New Style

Newsletter of the LaCrosse PC Users' Group

volume 19 number 4 April 1999

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- E-mail addresses
- PhotoImpact 4.2
- Various articles about Y2K

This Month: April 28, 6:30PM in the Overholt

Chuck Whalen presents Y2K, also known as the end of civilization.

Reno vs. Gates

In a recent article in the Wall Street Journal some particulars were revealed about the government's evidence in the anti-trust suit against MicroSoft.

Exhibit 1 defines a computer for the government's claim that MS controls the operating systems of 91% of computers. To be considered for statistical purposes the machine must a) be powered by an Intel chip and b) not be connected to a network.

This means that if you have a Cyrix or AMD chip powering your machine, or are connected to a network, you don't count.

Frankly, I'm surprised the percentage isn't higher.

Tax Time

Is fortunately behind us. When it came time to do the state form we couldn't find the booklet. Rather than run over town looking for forms we went online and were able to get Adobe Acrobat versions of them. For some reason Wisconsin set the documents so they could not be saved to disk, you could only print them.

Special edition

In one of the exchange newsletters was an article on the history of computers that I thought you'd find interesting. It is five pages long and would take up this entire newsletter. So, it's being attached to the electronic version only since there are no printing costs.

President's Message

Marian Havlik

Chuck Whalen, longtime LCPC member and resident computer guru, will tell us everything we ever wanted to know about the Y2K problem at our April 28th meeting in Overholt. Do come and bring a friend.

SOME THINGS TO DO BEFORE Y2K

An article in the Wall Street Journal (20 Jan. 1999) suggested these Y2K strategies.

1. Save bank, brokerage-firm and mutual-fund records; check them against transaction records.
2. Make sure your bank accounts are within federal insurance limits.
3. Review your mortgage and consumer loans statements.
4. Verify direct deposits or payments starting in December.
5. Pay special attention to local income tax, property tax, and utility bills.
6. Make sure computer hardware, software and operating systems are Y2K compliant.
7. Get extra cash for week of Jan 1, 2000.
8. Don't panic.
9. Ask questions.

An April 1999 Quill Corporation newsletter says that "if it plugs in, check it out". This includes computers, printers, copiers, fax machines, and phone systems.

What have you learned new about your computer this week? I finally got a PCMCIA card to work in my laptop, so was able to get email from most locations when I was traveling in March (3425 miles of driving).

IS YOUR E-MAIL ADDRESS CORRECT IN THE LCPC NEWSLETTER?

MARCH MEETING: Steve Anderson, Trane Co. database Analyst, gave a demo and answered questions on Federal (and WI) TurboTax which he's used since 1993. Although filing on-line will save re-keying errors, the IRS presently charges for this service. Some members use tax software as a way to double check their figures.

Chuck Whalen will be giving the presentation on Y2K this month.

Membership Info and Treasurer's Report

Gary Stelzig - Treasurer

Welcome new members Alvin and Monica Fritz. They joined at our last meeting after attending a couple prior meetings. Renewals for April include: Joe Doucet, George Frisch, and Kathleen Ann Gallagher. Our checking balance as of 4/13/99 is $350.64. Expenses for March include $13.20 for stamps.

Reprinted from ***Phoenix PC Users'Group News,*** *newsletter of the Phoenix Personal Computer Users' Group, October 1998*

Win95&Y2K

William Grizzell

Windows 95 (OSR) OEM Service Release

If you are going to continue using Windows 95 into the Year 2000, you need to download a patch file from the Microsoft Internet site. This patch will resolve all versions of Windows 95 for the following issues:

- Explorer supports 4-digit dates but must be set in Control Panel, Regional Settings.
- Windows File Manager does not display dates beyond the year 2000.
- Also, COMMAND.COM does not display 4-digit dates from 00-79. Entering this command will return the error "Invalid Date".

To install the update, obtain "WIN95Y2K.EXE" from ***ftp://ftp.microsoft/softlib/msfiles.***

This file also contains both updated versions of COMMAND.COM and installs the correct version. The file also contains the updated version of WINFILE.EXE.

For more information on this subject, see Windows 95 (OSR) OEM Service Release at ***microsoft.com/technet/topics/year2k/product/user_view523xx.htm.***

free stuff

Members are reminded that exchange newsletters and free software for review are available at most meetings.

File Splitter

Jack Storlie

Steve Anderson gave me a tip at the last meeting that is worth passing on. I had raised the problem of how to get a large file onto a 1.44 MB floppy, especially if it is too large to do a PKZip. I had a 2.6 MB PDF file in mind that I wanted to transfer from my laptop to my desktop. Steve said to go to "zdnet.com" and get a shareware program called "filesplitter". I downloaded it and the program split the graphics file into two files, transferred them along with a little batch program that combined them after the transfer. It worked beautifully. It asked how many times I wished to split and gave me the option of up to 99 sections giving one the ability to copy a file of up to about 142 MB. I selected two (2) splits since my file was somewhat less that twice 1.44 MBytes. After transferring to the second system I executed the batch program that combined the two files and For those of us without Zip drives, etc. this is a real find.

To Order FILE SPLITTER send $6.50 (overseas add 2$ shipping and handling) to

CodeShop
19645 Detroit #190
Rocky River,Ohio 44116

Here is a verbatim copy from the Web page of CodeShop that gives a succinct rundown:

"File Splitter is a very useful utility for anyone who frequently needs to copy large files or programs onto floppy disks. The program offers a fast and accurate method of dividing large files into smaller, more manageable, file sizes that you can copy to floppy disks. In use, you need only select the specific file to be split and specify the number of pieces you desire. The program then divides the file into the sections you indicated. A reassemble option permits you to rejoin divided files to recreate the original, large file or program. File Splitter will allow you to divide any file into up to as many as 99 separate sections. This version is a maintenance update that adds an automatic reassembly feature and a disk space checker."

I will be glad to send my trial copy to anyone who wishes and/or bring disk copies to the next meeting.

some thoughts from your editor:

When I received the first message from Jack about this program my reply was "why, PKZip will do this and a lot more."Jack was unaware of the ability of zip to continue writing an archive over several floppies (span). So there is no file, or group of files, that are "too large to do a PKZip."

If you are not familiar with the "span" feature of PKZip check the help file if you are using a shell program such as WinZip. If you're still using the DOS PKZip simply type "pkzip" to bring up the command help pages.

