, *BINOMIAL* does not create the combinations, it just counts them.

When would you use combinations? Like permutations, you can use them for generating test data or test cases. Frequently a user must select several items from a list. The logic of processing may depend upon which subset is selected. If so, you would want to thoroughly test the logic by trying all possible subsets.

If you want to choose subsets, combinations may be the answer.

We need an APL function to actually create all of the possible combinations from a set. The functions listed below do that for the set ι*N*. To create all the combinations of 2 elements chosen from 1 2 3 4, you say 2 *COMBINE*1 4.

```
COMBINE1: ((1↑ρC),α)ρ(,C)/,(ρC)ριω ∆ C←α NSUBSETS SUBSETS ω

SUBSETS: ⍉(ωρ2)⊤⌽ι2⋆ω

NSUBSETS: (α=+/ω)⌿ω

∆: α
```

This program runs quickly. Unfortunately, it also reaches *WS FULL* rather fast. This happens because the space needed for ι2⋆*N* grows too rapidly.

The function *SUBSETS* can be used in other contexts. It creates a boolean matrix. This matrix specifies all possible subsets which can be selected from a set. Each row refers to a possible subset. The 1's in a row designate which elements belong to that subset. The set containing all possible subsets is called the 'power set'. This is because there are 2⋆*N* possible subsets which can be chosen from a set of *N* elements.

Maybe you are wondering why reverse (⌽ is used in this function. Reversing the order of the integers makes the combinations come out in lexicographic order. You could get the same result another way. You could remove the reverse, and apply the not (~) function to the result of *SUBSETS*. The ~ function must convert the integer argument into a boolean representation before processing. This is more expensive than reverse, which just moves data around in memory. Data conversions are never cheap.

Listed below are two functions which together produce the same result as *COMBINE*1 and its subfunctions. They take more CPU time than the first method. This is because *COMB* is recursive, and executes repeatedly. These functions are useful, however, because they require much less space than *COMBINE*1. Programmers often trade off space for time, and vice versa.

```
COMBINE2: ⍉α COMB ⍳ω

COMB: ((''ρω),[⎕IO] (α-1) COMB 1↓ω),α COMB 1↓ω
    : α∊1,ρω
    : ((α≠1)ϕ1,ρω)ρω
```

This second algorithm was provided to me by Ken Iverson.

*COMBINE*1 and *COMBINE*2 are good examples of two common approaches to manipulating arrays in *APL*. The first approach has two steps.

1) Create all possible desired values (and probably some undesired ones as well).

2) Delete the values you don't want.

The second approach is to build up the array gradually. Either looping or recursion is used to execute the same code repeatedly. A subset of the required values is generated during each execution. The approach you choose depends upon which constraint, time or space, you are under.

A special case of combinations is when each subset has two elements. Finding special cases like this is a good way to speed up algorithms. Two approaches are shown below. Both use less CPU time than either of the more general functions given above. To create all the combinations of 2 elements chosen from 1 2 3 4, you say *PAIRS*1 4.

```
PAIRS1: (</R)⌿R←⍉(2,ω×ω)ρ(,⍉R),,R←(ω,ω)ρ⍳ω

PAIRS2: ((ϕ⍳ω-1)/⍳ω-1),[1.5] (,(⍳ω)∘.<⍳ω)/,(ω,ω)ρ⍳ω
```

You can see that *PAIRS*1 takes the approach of **value first, then shape**, just like *COMBINE*1. It creates an array containing all the desired pairs, and some undesired ones as well. Then it gets the shape right by eliminating the undesired pairs.

The use of </ in *PAIRS*1 determines which rows are in ascending order. Reductions and scans composed of the non-associative scalar dyadic functions (-÷|⋆⍟○!<≤≥>⍱⍲) are not generally useful. But, when used across array segments which have length 2, they are quite useful. This is because the associative law is meaningful only for 3 or more pieces of data.

