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Recreational & Educational Computing Newsletter

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Editorial

With the demise of so many computer magazines the past year or so, a tremendous void has been created. Popular Computing and Creative Computing, both of which featured your editor's "Recreational Computing" column at various times, are now gone. Most of the existing computer magazines don't even make a pretense at including programming, problem solving, recreations, challenges, puzzles, brain-teasers, math tricks, or computer investigations.

That is the reason why we've created REC, the Recreational and Educational Computing Newsletter.

Over the next year, we intend to grow very slowly. As we do so, we'll evolve policy on such matters as whether to accept outside advertising, publish readers' names and addresses with letters, etc. We need to hear from you about how you would like this to evolve. Your suggestions, letters, contributions of ideas, improvements and solutions to questions are solicited. Please remember, however, to enclose a self-addressed, stamped envelope (SASE) if you desire a personal reply to a question.

While you're reading this, please take time to look over your mailing label. Are your title, name, and address all correct?

As we go through the year, we may experiment later on with different computers and word processors. This issue is being word processed using LeScript, from Anitek Software, on a TRS-80 Model 4P. We also have a TRS-80 Model III, a TRS-80 Model 100 portable, a Sanyo 555, and a Tandy 1000, to name the major ones. The kids play with the Spectravideo SV-328, and we thank Quadram Corp. for the use of the loaner unit of the Datavue 25, an IBM-compatible portable computer with a disk drive and 640K. However, we want Apple, Commodore and TI users, as well as those of you with CP/M systems and others, to know that we want to work with you all, too. To do this, we will try to encourage and use only generic code which can be easily transported to your machines.

We will be looking at using other means to produce this newsletter, including Radio Shack/Tandy's Print Master, Microsoft's Word (new version), Satellite Software International's Word Perfect 4.1, Lifetree Software's Volkswriter Deluxe 3.0, and various enhancement products, mostly for the IBM-compatible Tandy 1000. Thanks to these companies and others, including Lotus and Borland.

This promises to be a most exciting year around here. Remember that we await hearing from you so that you may be part of this. We want this to be, at least partially, your newsletter. Let's hear from you!

The Challenge of Self-Reference

Here is a programming challenge which I ran in one of my Creative Computing columns last year. In two subsequent issues, I featured two solutions. Since the publication folded, we never had the opportunity to see the sharpest one to date, at least from the ones I've seen. Let me remind you of the goal and rules.

Your mission, should you decide to accept it, is to produce a program in generic Basic which, when run, produces precisely a listing of itself. In other words, you want the output of a RUN to look exactly like the output of a LIST.

The catch is that you may not use the command LIST itself. The one-liner:
10 LIST

would be a solution otherwise, and that is not worthy of the talents of you "Ecker's RECCers"! (Note: The last word should sound the same as "wreckers".)

Similarly, no peeks, pokes, calls, machine language routines, input/output or machine-specific commands are allowed.

I must warn you though: REC Subscriber Norlin Rober of Marshalltown, Iowa, has a beautiful solution, and some Creative Computing readers have sent in nice efforts the past few months. Can you come up with a solution? .. an elegant one?

We'll publish the best efforts next issue, with credit to the solvers.

More On The Mystique of Self-Reference: Who Shaves Sal?

For those who like the ramifications of this last programming challenge, consider the language analogs. For instance, in the town of Seville, Sal is a barber whose only clients are precisely all the barbers of Seville who don't shave themselves.

The question is: Who shaves Sal?