I've used up to four floppies to transport a zip file. Of course, zip is commonly used for packing groups of files into a single archive. With the span feature you can fill disk after disk with your files and then reassemble them.

Member E-mail addresses

Please check over your e-mail address carefully for accuracy. If it isn't right let us know!

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List updated to April, 1999

Ulead PhotoImpact Suite 4

by Don Atkinson

Ah, where to begin?

The good

OK, if you have followed my previous advice, and own PhotoImpact (PI) Suite 3, continue reading to decide if you should upgrade.

If you don't own PI3, what are you waiting for? Buy this program, it should be the only image cataloging and manipulation suite you will ever need.

When I presented PI3 at the Holiday meeting I emphasized cataloging and enhancing your photos to correct common photographic shortcomings. There is a whole other side to the Image Editor (IE) that I didn't demonstrate, the many creative and special effects and filters. It is mainly in this area that IE4 differs from its parent program. This program has nearly all the features that you would have paid upwards of $750 for two or three years ago.

There are at least 47 different named effects. Nearly all of these effects have parameters that can be set to control the appearance of the effect. During my presentation I showed the use of the tone map, brightness and contrast, cloning, adjusting color hue and saturation levels and other effects. But I never got to the artistic effects.

It would probably take me this entire newsletter to name each effect and explain what it does. So I'll just give you some of my selected highlights. Your mileage will vary.

The *Natural Painting* effects make your image look like it was produced in watercolor, oils, charcoal, or colored pen. Experimenting with the settings may yield exactly what you're looking for. Before adopting my current wallpaper I had a photo that I'd used the *colored pen* effect on. The result was gorgeous, it appeared to have been painstakingly built up with hundreds, maybe thousands, of pen strokes. It was no longer recognizable as a photograph. Both Carol and I were very impressed at what could be quickly produced.

Kaleidoscope selects an area of the picture and repeats and/or reflects it in one of 14 different patterns. Place the selection box as you like, you can also modify the shape and orientation of the box as you wish. You can obtain beautiful and striking effects from the most mundane images.

The *Warp* feature goes back at least to Image Pals 2, the grandparent of PI4. Warping places control points on the image, as you move the control points you move the underlying pixels of the picture, stretching or pinching things as you see fit. New in this version is the *Creative Warp*, which creates kaleidoscope effects out of the entire image. When you select two or more effects you can make the transitions into a GIF animation to place on your web page.

Now we come to the *Transform* command. This allows you to paint on selected effects where you want them, without applying the effect to the rest of the image. As you may expect, you can set the parameters of the 13 different effects. This is a very powerful set of commands, allowing you to do pinpoint editing.

If you are cleaning up a large image IE4 allows you to open only a portion of the image for faster editing and screen redraws.

The *light control* allows you to apparently direct spotlights onto your image, emphasizing certain areas.

Perhaps the most exciting of the new effects are the eight under the category *"particle"*. Most of these tools allow you to change the effect to a wireframe box to allow easy placement.

☑ *Bubble*-places soap bubbles over your image, distorting the underlying objects. You can place the bubbles as well as changing their size, color, reflectivity. Quite a fun tool.

☑ *Star*-more controls to fine tune this effect than you will ever use if you live to see Y3K.

☑ *Fire*-another really fun tool, place fireballs on your image.

These tools I have found to be less useful, or at least less entertaining:

☑ *Firefly*-place balls of light of several different colors.

☑ *Rain*-the effect of water running down the window thorough which you are viewing the image.

☑ *Smoke*-below the level of your vision, there is a fire burning between you and the image.

☑ *Cloud*-lays a cloud image over your picture.

☑ *Snow*-covers image with white blobs.

The GIF/JPEG *SmartSaver* which was a plug-in in IE3 is now an integral part of the program. I demonstrated this extremely useful tool at the meeting.

PI4's *Album* program is a very slight reworking of PI3's version. The main improvement, and it is one, is an Album holding bar. In previous versions of Album you had to either have all your albums minimized on the work area or stored on the shelf. This meant that either the work area was crowded, making it difficult to open more than one album, or you had to "take album down from shelf" and load it into the Album program. In Album 4 all of your albums are stored in a bar on the side of the screen where you can instantly and easily choose which album or albums to view. When you are done with an album you click the close "X" on the command bar to return the album to the storage bar. The file management commands remain, allowing you to do complete file maintenance from within the program. Albums can now be exported to the web either as thumbnail pages or slide shows.

Since I don't design web pages, there are several programs in the package I haven't used. Last month, Carol wrote about the *GIF Animator.* Another program web designers should find useful is the *button creator.* Buttons may be any shape to start and then further manipulated with the warp control. The button can then have a shadow added from any angle.

Included with the program is a very nice 272 page manual explaining how to use the many features of the programs.

The bad

Ulead has made some deletions from this suite that had been included previously :

☑ *PhotoImpact Viewer*-a quick image viewing program that allows you to zoom in and out, and preview images before loading them. This program is available as a freeware download from www.ulead.com.

☑ *PhotoImpact Explorer*-like Windows Explorer but creates thumbnails of image files in your selected directory. Allows file deletion, renaming, etc.

☑ *Capture*-screen capture program allowing you to select the area to be grabbed.

During installation, PI4 will detect PI3 and asks if you would like to integrate the programs to preserve personal preferences, etc. Answer NO! If you say yes you will no longer be able to access PI3. It doesn't delete the PI3 directory but it does change the IE3 program so that when you click on that icon you open PI4's Image Editor.

When selecting areas of the image for object creation and layering the display in IE4 is about 20% as fast as IE3. The process is as fast but the display of the active area is very slow.

The ugly

When I installed IE4 it would not run. The install program had choked at the same point each of the five or six times I ran it. So, off to Ulead's web page to leave a question with the technical support people. There was a note that due to traffic there would be some delay before questions are answered, if at all. Well, it's been seven weeks without a reply.

Dear Ulead, please do one of the following:

1. Hire more technical support people so you can respond to questions in a timely manner.
2. Remove the "send mail to technical support" option on your web site. Don't waste your customer's time writing messages that will never be responded to.

I just visited *ulead.com* today and there was a note that technical questions should be answered within 48 hours.