The second approach laminates the result of a replication to the left of the result of a compression. This approach takes less CPU time than the first. It creates less unneeded data. You save CPU time when you avoid unnecessary array manipulations. This is preferable to the 'disposable data' philosophy of the first function.

A third arrangement you might want is to create tuples. The simplest kind of tuple is pairs of numbers. The Cartesian product is one way to create pairs. It is formed by taking every element of one set and pairing it off with every element of the other set. Thus the number of pairs created is the number of elements in the first set multiplied by the number of elements in the second set. If one set contains the letters *A*,*B* and another set the letters *D*,*E*,*F*, the Cartesian product of the two sets would be the following pairs.

```
A  A  A  B  B  B
D  E  F  D  E  F
```

The outer product operator pairs the elements of the arguments in this manner. It then applies a scalar dyadic function to each pair.

Creating tuples is simply a generalization of the Cartesian product. This is done by taking 2 or more sets, and grouping the elements so that 1 item from each set is in the tuple. The number of tuples which are created is the product of the number of elements in each set.

When would you be interested in tuples? Once again, they are useful in generating test cases. Many interactive applications are driven by 'menus'. You could make a set of tuples from all the menus, which would describe all of the possible paths that a user can take in using your system. If you want to test each of the paths, the tuples will tell you what they are. **If grouping items from different sets is what you are after, tuples may be the solution.**

The two functions listed below work together to create tuples. The right argument of *TUPLES* is a set, which may be any array. Members are the segments of the array which lie along its first dimension. An example of such a set is a matrix namelist. This set is partitioned into numbered subsets by the left argument, which must be an integer vector. One item from each subset goes into a tuple. Each item of each subset is paired with each item of every other subset.

```
TUPLES: ((~S)⌿ω) REPEAT (S/α) TUPLES S⌿ω Δ S←α≠⌊/α
      : α∧.=1↑α
      : (1⌈2↑ρω)ρω

REPEAT: ((1↑ρω)⌿α),((ρω)×(1↑ρα),1)ρω

Δ: α
```

There are two interesting aspects of these functions. The first is the use of replicate ((⌿)) in *REPEAT*. The second is that *TUPLES* and *REPEAT* were created from a 12 line ∇ form function. Clearly, Direct Definitions are more concise. An example of using these functions would be the following.

```
SET←8 5ρ'BEAR CAT  DEER DOG  HORSELION TIGERWOLF
1 2 3 1 3 2 2 1 TUPLES SET
```

This article concludes this series on combinatorics. If you would like to try these functions, they can be found in the workspace 999 *TECHSUPP*. Comments regarding this article are welcomed and may be directed to the author.

COMMENT

Practical Combinatorics I

An alternative definition for *PERMUTE*2 et. al. could be:

```
PERMUTE2: PERMBUILD PERMUTE2 ω-1 : ω=1 : 1 1ρ1
PERMBUILD: ω PERMINSERT PERMDIAGONAL PERMSHAPE ρω
PERMSHAPE: ⌽×\⌽0 1+ω
PERMDIAGONAL: ωρ(2ρ¯1↑ω)ρ0,(¯1↑ω)ρ1
PERMINSERT: ((~ω)×¯1↑ρω)+(ρω)ρ(,ω)\,(¯1↑ρω)⌿α
```

Some of these changes are moot, except for the change of *PERMDIAGONAL* to a monadic function. (In the original definition the ρα was a function of ω anyway.) Also, *PERMSHAPE* makes use of an common reverse scan idiom.

J. Henri Scheuler, Calgary

GCD/LCM

Please note that in the drawing at the bottom right corner of page T1, we accidentally lopped off one box from the lower row of boxes, thereby permitting a GCD twice the size of the one shown.

Paul Berry, Palo Alto

CONTEST 10 ENTRANTS, PLEASE NOTE

There were a great many entries for Contest 10, and I automated the process of capturing the name of the author of each entry. The rules for the contest instructed the entrants to put their names in a variable named *AUTHOR*. My automated routine read each entry from the file, and created a variable *A*xxx where xxx was the component number, from the value of *AUTHOR*.