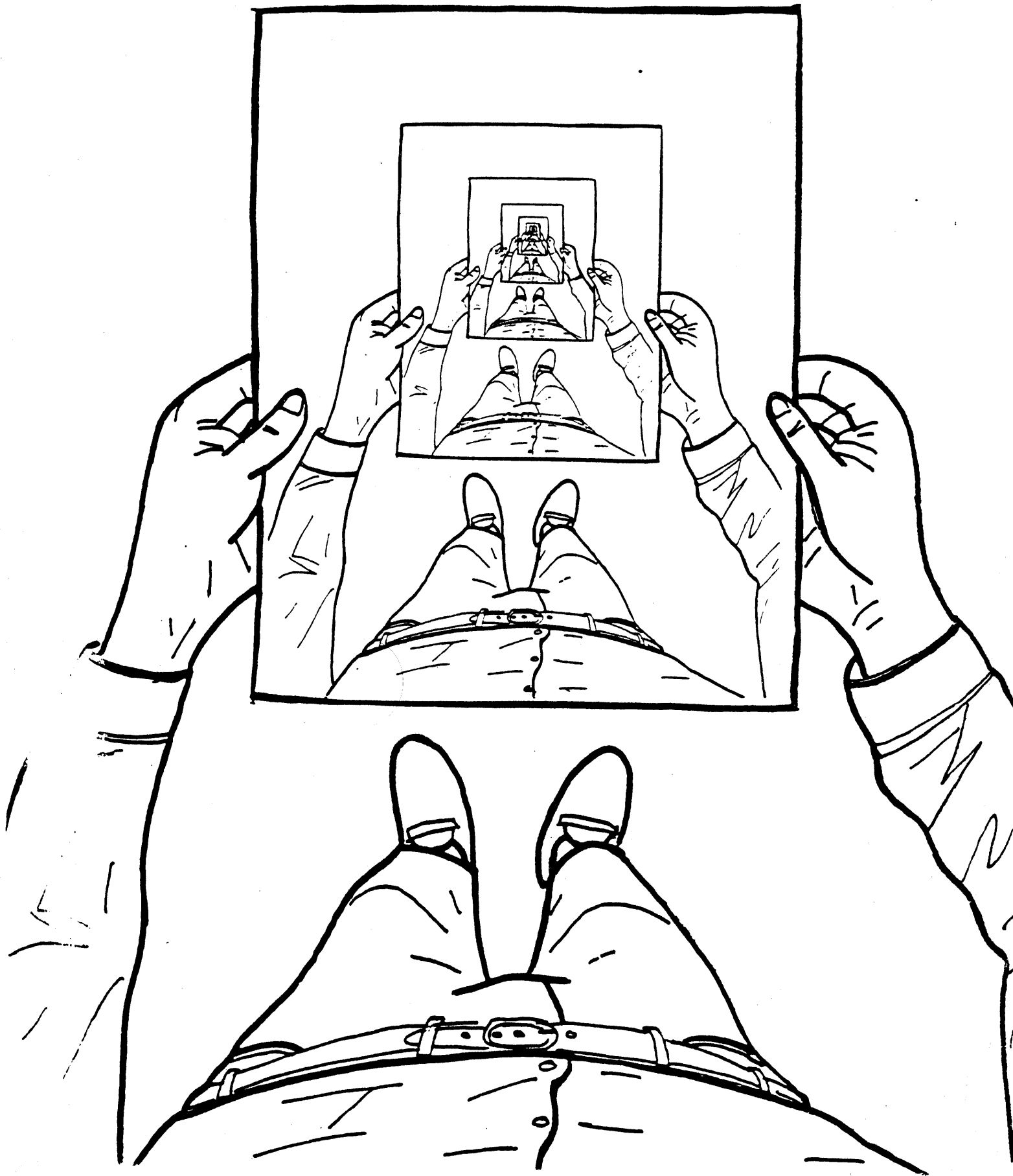
If Sal does not shave himself, then he is a barber of Seville who doesn't shave himself. But that makes him a client of himself. Hence, he must shave himself.

Inversely, if Sal does shave himself, then he is a client of himself. But his only clients are barbers of Seville who don't shave themselves. Thus, he is a barber who doesn't shave himself. Therefore, he doesn't shave himself.

In conclusion, we have one version of Russell's paradox: He does shave himself if and only if he doesn't shave himself!

Although Martin Gardner, famed mathematician, says the culprit is not self-reference, that is probably a good way to view the paradox. We have an unholy kind of intermingling of metalanguage (language about language) and object language (the actual language we converse in) which causes such problems.

The diagram on the opposite page, courtesy of Dr. Nathaniel Hellerstein, a mathematician and artist in Massachusetts, simulates the problem visually.



Next Number in Sequence

In the final issue of Creative Computing (Dec. 1985), I gave a challenge to write a program to produce the next number in a given sequence. No solution was published, as Creative folded. Hence, I'll give one here. But first, let me remind you of the question.

Suppose we started off with the numbers 1, 3, 5, 7, 9. We presumably would like a program to report 11 as the next number. For 1, 4, 9, 16 (note that these are perfect squares, and that they "go up" by an increasing amount in a clear pattern each time), next would be 25.