Left to my own devices I read through the FAQs. Well down on the page was a notice that PI4 didn't work with graphics tablets! Fortunately, there was a rewritten version of the .exe file that did, nearly a 4 meg download. I got the file and installed it, everything worked beautifully. Since this is a known problem, why doesn't Ulead include a small note in the package explaining the problem and directing buyers to the web site?

In conclusion

For purely photographic work there is not a great deal of difference between IE3 and IE4. But for more creative work IE4 is a significant advance. Since I don't do web page design I can't really comment on the web specific programs, although they certainly look useful.

Should you upgrade to PI4 if you own PI3? Hopefully, this review will help you make that decision.

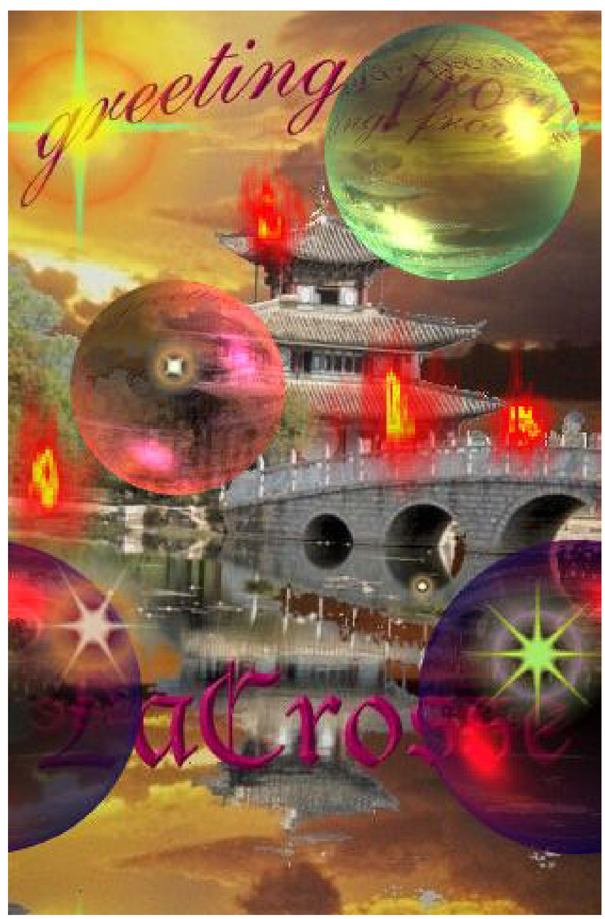
Should you buy PI4 if you don't own PI3? Yes! If you have any interest in working with images PhotoImpact is the best deal going. Almost any of the included programs are worth the package price.

To buy

You can purchase directly from **http://www.ulead.com/pi/purchase.htm** for $99.95. On this page you'll find a hot button to allow you to print out a $20 rebate coupon that apparently applies if you buy from the site or from another source.

This page will take you directly to a page listing retail dealers, prices and contact information: **http://www.shopper.com/prdct/589/672.html?pt.lgnome.hd**

Please go to page 12 for a complete explanation how this picture was made.



*Reprinted from **Datasheet II,** Newsletter of The Tarrant County Junior college Computer User Group, February 1999*

Y2K Leap Year

Dr. Emilo Bombay

Dear Dr. Bombay: I have heard that there will be no leap year in the year 2000. Due to some imperfection in the leap-year system, the century years are skipped. I need to do some system testing very soon and I need confirmation.

Leapin' Lizard

Dear Lizard: Go back to your calculator. Or just take a look at a calendar. Guess what 2000 is?

Leap years were instituted to keep the calendar honest. It takes 365.2422 days for the Earth to orbit the sun. so you have to make up for those extra fractions of days every once in a while with a leap day. It's like when the bank messes up my statement each and every month, and I have to make an adjustment to my check book to compensate for their stupid mistake.

There's a standard mathematical formula for figuring leap years, even though it's a bit off. Once upon a time, the head calendar guys decided there should be 97 leap years for every 400 years, yielding an average calendar year of 365.2425 days. I know, that all seems like nit-picking, but even with all those decimal thingies, the formula is still off by three days every 10,000 years. Imagine how embarrassing that will be for the Daytimer people, assuming the Earth isn't a smoldering heap of rubble by then.

Hopefully, the programmers who worked on your software didn't cut class for the Star Trek convention the day they taught that in Math 101.

First, determine if the year is divisible by 4. It's probably a leap year, but you're not through checking. lf it's also divisible by 100, it's not a leap year. Well, unless, of course, it can also be divided by 400.

Continued on page 5

*finally, also from **Datasheet II,** Newsletter of The Tarrant County Junior college Computer User Group, February 1999*

Getting Your PC Ready for the Millennium

***By Michael Stroh, Fort Worth** Star Telegram*

For a moment, forget about planes falling from the sky. Forget about power failures and other millennia mayhem caused by the Year 2000 computer glitch. It's time to think about the personal computer humming in your family room.

If you believe the Year 2000 date recognition problem affects only antiquated mainframes, think again. Greenwich Mean Time, a British maker of Year 2000 repair software, estimates that 93 percent of PCs built before 1996 will have problems ringing in the millennium.

Even if your PC is barely out of the box, don't gloat yet. Eleven percent of computers built in 1998 may have problems recognizing the date change, according to the Y2K consultant. Microsoft recently announced that Windows98 -which it touted as impervious to the Y2K bug - may display dates incorrectly in rare situations.

There are three potential trouble spots: hardware, software and data. To understand how the Y2K problem could affect your hardware, consider the convoluted way a Windows-based PC tells time. Your computer contains a battery-powered clock on its main circuit board that ticks off the time and date even when your computer is turned off.

The clock records only the last two digits of the year (the "99" in 1999) while it tucks the first two digits representing the century (the "19" in 1999) in a tiny section of memory known as the "century byte." When you flick the power switch, a tiny program embedded in a chip called the BIOS is summoned to life. The BIOS, or Basic Input Output System, calculates the date by fetching the last two digits of the year from the real-time clock and the first two digits from the century byte. Then it delivers this information to Windows or whichever operating system your PC happens to be running. Windows, in turn, passes the date to application programs such as word processors, spreadsheets, and finance managers.