One entrant submitted his entry without a variable *AUTHOR*, but with one called *NAME* instead. As a consequence, I created variable *A*198 with the value *WAYNE HARRINGTON*, the same as the value of variable *A*197. The one who submitted the entry in component 198 thus lost his identity.

Guess which entry was the winner?

You're right, it was 198!

When I looked for the name of the winning author, I looked in *A*198, and found, of course, the wrong name. So the information we printed was wrong: Wayne Harrington was not the winner, but rather

John Reeves
EDP Department
Commonwealth Banking Corporation
Sydney, Australia.

Eugene McDonnell,
Palo Alto.

Finally,

Residents of Winnipeg who found themselves briefly assigned to Saskatchewan will be happy to hear that they are now safely back in Manitoba ...

BACKUP SCHEDULE

On the first Sunday of each month we copy all customer files to a set of tapes and save them for four years. We do the same with customer workspaces. Each day we copy all changes to customer files and workspaces to tape. We keep these daily copies for the previous 90 days.

As a result, we can retrieve those files and workspaces that existed at our daily backup times, as they were at those times, for the past 90 days, and we can retrieve files or workspaces from the more distant past at the status of their monthly copies for the past 4 years. There is a nominal charge for these retrievals.

We can also, on user request, copy specific customer files and workspaces to tapes for backup, and save them (for a maximum of 5 years). There is a nominal charge for this service, and for the storage of such tapes in our tape library. Please consult your local SHARP APL representative for more details.

Note: In previous years we took the monthly tape copies for long-term retention at somewhat different times. The SHARP APL operator can indicate which specific dates are available.

SYSTEM RELIABILITY 80

	Outages	Minutes out	% up
JAN 80	6	80	99.8
FEB 80	12	203	99.3
MAR 80	9	152	99.5
APR 80	8	163	99.5
MAY 80	10	128	99.6
JUN 80	20	688	97.7
JUL 80	17	334	99.0
AUG 80	9	622	97.9
SEP 80	12	238	99.2
OCT 80	7	128	99.6
NOV 80	10	312	99.0
DEC 80	9	247	99.3

SATN (SHARP APL TECHNICAL NOTES)

SATN-0	INTRODUCTION, 1 Jan. 76
SATN-2	CONTROL MESSAGES, 21 Oct. 79 (4)
SATN-4	N-TASKS and B-TASKS, 1 Apr. 78 (2)
SATN-5	BATCH APL, 1 Feb. 78 (3)
SATN-8	HIGHSPEED PRINT, 1 Mar. 79 (2)
SATN-9	USAGE INQUIRY SYSTEM, 1 Nov. 80 (2)
SATN-10	SORTREQ, 1 Jun. 78 (2)
SATN-19	FILEPRINT, 1 Jan. 77
SATN-22	APL WORKSPACE TRANSFER, 11 Mar. 80 (3)
SATN-23	COMPARISON TOLERANCE, 15 July 78 (1)
SATN-28	TERMINAL CONTROL, 11 Jul. 77
SATN-29	SYSTEM TIME AND TIMESTAMPS, 15 Jun. 78
SATN-34	REPLICATION, 10 Sep. 80
SATN-35	EXTENDED UPGRADE AND DOWNGRADE, 15 Sep. 80
SATN-36	DIRECT DEFINITION, Oct. 80

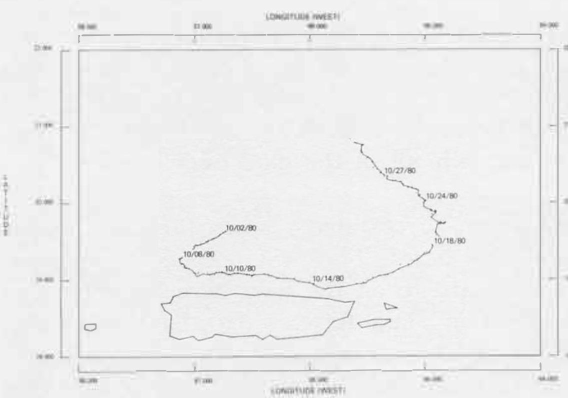
Revision number appears in brackets.