However, as I explained in that "Recreational Computing" column, there really is no such thing as "the next number". That is because, given any finite number of numbers, by various means, one can always find many formulas which produce those numbers for the first several values, but then produce different values for the next number. I pointed out that this also explains why such a question has fallen into disfavor on IQ tests, SAT's, and other achievement-type and aptitude-type tests.

Nevertheless, if we want to consider one such program which will produce a next number, based on the idea of either the differences of consecutive terms being constant, or differences of those differences being constant, etc., then we can still proceed. In fact, reader George Vogel of Massachusetts sent me a copy of some materials for producing not just a program, but a mathematical formula. (This is fairly well known among mathematicians, actually, but this does not lessen George's contribution any.)

For details of what this program would do, please see the Dec. 1985 "Recreational Computing" column in Creative Computing. (If you cannot locate a copy, send me a quarter for photocopying and a self-addressed, stamped envelope and I'll send you a copy of the article.)

The program here was written for a TRS-80 Model 100 portable computer, but should run with few changes on other machines. CLS clears the screen, so you Apple users would presumably use HOME; Commodore users should adjust for their machines, as with TI owners, who should double-check the syntax for translation to their version of Basic. Consult your manual if in doubt.

NEXT NUMBER IN SEQUENCE PROGRAM

```
10 CLS
20 PRINT "THIS PROGRAM WILL ALLOW YOU"
30 PRINT "TO INPUT VIRTUALLY ANY"
40 PRINT "NUMBER OF NUMBERS AND THEN"
50 PRINT "DETERMINE THE NEXT NUMBER"
60 PRINT "BASED ON EVENTUAL ZERO N-"
70 PRINT "FOLD DIFFERENCE."
80 PRINT
90 INPUT "ENTER TO BEGIN"; NX$: CLS
100 INPUT "HOW MANY NUMBERS ARE GIVEN"; N
105 DIM A(N+1,N+1)
110 FOR J=1 TO N
120 PRINT "ELEMENT NUMBER "; J;
130 INPUT A(1,J)
140 NEXT
150 FOR K=2 TO N
160 FOR J=1 TO N+1-K
170 A(K,J)=A(K-1,J+1)-A(K-1,J)
180 NEXT J
190 NEXT K
200 A(N,2)=A(N,1)
210 FOR L=N-1 TO 1 STEP -1
220 A(L,N-L+2)=A(L,N-L+1)+A(L+1,N-L+1)
230 NEXT L
240 PRINT "THE NEXT NUMBER IS ..."
250 PRINT A(1,N+1)
```

Baseball Cards and Other Collections: A Simulation

Remember collecting baseball cards and always being stymied by just one or two cards that you needed to complete that collection? Perhaps it was something else less frivolous. In many sweepstakes, one needs to collect all the letters of some word, as in collecting W, I, and N of the word "win". Or collecting each of ten symbols. Or in gaming/gambling, perhaps you have to roll one each of 1 through 6 within a certain number of tosses of the die in order to win.

There are lots of examples of this outside of gambling and probability situations, too. Can you see the similarity of these examples? Can you think of others?

Let's suppose, now, that you wanted to collect a full set of fifty different baseball cards. How many cards would you expect to have to buy, on the average, in order to have a full set? In other words, you want at least one of each card in the set. Let's assume that each card is infinitely available, and each card is as likely to get as another.

The mathematics involved is not trivial, and it certainly is not feasible to go out and buy objects this way, so we need another approach: a simulation. We will simulate collecting cards via random generation (or pseudorandom generation, at least) of the numbers 1 to 50. A program will keep track of which numbers are collected and how many cards are needed for the collection to be completed.

To get an average, have your program keep track of the number needed during each run. Have it do at least 100 trials, and then report the average number of times for each.

For instance, suppose that it takes 125 numbers for each of 1 to 50 to appear. Next time it might take 100. The next time it might take 145. And so on. Then your expected value or average would be the average of all these numbers: 125, 100, 145, etc.

Send your programs in for publication next issue. If you can spare a disk and have one of the machines listed on page 1, feel free to do so. It will certainly be easier to test, and may result in publication. Of course, you'll get credit as the featured solver. Do remember to avoid machine-specific commands as much as possible, regardless of form of your solution. Our address is on page 1, top.