Here's where the millennium can foul things up: The century byte doesn't change. So when the clock strikes midnight December 31, 1999, the real-time clock will flip from 99 to 00, but the century byte will stay put at 19. When you flip on your PC the next morning, a faulty BIOS will think the year is 1900. But there's a twist. The year will register on your screen as 1980, since that's the beginning of time according to Microsoft. A good BIOS, one that has been modified to deal with the millennium bug, will notice the error and quickly replace the "19" in the century byte with a "20."

How do you know if you have a good BIOS or a rotten one? First, check your computer maker's Web site. Dell (www.dell.com/year2000) for example, allows you to enter the make and model of your PC to find out whether it's OK.

On the Internet, you'll also find several free programs that will automatically test your computer's BIOS and tell you if it can handle the millennium data change. Try PC Magazine's Year 2000 Web site (www.pcmag.com/y2k) for a complete list.

If your PC is afflicted with the Y2K bug, you have to exterminate it. In some cases you can do the job by running a program that changes the BIOS. In the worst case, you may have to replace the BIOS chip itself- a job for a competent technician. Either way, call the PC manufacturer or check the company's Web site.

Once you've solved the hardware problem, you're still not in the clear. "Software is a bigger problem," says Michael S. Lasky, senior associate editor at PC World magazine (www.pcworld.com), which offers an in-depth look at the year 2000 glitch in its latest issue

According to Lasky, you have to consider all your software. Ifyour PC is running Windows 3.1 or earlier, you may be out ofluck. Microsoft is not offering a Y2 K update to that operating system nor are most software makers going to fix aging software that runs on it. Your best bet may be upgrading to Windows 98 or buying a new machine.

Windows 95/98 users have more help available. Ifyou use Windows 95, you'll have to upgrade the File Manager, which was inherited from earlier versions of Windows and won't display dates after Dec. 31, 1999. Get a software fix at support.microsoft.com/support/downloads.

Windows 98 users can find a fix for its recently announced Y2K ills at windowsupdate.microsoft.coml/ or by calling (800)363-2896 for a free CD-ROM.

The final hiding place for the Y2K bug is the data stored on your hard drive, especially in spreadsheets and databases. If you're in the habit of entering two-digit dates into your spreadsheet - such as "12/6/98" instead of "12/6/1998" - you may have problems.

When you enter a two-digit date, spreadsheets or financial software programs are forced to make assumptions about which century you mean. You'll have to comb through your crucial spreadsheet and database files to find any that contain abbreviated dates and replace them with dates that contain the full, four-digit year, a tedious and possibly impossible chore. So you may want to buy a program to do it for you.

TWO of the best are Check 2000 PC Deluxe (Greenwich Mean Time-UTA, $59.95) and Norton 2000 (Symantec, $44.95). These programs not only comb your data to find potential Year 2000 date conflicts, but also check and repair your BIOS. In addition, they will examine every program on your machine to ferret our known Y2K bugs.

Dr. Bombay–Continued from page 4

There is no real imperfection in the leap year system, but there maybe in the way your programs are written. But what's the worst thing that can happen? With all those other undiscovered millennium bugs contributing to the end of civilization as we know it, we'll be sitting in caves gnawing on rodent bones by Feb. 29,2000. anyway. Save 'me a tail!

Dear Dr. Bombay: Is there access to past columns? Sometimes I remember having seen something that may be relevant to a problem I'm having now, and it would be great to search your past columns for the answer.

Devoted Reader

Dear Reader: You mean you haven't been keeping a scrapbook? I'm deeply hurt. You might try a Yahoo! search, but my guess is that all that past wisdom is like so much snail slime washed away by the spring rain. Gee, that's so poetic!

Some publisher could probably be making big money with a book of past columns by noted computerologist Dr. Emilo Bombay. The really smart ones can reach him at drbombay@startelegram .com, or they can send an advance to him at Fort Worth Star-Telegram, Box 1870, Fort Worth 76101. Cash preferred. Fax:390-7257.

Fort Worth Star-Telegram, Dec. 1998

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General meetings are held the last Wednesday of each month in the Lutheran Hospital, either in the Overholt Auditorium or conference room 1 in the basement, check page 1 for location. The combined November-December meeting is held the second Wednesday in December. Meetings begin around 7:00 PM. Everyone is welcome, attend a meeting or two with no obligation to join.
Dues are $20 for one year following payment. Membership entitles you to attend meetings, tap into the corporate wisdom, receive special user group discounts from publishers and others, receive (and contribute to) this newsletter. You may also obtain software provided by publishers for review of the product. Unsigned articles are by the editor.
Other user groups are welcome to reprint with proper credit.
The newsletter is printed the Wednesday before the meeting, submit articles by the 13th of the month. Upload to *deapublish@aol.com* or phone me at 784-0150 if you want to deliver the article. Submit in ASCII, AmiPro, orWP5.
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From the December 1998 issue of "Sacra Blue" the Sacramento PC Users Group Magazine

Computing's first 50 years

by Milt Hull

This month, I want to talk about the first computers and why bugs are called bugs. Before I do that, I want to talk about the first computers. So I searched the Internet and found the following information researched by Dilys Winegrad and Atsushi Akera of the University of Pennsylvania.

Today, the northeast comer of the old Moore School building at the University of Pennsylvania houses a bank of advanced computing workstations maintained by the professional staff of the Computing and Educational Technology Service of Penn's School of Engineering and Applied Science. There, 50 years ago, in a larger room with drab-colored walls and open rafters, stood the first general-purpose electronic computer, the Electronic Numerical Integrator And Computer, or ENIAC.

ENIAC spanned 150 feet in width with twenty banks of flashing lights indicating the results of its computations. ENIAC could add 5,000 numbers or do fourteen 10-digit multiplications in a second-dead slow by present-day standards, but fast compared with the same task performed on a hand calculator. The fastest mechanical relay computers being operated experimentally at Harvard, Bell Laboratories, and elsewhere could do no more than 15 to 50 additions per second, a full two orders of magnitude slower. By showing that electronic computing circuitry could actually work, ENIAC paved the way for the modern computing industry that stands as its great legacy.

The First Computer

ENIAC was by no means the first computer. In 1839, Englishman Charles Babbage designed and developed the first true mechanical digital computer, which he described as a "difference engine," for solving mathematical problems including simple differential equations. Ada Countess Lovelace a member of the aristocracy and the daughter of Lord Byron, assisted Babbage in his work. They worked out the mathematics of mechanical computation, which, in turn, led Babbage to design the more ambitious analytical engine. This machine, which was never built, encompassed many principles of computer operation that were rediscovered a full century later.