TRACKING OCEAN CURRENTS WITH THE HELP OF SHARP APL GRAPHICS

Michael Berry, Boston

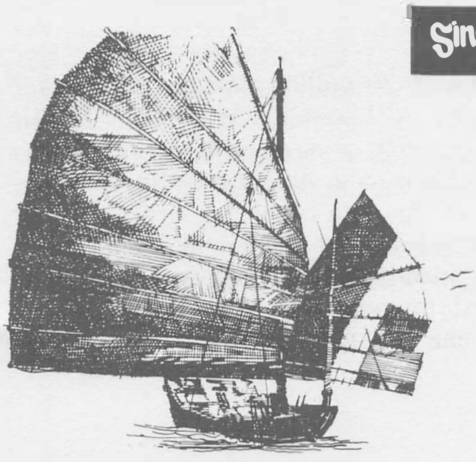
The Boston office HP plotter has been turning out maps of the Carribean recently. No, we are not looking for sites for the next APL Users Meeting, we are plotting the track of a floating radio buoy. The buoy was dropped into the ocean north of Arecibo, Puerto Rico, by an oceanographer who is a customer of the I.P. Sharp Boston office. Each day, the buoy radios data on position, temperature, water salinity, and so forth, to one of two satellites. The data is then transmitted to another computer in Virginia, from which it is finally input into the I.P. Sharp system. The track of the buoy is then plotted against a background of maps drawn from our online map files. These maps span the globe, and can be drawn at any coordinate to any scale.

TRACK OF BUOY (MERCATOR)



NEW OFFICE

Singapore



SPONSORED BY ASSOCIATION FOR COMPUTING MACHINERY

APL 81
San Francisco Hilton
October 21-23

APL 81, sponsored by the Association for Computing Machinery and STAPL, will be held in San Francisco from October 21-23, 1981. The program will include over 60 contributed papers. Topics to be discussed will include language extensions, programming methodology, graphics applications, tools for building large systems, and more.

Experts invited to address the meeting will help us to understand how the ideas which shaped other programming languages are relevant to the development of APL. **Karel Babcicky** of the Norwegian Computing Center will describe SIMULA-67 and its relevance to APL. **Alan Perlis** of Yale University will describe the relationships of APL to other programming languages. **Jack Schwartz** of New York University will describe his work with SETL, a set theory oriented language with relevance to extensions of APL currently under consideration. **Clark Weidmann** of STSC, Inc. will describe the work of the APL Standards Committee, of which he is chairman.

The commercial exhibit will contain displays of the latest in hardware, software, and services. A series of lectures at both the elementary and intermediate levels will be presented, including the following:

APL Thinking: Finding an Array Solution, Robert Metzger, I.P. Sharp Associates
Boolean Techniques in APL, Bob Smith, STSC, Inc.
Data Structures and File Design, Roy Sykes, STSC, Inc.

"APL 81 will be an exciting experience. It comes at a time when APL is undergoing some of the greatest changes in its history. A host of new implementations and new hardware is emerging. We will learn more about these developments at the conference. As we learn, we also hope to help educate others so they may share our enthusiasm. You will enjoy APL 81 and I look forward to seeing you there."

Eugene R. Mannacio,
Conference Chairman

DATA BASE TRENDS

David Keith, Toronto

There can be no doubt about it: the information explosion is upon us. Organizations which choose to ignore this fact run the risk of losing out to their competition. Data is a valuable resource, which, if used properly, can assist the decision-making process in ways which were not possible before. The sudden increase in the wealth of data in computerized form has put tremendous pressure on computer programmers to produce generalized software that is easy to operate, yet flexible enough to handle complex problems.