Reminder: If you have a question requiring a personal reply, please enclose a self-addressed, stamped envelope (SASE). Please also indicate whether I may quote you and use your name/address in REC. This will allow me to solicit help from readers without my having to be a go-between who will slow things down.

Who reads REC? (Read that to the tune of "Who reads Playboy?!")

REC readers run the gamut, but some trends emerge. A surprisingly large number of you have advanced educations and even PhDs. Many are or were in academia or teaching. Many of you are enjoying retirement with computers and exploring things you never had time for, or interest in, before.

All of you, however, seem to share REC's premise of enjoying computing and programming outside of the limited context of business packages, the domain of

the business computer mags. You like to examine things, enjoy challenges and computer recreations, and are active participants in what you do. Many of you felt strongly enough to write lengthy letters describing yourselves, your interests, your systems, etc. Thank you all so much! I wish that I could individually name each of you here, but that would not be a good idea!

To all of you again, welcome. I look forward to hearing from you as we slowly grow through the year and beyond.

Letters and Help

Thank you for the nice letters; they are gratifying and appreciated!
At the same time, REC has gotten mentions in some publications, including local press and several mathematics publications.

Thanks to J. Donald Brown of Virginia for sending more than the asking price of REC so that I may "pay for postage to contact other interested parties to boost the ranks of supporters". Thanks! What a nice gesture! I appreciate it.

Thanks to Norlin Rober for sending me a picture of Iowa Governor's Branstad, who Norlin thought looked like me. Maybe I'm in the wrong business...

One thing I would like to address before getting into the questions is the matter of coverage in REC. Specifically, we will not go into other programming languages, much as we may be tempted to jump into Pascal. Sorry, but let's try to keep it to Basic, at least most of the time. The reason for this is to have a common denominator. Similarly, unless there is demand and a reader will do the work, we don't plan anything with machine language. Remember, as well, that our readers have many different machines. Thanks for your understanding!

However, your contributions of appropriate, short articles - with your byline - are welcome. I cannot promise acceptance, and I definitely cannot pay you. (I calculated that this operation pays - well, let's just say not a lot.)

Can you help these readers? If so, please write them directly, and send us a copy of whatever you advise. Your fellow readers will appreciate it.

Bill Thompson (P.O. Box 7044/ Carmel, CA 93921) has a Tandy 1000 and would like to know how to use the Sort command on columns other than the first when he creates a file with a number of entries and uses the tab Key for spacing.

Richard Oberdorfer (Rt. 4, Box 721/ Newport, WA 99156) would appreciate help in understanding how to save tab settings, margins, etc. when using Volkswriter Deluxe version 2.2 on his Leading Edge computer.

Ernest T. Thiersch (644 East Goodrich Drive/ Deltona, FL 32725) wants to know how to use MBasic on the Osborne 1 without DSKF so as to work around that without having to interrupt a program to check disk space. Anybody out there in the CP/M world know what this is all about?

Mr. Thiersch, a retired engineer and corporation exec, also wanted info about rounding numbers, notably with trig functions. Anybody care to write a small, not-too-technical piece applicable to most machines?

Richard Barth (65-09 99th St./ Rego Park, NY 11374) is interested in recreational math publications/magazines. Know any current goodies, anyone?

B.B. King (no Kidding folks! - 2707 Dumbarton Ave. NW/ Washington, D.C. 20007), asks why it seems impossible to use Lotus graphics in monochrome, even with a Hercules. He also asked about the Boolean logic in the direct mail blurb that you all received, and why I had two "(N>1)"s in the program.

Answer - That one is easy. Many micros use -1 for true. So, since both -1 and 1 have 1 as square, I played it safe by squaring first. Otherwise, there could be a subtraction instead of addition if you have an IBM or TRS-80 or

One more item: Mr. King chided me for not replying to his letter when I wrote "Recreational Computing" for Popular Computing. Other readers wondered why I did not use their contributions. Be assured I do answer all mail for which: I get the letter and there is a SASE. Not only do I have to receive your letter from the postal system, but it has to deliver my response. And remember, I do expect that SASE. OK? As for using contributions, I'll try, but remember I get a lot of mail, and I do have numerous responsibilities, I do get many solutions, so I cannot use everything I get. Wish I could. Please understand everybody!

Thanks to Al Ritsko for interesting info re: Sanyo 550/555, as well as suggested modifications to our finances software. (Yes, I know some of you hate this.)

Thanks to Ed Roberts for sundry forms of help.