ENIAC was not the first electronic computing device. By the early 1930s, physicists were already using radiation counters, which employed vacuum tubes (as did the ENIAC), and several laboratories had produced devices known as ring counters, which could count from one to ten. In the later 1930s and early 1940s, several people and agencies made at least three separate efforts to use electronic circuitry to address the problem of computation, including John Atanasoff, British Intelligence, and IBM.

Between 1937 and 1941, John Atanasoff, who taught physics at Iowa State College and had an interest in the general problem of high-speed computation, set out to design a specialized machine that could solve a complex system of linear equations. The Atanasoff-Berry Computer, developed with substantial contributions from graduate student Clifford Berry, was close to if not fully operational by 1941.

By 1941, IBM, whose expertise then was in punch-card tabulating equipment, had also designed an electronic multiplier. In the late 1 930s IBM began to work with Wallace Eckert of Columbia University to explore how their equipment could be used in various scientific applications. It became clear that an electronic multiplier would greatly speed up the kinds of computations being employed by Eckert. IBM had collaborated with him in designing such a system.

Only British Intelligence's Colossus, a computer built at Bletchly Park around 1942, was a large-scale electronic machine. Atanasoff and IBM were limited by available funds, whereas Bletchly Park and the Moore School tapped into the immense resources for research and development resulting from the war effort. Though Colossus was highly innovative, none of these specialized computers, unlike the ENIAC, was designed to carry out general-purpose computation. Instead, Colossus served a specific purpose, much the way specialized particle detectors are designed by experimental physicists to deal with a specific set of phenomena in high-energy physics. Colossus was a special-purpose machine developed to decode secret messages, and performed only the logical, as opposed to arithmetical, operations necessary to defeat the famous German code machine Enigma.

The Atanasoff-Berry computer's speed was limited by its choice of an electromechanical means of storing numbers, namely the coefficients representing the system of linear equations. As long as Atanasoff's principal scientific interest remained the theoretical physics problems that motivated the machine's design, his computer was a novel and sufficient solution for those needs. Since he chose to use electronics rather than approaching the problem, as he night have done, by means of a complex system of mechanical relays, this reflected a combination of Atanasoff's interests as well as the effectiveness of electronic circuitry with which, like ENIAC's inventors, he had some familiarity.

Invention is almost always a continuous process, with parallel efforts and simultaneous discoveries the norm rather than the exception. This was true for human powered flight as well as for the invention of the electric light bulb, and James Watson and Francis Crick's discovery of the structure of DNA depended greatly on other theoretical and experimental work. This creative tradition of building on the best of the past was true for ENIAC.

Despite its many innovations, ENIAC lacked certain features considered essential to modem computing systems. Without the ability to store a program in its own memory-a feature known as the stored program concept-ENIAC had to be manually wired to execute a particular program. John Mauchly and J. Presper Eckert of the Moore School along with John von Neumann and others contributed to this concept. The first machine to operate with this particular design was the EDSAC computer built by Maurice Wilkes at the University of Cambridge in 1949. Neither ENIAC nor its successor, the EDVAC, had indexed memory and random access memory. Von Neumann and Herman Goldstine at the Institute of Advanced Studies and a team of researchers at the University of Manchester did the most to develop and formalize early computer architectures. Conditional branching, such as the IF statement in a BASIC or FORTRAN program, was not part of the ENIAC's original design.

The Moore School computer nonetheless provided a crucial step in a progression of technological advances; it also served to convince military scientists and technical experts of the value and practicability of electronic computation. The resulting enthusiasm was compounded by the advent of the Cold War; use of electronic computers in the development of the hydrogen bomb laid the foundations for the subsequent computing and information processing industry that has transformed the world since World War II.

ENIAC and the Electronic Computing Revolution

In the 1940s, the nation at war was ready for a breakthrough in computing techniques. At the University of Pennsylvania's Moore School of Electrical Engineering, there was fertile soil. A course in the design of electromechanical instruments had been instituted at the school and a differential analyzer, the state of the art machine for general computations at the time, was in constant operation as a result of the national emergency.

Scores of "human computers"-young women with mathematics degrees, supplemented by specially trained recruits from the U.S. Army's Women's Auxiliary Corps, were engaged in the ballistics computation work assigned to the University. The rate of change in artillery designs and the changing patterns of warfare created demands that exceeded their computational capacity. At any other time, the ideas worked out by John Mauchly and J. Presper Eckert-only 32 and 23 years old at the time they met-would have been dismissed as impractical. Under other circumstances, their ideas would have been rejected for the simple reason that the ENIAC would cost too much to build.

John Mauchly's interest in calculating machines was associated with a dream he had of solving "the problem of the weather," an interest his father had shared during his lifetime working on similar problems at Carnegie Institute of Washington. Meteorological research necessitated the computation of enormous amounts of statistical data, and Mauchly, a physics professor at Ursinus College, was constantly looking for ways to achieve more and faster computations than were possible using mechanical desk calculators.

At Ursinus, he had already investigated the possibility of using cold cathode tubes. Although these were very much slower than the higher-powered vacuum tubes and had a much more limited margin of operation, they were less expensive and consumed a far smaller amount of electrical energy, making projects more manageable. Mauchly's work on digital electronic circuitry was not sufficiently developed to help him in his meteorological research, and for this purpose he built a somewhat more familiar analog device that he named a "harmonic analyzer."

Mauchly still considered himself a meteorologist rather than a specialist in computational devices. But he was also all too aware that most meteorologists considered his theories "crackpot notions." In fact, he had been so sure these colleagues would not take the statistical results of the work with his "harmonic analyzer" seriously that, when the American Association for the Advancement of Science met at the University of Pennsylvania in 1940, he delivered a paper on weather statistics to the physics section. One of those in the audience who took a clear interest in Mauchly's talk was John Atanasoff.

The two researchers spent considerable time discussing their mutual interests at that talk and on subsequent occasions. Though the machine developed by Atanasoff and Berry was a special-purpose computer, it used all-electronic circuitry to perform the addition and multiplication operations at the heart of modern computing equipment. That all-electronic circuitry received great attention because Mauchly visited Atanasoff and Berry in the summer of 1941 to look at their computer with its electronic calculating circuitry.