At I.P. Sharp Associates, we are expending more effort than ever to produce generalized, user-oriented data base software. Two packages in particular have proven to be very popular with customers: MAGIC, which allows users to access and manipulate time series data (public or private); and MABRA, a simplified technique for the maintenance and analysis of record-oriented data. These two packages alone account for approximately 40% of the use of the software in the SHARP APL public libraries.

Right now, if you have a time-sharing terminal, you can use that terminal to obtain information from over 700 public data bases offered by approximately 100 vendors around the world. Several companies specialize in publishing directories of these data bases, and if you like, we can suggest some excellent data base directories. In scanning these directories, it is clear that I.P. Sharp Associates has already become a major worldwide data supplier. There are several reasons for our success in this respect:

- I.P. Sharp has one of the most comprehensive time-sharing networks in the world. No other data base vendor allows you to sign on to their system from so many places in the world for only $1/hour (or equivalent) of connect time.

- We generally do not require users to pay a surcharge or royalty for the use of our public data bases. We are becoming more and more unique in this respect. We have observed that a data base access charge, however minimal, tends to discourage the use of the data base. For example, the Financial Post Securities Data Base and the Official Airline Guide Data Base used to have surcharges related to the amount of data accessed. Since removing the surcharges on these data bases, the amount of data accessed has tripled. We soon plan to offer the OECD Data Bases (major economic indicators and national accounts), and expect to be the only vendor of this data not requiring an access surcharge.

- I.P. Sharp has built a reputation over the past six years for excellence in data accuracy and data timeliness. For many data bases (e.g., the CAB Form 41 Data Base), we keypunch, verify, and edit all of the data ourselves.

- We listen to customers when they ask us for new data bases. The next newsletter will contain an article on the new National Planning Association Data Base, a data base containing demographic and economic time series information (historic and forecast) for each of the 3098 counties in the United States. When a customer in Washington D.C. initially asked us for the data, we realized its general appeal, and decided to offer it as a public data base with access via MAGIC. As usual, there will be no surcharge to use this data.

There are over 20 million time series available via the SHARP APL system. An updated **Public Data Bases** directory is now available to give you an overview of this data. As indicated in the directory, fifteen of the data bases are either new, or have been extended in the past six months. In your work, if you identify public data that appears to be of general interest, please let us know. We always welcome your suggestions.

PUBLICATIONS CHECKLIST

Jane Minett

A lot is happening in SHARP APL publications. Please call your local office or write to I.P. Sharp Publications in Toronto for copies of these new and revised publications.

Banking Applications, Dec. 80, 5 pages. This new pamphlet contains brief descriptions of a few of the applications that our banking customers are running on the I.P. Sharp system.

CONSOL Reference Guide, 205 pages (available soon). A discussion of the system appears on pages 2-4.

A SHARP APL Minicourse, Revised, Jan. 81, 52 pages, $6. As the name suggests, this is a brief introduction to the SHARP APL language.

INS User's Manual, Revised, Nov. 80, 34 pages, $4. The INS data base contains information about airline passenger traffic between U.S. cities and cities outside the U.S.

Public Data Bases, Revised, Jan. 81, 12 pages. This directory summarizes our public data bases in the areas of economics, finance, aviation, energy, and insurance. With a few exceptions, the data contained in these more than 40 data bases (representing in excess of 20 million time series) is available to all I.P. Sharp customers without restriction.

Hardware Configuration, Revised, Dec. 80. This one-page diagram shows the hardware configuration of our computer centre in Toronto.

NEW BOOK FROM ISGS

The International Society for General Semantics has just published *Semantics of Air Passenger Transportation* by Edward MacNeal. Copies, $19.95 postpaid, may be ordered from the publisher at 834 Mission St. (4th floor) San Francisco, Ca. 94103, U.S.A.

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