Thanks to Dr. L. M. Annett for offering an intriguing program. Care to send me a tape or disk, doc?

Lastly, I was asked what I teach. I am an associate professor of mathematics and computer science, presently at the University of Scranton, having formerly taught at Penn State. I will be moving on to another position within the next year, possibly much sooner.

Coming Next Issue!

The Mystique of Strange Attractors. More Challenges and Programming. Solutions to Previous Questions. Letters and Help. Software Reviews. And more!

Quick Bytes: Software and Book Reviews

Do you like both math and art? If so, a new book by Martha Boles and Rochelle Newman may be for you. These two women are professors: one teaches math; the other teaches art. The two have collaborated to create a course (with a book) which integrates these beautifully (literally!) for those fascinated by such an approach, and those who might be a bit intimidated by more traditional math.

Their book is The Golden Relationship: art, math, nature - Book 1: Universal Patterns. Such topics as ratio, proportion, the golden mean, Fibonacci numbers, spirals, and the like predominate, all interacting with nature and art. The mathematics involved is not advanced, and the book succeeds in its purpose.

Although this big book is a bit pricey at \$30, it really is in the ball park for texts. The art efforts are quite nice in their own right as well as in the way they relate to the geometric and other mathematical concepts. Although the math is not new, the book is unique in its overall approach.

Contact Pythagorean Press/ PO Box 162/ Bradford, MA 01830 to order or for info.

Baffles II
Conduit's adaptation of a classic game

How many of you fellow game-lovers remember a game in the 1970s which was marketed under the name of **Black Box**?

Black Box spawned a number of faithful computer implementations. I recall a public domain version for the TRS-80 which did this superbly and was a great joy. Somehow, though, this great game of logical deduction got buried in some box of disks, so I haven't thought about it much in the last couple of years.

Recently, I came across Conduit's catalog and noticed that this company has begun to produce one or two IBM software products in addition to its Apple line. One of the first is **Baffles II**. **Baffles** was originally produced for the Apple, and now **Baffles II** merits attention for being a newly released, well-made, fun and educational product for IBM. It's terrific to play, and I know of nothing comparable for the MSDOS world. The Apple version is still available, too.

Nothing Baffling So Far...

Baffles is best described as a combination of recreation and education in which you use elementary logic, intuition about space, and good old common sense to locate the exact positions of deflectors which are placed somewhat randomly inside a box. That is, when you play the game, the computer places little diagonally slanted line segment barriers in several boxes in a grid. Your goal is to identify where these have been placed, without seeing any, by shooting in imaginary rays or lasers. Depending on where the ray comes out, you can make logical guesses or even inferences about where one or more barriers must be located. The game baffles you - thus its name - as there are initially many possible combinations of barriers which could produce a given result or results.

For instance, if you shoot a ray in one side, which you do by specifying a coordinate or number, suppose that the computer reports a number which corresponds to the ray coming out the opposite side. A person might reasonably conclude that there were no obstacles in the line of fire.

What makes the game tricky is that it is possible, although not probable, that there were several deflections, and the resulting beam may happen to come out the opposite side. Further testing is needed, therefore, even in such "obvious" cases. Of course, the real fun and challenge come when you start getting deflections. Then there are many possibilities. How many barriers were touched by that last shot? Where are they? You get the idea.

What You Get

Baffles II comes in a vinyl protector/binder which includes two disks and documentation of a couple dozen pages. The disks are copy protected (ugh!); thus the second copy. I did not try to make a backup using any of the popular copy programs (such as COPY II PC, my personal favorite), because I saw no need to try. Nobody likes copy protection, and while I won't defend it per se, I suspect that this program would be pirated several times for each legitimate purchaser. The \$50 price tag would not help matters, although I found this to be such a nicely done program that I can hardly blame Conduit for wanting appropriate reward for both itself and the authors, James D. Spain and John Wm. Ridge.

The documentation includes information about licensing, installation of the program (including to a hard disk), DOS, etc. You can create a self-booting disk, for instance, but I won't bore you with details of such matters; that's all there in the instructions for all to read anyway.