The use of an electromechanical device to store data and the intermediate results of computation limited its overall speed. Mauchly, who was interested in high-speed, general-purpose computation, reflected his own somewhat different vision for the development of modern computing circuitry when he commented on the relatively slow speed of the design. Seeing the Atanasoff-Berry machine may have encouraged Mauchly by indicating that a larger general-purpose electronic computing machine might be a possibility.

When the U.S. went to war in 1941, many of the Moore School's faculty was called away on secret military research projects or active service. With many new demands for military and communications technology, the War Department sponsored courses of training in the operation of increasingly complicated weapons systems.

The government underwrote the Engineering, Science, and Management War Training (ESMWT) program at the Moore School. Mauchly came to Penn to learn about the latest electronic devices and techniques, and he and Arthur Burks, another Ph.D. enrolled in the ESMWT program, were promptly hired to replace Penn professors who had been called up for active duty.

Meanwhile, the brightest graduate student in the Moore School at the time described as "undoubtedly the best electronics engineer in the Moore School"-was J. Presper Eckert, Jr. Still in his early twenties, Eckert had already developed an electronic device for measuring magnetic fields and for recording this information on film. The Navy had adopted Eckert's mechanism to assess the performance of their airborne minesweeping operations, which were then employing magnetic instruments. Eckert had also already begun his career as an inventor by securing a patent for recording sound on film using diffraction patterns. As an instructor at the Moore School in the summer of 1941 Eckert was hired as an assistant responsible for running the electronics lab associated with the ESMWT course.

The laboratory work of the ESMWT was not much different from what John Mauchly had been teaching his own students at Ursinus, which left plenty of time to chat with Eckert about his major preoccupation, a search for a way to apply electronic techniques to the problems of high-speed computation. Mauchly and Eckert continued their discussions over coffee and fruit sundaes at a local restaurant called Linton's, and in the room containing the Moore School's differential analyzer, the only place with air-conditioning in those early days.

Eckert pronounced Mauchly's ideas on electronic computation to be clearly in the realm of the possible. Using all his engineering creativity, and native genius, Eckert set about addressing the problems that would have to be worked out. Encouraged by Eckert's receptivity to his theoretical notions, and spurred by the serious possibility that his ideas might be implemented, Mauchly wrote a five-page memo on the subject in 1942 entitled, "The Use of Vacuum Tube Devices in Calculating." This memo became the basis of the report subsequently submitted by The Moore School to the Army's Ballistic Research Laboratory.

Faster Tables

With pressure to produce firing tables for new artillery continually mounting, the need to find faster ways to perform ballistics computations became increasingly urgent. Calculating a trajectory could take up to 40 hours using a desktop calculator. The same problem took 30 minutes or so on the Moore School's differential analyzer. But the School had only one such machine, and since each firing table involved hundreds of trajectories, it might still take the better part of a month to complete just one table. In his report, Mauchly argued that an electronic machine that could perform 1,000 multiplications per second would be able to compute complete ballistics trajectories in minutes rather than days.

When the Allied forces landed in North Africa in 1943, they found themselves operating ordnance in terrain that was entirely different from anything they had previously encountered. The military suddenly needed an entirely revised set of firing tables. With requests growing faster than the calculators could handle them, the backlog of firing tables mounted. This military emergency provided the final impetus for large-scale experimentation in the field of electronic digital computers.

Mauchly's memo was turned into a proposal that could be supported by the Bureau of Ordnance by Captain Herman Goldstine, a mathematician stationed at the Ballistic Research Laboratory (BRL) located at the Aberdeen Proving Ground in Maryland. Goldstine realized that the military was more likely than any other organization to take a calculated risk in time of war. With the approval of John Grist Brainerd, who chaired an important faculty committee, Goldstine presented Mauchly's concept to his superior and arrangements were made for a presentation to the head of the BRL and its chief scientist, Oswald Veblen. On April 2,1943, a proposal for an "Electronic Diff. Analyzer" was submitted. The name was calculated to forestall anticipated skepticism by associating the proposed computer with the existing differential analyzer. In fact, as a digital device, the computer would solve differential equations-the particular mathematical equation used in ballistics problems-by differencing rather than differentiation, the dominant approach at the time. This double entendre was a deliberate subterfuge. More important, the computer described in this report, unlike all previous devices, was to be fully electronic and could compute a ballistic trajectory in less than five minutes.

After delivering the initial proposal, Eckert and Mauchly continued to work around the clock to produce supporting arguments and data in anticipation of possible criticisms. On April 9, Eckert's 24th birthday, they presented a more detailed proposal. In May, an agreement was reached, and on June 5,1942, contract No. W670-ORD-4926 was signed by the Trustees of the University of Pennsylvania and the U.S. Army Ordnance Department with Brainerd as project supervisor and Eckert as chief engineer. Mauchly was the project's principal consultant, and Goldstine the Army's technical liaison. With a contract now in hand, the machine was named the Electronic Numerical Integrator And Computer, ever after to be known as ENIAC.

Progress Report, 1942-1946

The machine was funded by the United States Army and constructed at the University's Moore School of Electrical Engineering in 1942. Although the impetus for the computer's construction was its function to serve the ballistic needs of the Army, construction was not competed until after the end of the war. By that time, the military foresaw ever-greater numbers of applications than anticipated. The first public demonstration of ENIAC in February 1946 truly marked the beginning of the postwar revolution in digital electronic computation.

In 1942, the first critical problem that had to be solved was construction of a reliable decade counter-an electronic subassembly designed to store and increment numbers from zero to nine. The decade counter was the key component used in a larger unit known as the accumulator, which basically consisted of ten decade counters and their associated control circuitry. Assembled in this fashion, the accumulator could add and store positive and negative numbers from zero to ten billion. Four different types of counters, some based on designs developed elsewhere, were tried out during the first six months of the project.

The major obstacle the inventors faced was the reliability of the vacuum tubes that were the heart of electronics, which some considered an insuperable problem. Unlike the relatively small number of vacuum tubes used in radios, long-distance telephone systems, and even the more complicated fire control systems (developed by the military for antiaircraft guns), ENIAC employed vast numbers of these tubes, which could fail unpredictably during long periods of operation. With 17,480 tubes operating at a rate of 100,000 pulses per second, there would be 1.8 billion chances of a failure occurring each and every second. Malfunction of any one of the thousands of tubes, resistors, and condensers could ruin the project. As with any digital calculation, a single failure could alter a number dramatically; one glitch could cause an artillery shell being modeled by ENIAC to suddenly be traveling down instead of up or a hundred times faster than its projected velocity.

Eckert and his team of engineers tested various vacuum tubes, studying when and why they failed in order to eke out a more delicate mode of operation that would increase the life of individual tubes. Lower power levels and careful design alternatives were sought to minimize the amount of work demanded of the vacuum tubes. Most tubes were found to fail early or late in their lives, which resulted in a regimen of preventive maintenance ensuring that only the "healthiest" tubes were used in the ENIAC.

Beyond these careful vacuum tube studies, Eckert instituted rigid requirements for careful design and construction that had to be met by all engineers and technicians on the project where even a faulty soldering joint could render the entire machine useless. Universal design standards, established collaboratively by all of the Moore School engineers, ensured that components such as resistors as well as the vacuum tubes, operated at a certain percentage of their rated capacity. As a result, ENIAC consistently operated for periods greater than the twelve hours Goldstine had proposed as an optimistic estimate. In his account of these early days, Goldstine called Eckert a "superb engineer":

Eckert's contribution, taken over the duration of the project, exceeded all others. As chief engineer he was the mainspring of the entire mechanism. Mauchly's great contributions were the initial ideas together with his large knowledge of how in principle to implement many aspects of them.

The ENIAC contract described Mauchly's status as that of principal consultant. As a physicist, Mauchly was not one of the regular members of the ENIAC engineering team, though he understood certain concepts about the uses of high speed computing that others were only gradually beginning to comprehend.

During the entire period of its development, work on ENIAC was shrouded in secrecy. No papers could be published, and discussion was limited to its initiates. Herman Lukoff, an undergraduate hired during the first summer of the project to design a pulse generator-the unit that generated the "ones" and "zeroes" that were both the data and the control signals for the machine-had no knowledge of its purpose. Lukoff was so excited by the work that he returned as a graduating senior to engineer the power supply for the first two accumulators, a task he completed only hours before he was inducted into the Navy.

ENIAC Comes Online

In May 1944, the ENIAC team was able to demonstrate ENIAC's workability in what has come to be known as the "two accumulator" test. In this, one accumulator was made to increment its value from one to five. The number was then transferred into the second unit 1,000 times using the limited control circuitry housed in each accumulator, all in just over one fifth of a second, or about the blink of the eye. At the end of the test, the second accumulator sat idle, displaying the number 5,000-hardly the most impressive of mathematical feats. This demonstration nevertheless caused Dean Harold Pender of the Moore School to express "moderate optimism." As a veteran in the electrical engineering field, the dean knew the risks but he also had great faith in his school's engineers. Even so, a great many people continued to doubt that the machine would ever function.

For the inventors, it was a time of elation. They would gladly have continued to devise newer and cleverer means of solving problems. But at a certain stage it became necessary to "freeze" the classified design in the interest of completing the task at hand. Nonetheless, as the end of the war approached, engineers at the Moore School began to think intensively about developing a more sophisticated computer.

From the start Mauchly had envisaged the construction of a general-purpose computer, and ENIAC was designed to address this principal concern. Eckert had proposed ways to overcome what he recognized as the major shortcoming of ENIAC, which introduced most of the fundamental elements of hardware design that have become the basis of subsequent computing machinery, with the exception of internally stored instructions. Much of the early discussions focused on the need to increase the machine's memory, for ENIAC could store only 20 numbers in high-speed memory. But the stored program would not be implemented until ENIAC's successor was built.

Eckert had experimented with acoustic delay lines early on; drawing on those developed by William Shockley at Bell Laboratories. Now he and his staff investigated the possibility of developing mercury delay lines suitable for use as computer memory. This complex assemblage of mercury tanks, heating units, and electronic control circuitry became the basis of the principal memories in the next generation of computers at the Moore School and elsewhere. These included the EDSAC developed by Maurice Wilkes at Cambridge University (1949), the SEAC developed by Samuel Alexander at the National Bureau of Standards (1950), and the EDVAC, the second large computer built at the Moore School (1951). Eckert and Mauchly also used mercury delay lines in the BINAC (1949) and UNIVAC (1951), two computers they designed and built after leaving the Moore School to establish an independent company.

The idea of storing a program in the same high-speed memory unit as the numerical data was a major innovation to emerge during ENIAC's construction. It was all too apparent that the manual wiring required to program ENIAC would present an enormous burden that had to be avoided. In spring 1944, Eckert, Mauchly, and other members of the project staff discussed ways of setting up and controlling a computer automatically.

In June 1944, the world-renowned mathematician John von Neumann joined with the ENIAC team to discuss the formal design of the next generation of computer systems. Most likely drawing upon an earlier version of the stored program concept developed by the famous British mathematician Alan Turing, von Neumann laid out a formal description of the stored program concept as it might be realized in a high speed computer design. The result of his efforts was "The First Draft Report of the EDVAC Design," a document authored by von Neumann but based at least in part on ideas contributed by others.

In late 1944, the Army Ordnance Department granted a supplemental contract authorizing the Moore School team to begin work on the EDVAC, or Electronic Discrete Variable Automatic Computer.

The Birth of Modern Computing

ENIAC was completed too late for its original purpose of calculating firing tables for artillery weapons. Instead, the first real task assigned to ENIAC during its test runs in 1945 involved millions of discrete calculations associated with top-secret studies of thermonuclear chain reactions-the hydrogen bomb. Nicholas Metropolis and Stan Frankel, both from the Los Alamos Scientific Laboratory, were sent to Philadelphia to set up and supervise the first set of nuclear physics calculations to be run on an all-electronic computer. The first set of calculations was executed on ENIAC in November 1945, and subsequent calculations continued through the time of ENIAC's formal dedication in February 1946.

While many military projects were terminated at the end of the war, ENIAC was not among them. The military's interest in high-speed computing and its use in the nuclear weapons development program ensured the federal government's continued support of the nascent technology. At the same time, the computer's value for applications far different from problems associated with military weapons and national security came to be recognized by the military and others.

A press release issued by the War Department on the occasion of ENIAC's dedication described "The Uses of Computers in Industry," with the computer seen as a means of accelerating economic growth and establishing civilian industries after a devastating war. Commercial uses for computing started to be introduced within a decade of ENIAC's development. Computer technology soon matured into a civilian industry whose growth has been astounding.