Educational Perspective and History

Conduit produces educational software and has angled **Baffles II** as an educational product rather than as a game. Personally, as a mathematician who is accustomed to such thinking, I found it more a game. Nevertheless, **Baffles II**

does build or foster critical thinking -- with some teacher intervention, if needed, that is. The "preface to the instructor" - a standard fixture in textbooks - speaks of the benefits of familiarizing students with the coordinate plane / grid concepts. It also mentions some other related games, such as Battleship (remember that?!), all found in David H. Ahl's 101 Basic Computer Games. I was surprised not to find any reference to Black Box, however.

Details of Play and Critique

All baffles - or barricades - are placed at 45 degree angles. The rules are clear and graphic, with ample illustration of each point. You can play several versions of the game, such as choosing how many obstacles you want placed in the sealed box. In general, the more, the more difficult the game. You can place guesses tentatively by summoning the draw command, D, from the screen. You can erase if you obtain contradictory evidence; do so by implementing command E, at which point you might draw in some new baffles at new locations. At the conclusion, you tally your score, which is based on how few shots you used, how many positions you correctly identified, and the number wrong. The more baffles used, the higher the possible score, but again, the game is more demanding then.

A nice feature is the option of two-person play. As with games such as Master Mind, one person can place the baffles while the other leaves the room. Later, the two players can reverse roles.

I would like to have seen the ability to save games in progress. It is not a critical feature, but it would have been a nice little extra. Personally, I don't care that there are no computer records of completed games, either, however. You can print out screens on your printer, if you wish. I was also delighted with the nice color graphics; I know that I shouldn't always get so excited about such things, but I still do.

Summary

Educational or not, this is a lot of fun. It's easy to learn, educational enough to benefit whether you know it or not (or care), and looks and works great. I had no problems.

The copy protection is unfortunate, but at least you get two disks.

As far as I know, Conduit, which is associated with the University of Iowa, has a fine reputation for educational software. While \$50 might seem a few dollars more than hobbyists want to spend, Conduit has targeted Baffles II for the education market, where eyebrows will certainly not be raised.

Baffles II is a pleasure to play and review, and I heartily recommend it. Contact Conduit Educational Software, The University of Iowa, Oakdale Campus, Iowa City, Iowa 52242. Phone: 319-353-5789.

Marketplace

Note to publishers of software and books: REC accepts limited advertising and co-op ads of worthwhile products in which we sell products on commission. If you have a worthwhile computer-related product, particularly if it relates to education or recreation, send us a copy for consideration or review, as we won't sell poor quality items, regardless of potential profit. Bear in mind that we don't review "loaners" or demos or samples - only full, complimentary products. Exceptions can be made for expensive hardware, but by prior arrangement only.

New Product! George Farnsworth, author of Bridge-80 for TRS-80s, has just written a superior version, Bridge-86, also known as PC-Bridge, as it is for the IBM or MSDOS compatibles using GW Basic or Basica. This program is really nice insofar as you get one-keystroke responses, you never have to hit the Enter key, you always get the best hand, and the program allows replaying, displaying of

cards, printing of hands, computer scoring, and much, much more. It looks great!

Not copy-protected, the program, available for MSDOS and TRSDOS (including tape for Models 1 and 3) is listable, and features popular play conventions, bidding, computer play of opponents. Mr. Farnsworth, a bridge player, advises that PC-Bridge involves certain aspects of expert systems.

After reviewing Bridge-86 (as I prefer to call it), I was so impressed that I asked George to allow Recreational Mathematical Software (sponsor of Recreational and Educational Computing Newsletter) to distribute it exclusively (other than direct sales by author). The documentation and program are now ready for March 1986 release simultaneous with this first issue of REC. The special price to REC subscribers is \$18.95. Please specify computer and model. Write:

Recreational Mathematical Software/ 129 Carol Drive/ Clarks Summit, PA 18411.

Magic Math Plus - Just a reminder that Recreational Mathematical Software's main product of recreations and "mathemagic" is available for \$5 off to REC subscribers. It includes number tricks, computer investigations, computer math, computer games, and much more. The TRS-80 version lists for \$37.50 and has nearly 40 programs on a self-booting disk in menu-generated format. The Sanyo and MSDOS versions come with nearly 20 programs for \$27.50 list, both with menu-generated format. The Sanyo 550/555 version comes on a self-booting disk.

For more information, send a SASE with 39 cents postage to RMS at above address. Be sure to specify your computer model, and advise of your interests.

That will be it for this issue! I already have loads of material in readiness for next issue. To any publishers or supporters we've overlooked, please drop me a note to check on your status.

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