During the 1950s, the demands of advanced weapons programs, scientific research and engineering development, and an expanding awareness of data processing applications laid the foundations for a civilian computer industry. The early leaders were the Univac division of Remington Rand Corporation and IBM. Remington Rand (later the Sperry Rand Corporation and now Unisys) acquired the Eckert-Mauchly Computer Corporation in 1950, and was the initial leader in the field.

IBM, which introduced the IBM 701 in 1952, gained a predominant position in the computer industry by the mid-1950s largely through sound product strategies and the efforts of their sales and marketing organizations. Other early manufacturers included Engineering Research Associates (ERA). In 1951, the ERA 1103 computer was actually the first computer system available on the open market. Remington Rand acquired ERA in 1951.

Users were critically important to the sales of early computers. The computing needs of the advanced design efforts of military systems engineering firms, and particularly of the aviation industry in Southern California, provided a major impetus for the growth of IBM's business. The expanding bureaucracies of the federal government-whether in the military logistics and procurement operations of the USAF Air Material Command and the Office of Air Comptroller, or the records keeping of the Census Bureau U.S. Patent Office, or the Social Security Administration created a large market for data processing systems.

Users also contributed by providing a market for computer Systems as well as much-needed technical expertise in the early operation of computer systems. The 1950s saw a severe shortage of scientists and engineers, and computer companies had a hard time financing large programs of computer development. In this situation, volunteer user associations such as the IBM users group SHARE (established in 1956), came up with much of the early applications and systems programming, along with hardware modification recommendations that IBM's own technical staff was unable to provide.

Solid-state electronics, transistors, and integrated circuits were the revolutionary developments that made possible the miniaturization of computers and heralded the world of today. For a time, development was concentrated in the Northeast, where people like Ken Olsen, the founder of Digital Equipment Corporation (where the first minicomputers were produced), contributed to the rapid growth and technical innovations of the industry. Then the action moved out west; the increased use of electronics in the U.S. had created regional pockets of distribution where integrated circuits and other electronic components could be picked up almost as easily as a case of Coca-Cola. Many other people, for whom computer components were as familiar as books, typewriters, or hand calculators, worked as hard as the first generation of computer pioneers to bring about the microcomputer revolution.

ENIAC is one in a long series of innovations that made possible the computing industry of today. Building on past insights and a range of prior work, such as the electronic ring counters designed by RCA, the ENIAC team was also inspired by other individuals, such as Moore School faculty member Irven Travis, one of those called up for military service, whose writings on ganged, mechanical adding machines greatly influenced Mauchly's first sketch of the
ENIAC's architecture and brought him to Penn for the ESMWT course in the summer of 1941. ENIAC's design also pointed boldly to the future, incorporating concepts and innovations that went well beyond those developed by earlier researchers and inventors. Regrettably, a dispute over the ENIAC patent soured the memories of many people associated with the ENIAC project and other efforts. The Atanasoff-Berry Computer was judged to be "prior art" by the court in 1973, thereby rendering invalid the ENIAC patent as filed by Eckert and Mauchly.

With the 50th anniversary of modern computing, it's time to recognize the common heritage and the wide range of contributions that so many creative individuals have made to the field of computing. In planning their public demonstration in 1946, it occurred to Eckert and the rest of the ENIAC team to place translucent spheres-ping-pong balls cut in half-over the neon bulbs that displayed the values of each of ENIAC's twenty accumulators. Ever since, the flashing lights of computers, often called electronic or giant "brains" in the early years, have been part of the scene involving computers and science fiction.

Today it is impossible to think of a world without computers, hard to grasp the ideas from which these first computers were developed, and hard to imagine that what we take for granted might have been strenuously resisted in the past. The fact is that scientists and administrators involved were skeptical-and with good reason. That skepticism appears throughout the written records, and there were large doubts as to whether computation by electronic machines would ever be a practical reality.

If it seems barely credible today that scientists, engineers, and businessmen five scant decades ago might not at first have grasped the implication of the new technology, this has been the case more often than not throughout history. Variations on the theme of, "Who needs it?" are followed by the reasons why it can't be done. Examples of early responses to innovations that went on t9 change the modern world range from Lord Kelvin's observation that radio had no future to Harry M. Warner's skepticism about the market for talking movies. John Logie Baird was considered a lunatic, possibly dangerous, for claiming to have "a machine for seeing by radio." Even in the 1950s, Britain's Astronomer Royal dismissed the notion of space travel as "utter bilge." The development of computers has come a long way since ENIAC's lights first blinked on; but this is only the beginning. The societal transformation brought about by computers worldwide has only just begun. The next 50 years may well be even more exciting than the last 50.

What About Bugs?

Now I have a bonus answer to the question, “Why are bugs are called bugs?” Back when they were running the ENIAC, it quit working for a while. They checked and rechecked the system over and over for several days. Finally they found a moth in one of the relays that made the system calculate wrong. When somebody asked what was wrong with the system, they said it had a bug in the system. Ever since that day, computer errors are called bugs.

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"Greetings from LaCrosse" picture techniques

This is the image I demonstrated at the close of the meeting, although I didn't have time to get to the text placement.

a)Background terrain selected in the building picture.

b)mask inverted and building and water made an object.

c)select all of sunset picture and make an object.

d)sunset placed behind building using layer stacking command and image merged.

e)water in foreground selected, mask inverted, building and sunset sky made object.

f)sunset object flipped vertically and applied as a reflection, moved behind building and sky, image merged onto one layer.

g)"greetings from" text pulled to follow half circular path and 3-d shading applied. "LaCrosse" in a different font, with 3-d shading.

h) bubble filter applied. Notice internal reflections, especially in the top bubble. For demonstration purposes, bubbles have different colors. Bottom two bubbles are same color because they are a unit of two bubbles. Fire and star effects are not reflected in bubbles because they were added later.

i)stars added. Notice different colors, sizes, number of points and different levels of transparancy for demonstration purposes.

j)fire added. Yes, if I were really serious about this picture I should have the fire reflected in the water. But this picture is to demonstrate the effects, not for any great artistic merit.

As always, your questions and feedback are welcome to **deapublish@aol.com**

Drop me a note if you'd like the full size "Greetings from LaCrosse" image (35k)